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Man is (Still) Not Lost

*Revisiting the Mark 11 Navigational Wristwatch
Part 1: General Information*

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In January and February 2004, the article ‘Man is Not Lost...’ was published here in the *Horological Journal*. That article comprised most of the knowledge that the authors had gathered up to that point about one of the most famous, if not the most famous aviator’s watch of all time: the Royal Air Force Mark 11. Now, 16 years later, the time has come to report on additional findings that have been made since then.

1.1. The Soft Iron Shield Against Magnetic Fields and Other Case Features

1.1.1. The Soft Iron Cage, its Purpose and its Origins

The distinctive and best-known feature of every Mark (Mk.) 11 case is the soft iron cage that completely encloses the movement and protects it against magnetic interference. The soft iron cage comprises the dial, the retainer ring holding the movement and an inner rear cover over the rear of the movement, **Figure 1**. In accordance with the principles of a Faraday cage, the soft iron cage deflects the magnetic field, causing it to by-pass the movement, thus shielding the interior. The inner rear cover presents a completely unbroken surface, whereas the retainer ring and the dial each have an opening respectively for the winding stem and the central drive to the hands. These two openings allow magnetic fields to find their way into the interior of the soft iron cage to a minor extent; to compensate this effect the Mk. 11 was fitted with a non-magnetic escapement with a Glucydur balance, a Nivarox balance spring (with Breguet overcoil) and a balance staff, regulator curb pins and hands made of non-magnetic material. The Mk. 11 is able to withstand magnetic fields of up to 70,000 Amperes per metre (A/m); in accordance with ISO 764:2002 a watch is considered anti-magnetic when it can withstand a magnetic field of 4,800 A/m and withstanding 16,000 A/m it qualifies in accordance with ISO/DIS 764:2019 Annex A as an ‘enhanced magnetic resistant watch’. So the Mk. 11 demonstrated and continues to demonstrate in practice more than sufficient resistance against magnetic interference. Today, non-magnetic balance staffs and curb pins are no longer available, which is something to keep in mind before servicing such a watch. The soft iron cage later became somewhat like the ‘hallmark’ of both the International Watch Co. (IWC) *Ingenieur* series and the IWC pilot’s watch series.

Contrary to what one might initially suspect, however, the soft iron cage was not invented by IWC, nor Jaeger-LeCoultre (JLC), the only two companies that produced Mk. 11 for the RAF. The soft iron cage was a requirement of the Royal Air Force (RAF). The RAF had used soft iron covers in WWII with its radar equipment and the principle of



Figure 1. The three parts of the soft iron cage.

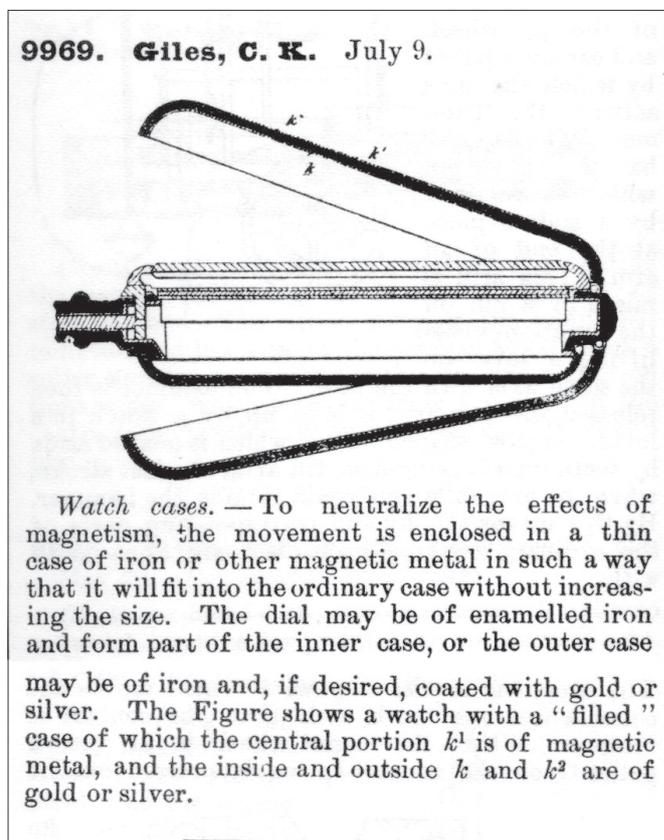


Figure 2. Patent of C.K. Giles, 1884.



Figure 3A. Soft iron dome of LeRoy Royal Navy Chronometer Watch (CW).



Figure 3B. Soft iron retainer ring of a LeRoy Royal Navy Chronometer Watch (CW) holding the movement. A soft iron plate, not depicted here, is positioned between the dial and the movement.

shielding a watch movement against magnetic fields by means of such a cage has been the subject of old watch patents. In fact, a patent for such a pocket watch case was granted to C. K. Giles of Giles Bros. & Co. as early as 1884, **Figure 2**. According to a detailed description of his invention in *The Watchmaker & Metalworker* in May 1884, Giles used a gold, low-carbon steel and copper alloy. However, just a few years later, soft iron was discovered to be a less expensive and more efficient alternative. Accordingly, a LeRoy Chronometer Watch (CW) from the Royal Navy (RN) from around 1910 was already equipped with a soft iron cage that enclosed the entire movement, **Figures 3A and 3B**. Already before WWI, marine chronometers such as the A. Lange & Söhne Chronometer No. 79 of the Imperial German Navy, M 671E were equipped with cases that were fitted with soft iron. The Imperial German Navy added an E to the inventory numbers of such chronometers, indicating they were suitable for use near to electric motors as on submarines. P. Ditisheim later also received a patent on the protection of a movement against magnetism through a soft iron cage on 22 October 1926, a good 20 years before the initial rollout of the Mk. 11. The patent application of Ditisheim was not dismissed, probably due to negligence on the Patent Office's side, though the principle was already known and in practice for decades and therefore, by 1926, no longer patentable.

Already before WWII, RAF engineers realised that the magnetrons used to generate radar beams aboard bomber aircraft generated powerful magnetic fields. However, it took some time to gather information on the effect on the accuracy of the crew's watches and on the displays of the other on-board instruments. Counter-measures, therefore, were not taken immediately and a lot of equipment, including crew watches, was used in WWII without any proper shielding. The cathode ray tubes of the on-board radar screens also generated magnetic fields that radiated outwards and interfered with other instruments, while at the same time, strong magnetic fields from other devices could divert the cathode rays within the tubes of the radar screen resulting in incorrect images. For this reason, the tubes of the radar screens of WWII RAF bombers were the first to be clad with mu-metal, **Figure 4**. A number of different versions of this sheathing are shown in the RAF's radar equipment parts lists from the WWII period.

With those experiences in mind, when discussions started immediately after WWII about what the design for a new



Figure 4. Mu-Metal screen of a radar cathode ray tube; Royal Air Force WWII.

generation of navigational wristwatches should look like, the Royal Aircraft Establishment (RAE, which was the research and development department of the RAF) exposed some WWII navigational wristwatches, Stores Ref. No. 6B/159 (also known as Mk. VII), to magnetic fields of varying intensities – specifically 0, 25, 50, 75 and 100 oersted. LeCoultre and Longines watches were used for these tests. A comparison of the accuracy of the same watch exposed to the same magnetic field, once with the protective soft iron cage and once without, demonstrated that the accuracy of the watch remained consistent *with* the corresponding protection, while the accuracy varied greatly *without* such protection, all the way to a complete stoppage. None of the watches tested continued running after being exposed to a magnetic field of 100 oersted without protection. Accordingly, the recommendation from the RAE in October 1946 was to enclose the movements of navigational wristwatches fully within soft iron cages. Such cages were intended to ensure protection against magnetic fields of at least 150 oersted, which corresponds to 11.937 A/m (a value that the later manufactured Mk. 11 would surpass nearly sixfold). Furthermore, the RAE recommended that the balance staffs and the hands all be made of non-magnetic material. With that, the basic concept of the Mk. 11 had been defined.

1.1.2. The Design of the Outer Case and its Predecessors

Another characteristic feature of the Mk. 11 is the threaded ring that presses the specially shaped crystal from inside against the case. This is another feature that did not originate with IWC, JLC nor their case suppliers, and neither was it featured for the first time on the Mk. 11. It was the result of positive experiences that the British military initially had with watches issued from 1943 onwards, procured by, and for, the Combined Operations Stores Depot (COSD). It was Dennison, as far as we know, that first used this feature in a watch for the British Armed Forces. Later, on a broader scale, a threaded ring to fix and seal the crystal became a design feature of several types of the British Army 'Watch, Wrist, Waterproof' (usually abridged and referred to as the w.w.w. or, colloquially, 'the Dirty Dozen').

That said it is no surprise that the JLC Mk. 11 is nearly identical to the JLC w.w.w., while the IWC Mk. 11 case and the Record w.w.w. case are nearly identical. The IWC Mk. 11 cases differ from their plated base-metal Record w.w.w. predecessors, and the JLC Mk. 11 cases from their JLC w.w.w. predecessors only in that they are made completely of stainless steel and have a differently shaped case back to create space for the inner soft iron cover. According to rumours that circulated earlier – and which were, in part, spread by IWC itself – the Mk. 11's case was *specially designed* to withstand low pressure observed at extreme altitudes and, in particular, to prevent the crystal (separating the ground-level pressure still present within the watch and the ambient low pressure of high altitude) from popping off the watch. The fact that the Mk. 11 adopted the case design from the JLC w.w.w. and the Record w.w.w. without any material alteration demonstrates that the design of the Mk. 11 cases was by no means *special or unique*. The reasons for simply adopting the design of the British Army's 'Watch, Wrist, Waterproof' were threefold:

- Firstly, the RAF watchmakers had already, during WWII, complained about the watch cases of the 6B/159, which allowed the ingress of humidity and dust. This weakness of the 6B/159 cases from 1940 caused a great deal of additional work for British watchmakers because the moisture, sweat and dust that penetrated the watches resulted in significantly shorter service intervals as well as considerable corrosion. One of the requirements for the Mk. 11, therefore, was a case design conferring watertightness, with consequent extended service intervals. To reach that goal, the w.w.w. case design of JLC and Record with the threaded ring for the crystal was adopted. Each Mk. 11 was therefore tested for watertightness at ground pressure to a depth of 20 feet, and in shallow water under reduced air pressure equivalent to 35,000 feet ICAN (International Convention for Air Navigation, which provides standards). Furthermore, to assure this level of watertightness, the winding stem was sealed with a waterproof gland.
- Secondly, RAF aircrews experienced the poor cases of the WWII navigational wristwatches resulting in crystals popping off ageing cases with signs of wear and tear. For a navigator, whose task is to navigate the aircraft exactly to the target and to bring the crew and aircraft safely back afterwards, a detached glass was unacceptable: a watch without a crystal is obviously

prone to stopping or becoming damaged, and with the glass gone, it will lose its reliability.

- Thirdly, the Mk. 11 was not in use only in the back of the cockpit on the navigator's desk alongside pencils, rulers, compasses and other items lying there. Right from the beginning the Mk. 11 was issued not only to navigators but also to the captain of the aircraft and, from the late 1950s onwards, to all pilots including those of single-seater fighter aircraft. For pilots, a glass popping off their watch caused a 'loose article hazard' and could hamper the function of the controls in aircraft and even result in a mission being aborted. This aspect became more important from the late 1950s than it had been in the design phase in the mid-1940s, as loose articles flying around in the narrow cockpit of a single-seat fighter during a dogfight are obviously a different situation from being in a bomber aircraft trying to remain undiscovered.

All these problems were solved by adopting the w.w.w. design with the threaded ring, a design which had proved to grant sufficient watertightness and at the same time to fix the crystal securely.

The similarities between the Record w.w.w. and the IWC Mk. 11 cases are so great that Record cases have frequently been, and still are, used to create fake IWC Mk. 11 watches. This is very hard for inexperienced collectors to spot if the chrome plating of the Record w.w.w. base-metal case is still intact.

In 1956 the RAF decided to re-case the best of the remaining movements from their old WWII 6B/159 navigational wristwatches. When defining the design of the new cases the RAF watchmakers again chose the threaded ring as the preferred method of securing the crystal, **Figures 5A to 5C**.

Those readers interested in more details on similarities between different types of UK service watches from the late 1940s to the early 1970s will find additional information in Kenneth Gordon's article 'Zulu Time – The British Military General Service Wristwatch'.¹ Regarding improvements of the Mk. 11 case in particular, see below.

1.1.3. The Use of the Mk. 11 in Practice

It is a well-known fact that the Mk. 11 wristwatch is for celestial navigation. So the Mk. 11 is no pilot's watch, but rather a navigator's watch, disregarding that the marketing of several brands abnegate this difference. The Mk. 11 was the most precise watch on duty at that period and therefore, in the beginning, was issued only to navigators on active flying duty and to aircraft captains, while pilots got issued the old WW II 6B/159 or 6B/234 watches or later on the 6B/542 General Service Wristwatch. Only pilots of the Fleet Air Arm were issued chronographs, e.g. H.S. 9, in lieu of the General Service Wristwatches without chronograph function. Mk. 11 models were not issued to pilots as well until the late 1950s onwards. The reason why the RAF did not procure additional Mk. 11 after 1952 and instead issued its stock Mk. 11 watches to both pilots and other crew members is that the piston engine propeller-driven bombers of WWII, which delivered air raids within bomber fleets of more than one thousand aircraft assigned to a single sortie, were replaced by a comparatively small number of jet-propelled nuclear bomber aircraft (which required two navigators per crew), which in turn lost their



Figure 5A. Screw down ring to tighten the crystal, Record w.w.w.



Figure 5B. Screw down ring to tighten the crystal, IWC Mk. 11.



Figure 5C. Screw down ring to tighten the crystal, Omega 6B/159 1956.

relevance when from the early 1960s intercontinental missiles entered the scene. The decrease in the number of navigators needed was mirrored by the decrease in numbers of watches for navigators.

What is not that widely known are the basic conditions of issuance. The British Overseas Airways Corporation (BOAC) and, during WWII, the German Luftwaffe, did not issue their navigational wristwatches on a permanent basis. Both handed them over to the navigator only directly before a sortie requiring celestial navigation as the primary or back-up navigation method. The watches were then returned during the debriefing directly after the flight. As a result, the wearer was not familiar with the precision of his particular watch. The RAF, on the other hand, decided to issue the Mk.11 watches permanently. The owner would return his watch only when it was called in for maintenance after a period of 12 to 24 months. He was then issued another Mk. 11 in return, the deviation in practical use of which he again would note with scrutiny. The advantage of this permanent handover was that the navigators were intimately familiar with the conditions that would result in a deviation in rate in ‘their’ watches, and therefore knew exactly how many seconds the watch would have gained or lost after, for example, six hours of flight, compared with the last time their watches were synchronised. This information was extremely important for precise astro-navigation because a deviation of even one second would mean a position error of up to 463 metres, depending on the distance from the equator. In terms of bombing military targets with conventional bombs, a mission must be considered a failure when the bomb misses the target by 500 metres. BOAC as an airline and the German Air Force in WWII did not aim for such precision: BOAC simply had to find the airport and to get within the range of its radio beacon/ILS, while the German Air Force used celestial navigation mainly for long-range reconnaissance flights over the Atlantic and North Sea, trying to spot Allied convoys as targets for German submarines. On the one hand, pinpoint bombing was not a major topic for the German Air Force and on the other hand, it had broadly relied on their electronic *Knickebein* radio beam system (soon jammed by the British).

For a sortie of a few hours in a military aircraft, the size of the watch doesn’t really matter, so the German Air Force decided to procure the huge 55 mm diameter navigational

watches, comprising pocket watch movements. When it came to wearing the watch during daily life on duty and during leisure time, however, a watch with a diameter of more than 40 mm and without shock protection was not a viable option.

1.2. Prototypes from Manufacturers Other Than IWC and JLC and the ‘true Mk. X’

Today we know more or less nothing about which manufacturers were invited to submit prototypes for the first generation of Mk. 11. The original specification for the Mk. 11, i.e. G.943, outlining the requirements the prototypes should meet, has yet even to be seen. However, we do know (i) that only IWC and JLC received volume orders for Mk. 11 navigational wristwatches and (ii) test samples of two other brands were tested, though at the end of the day no order was placed with these other manufacturers.

1.2.1. The Longines Mk. 11

In 1950 Longines submitted under the Mk.11 specification test samples that were 44 mm in diameter, fitted with a calibre 15.68N. This calibre is identical to the Longines 14.68N calibre with the exception of the fact that the 15.68N calibre has stop-seconds work (‘hacking’), a feature required in the Mk.11 spec. The Longines reference for these Mk. 11 prototypes was 6111-1. Baume, the UK agent for Longines, sent only a few of these watches to the RAF via Goldsmiths & Silversmiths Co. in spring 1950 for testing purposes. We do not know how many of these test watches Longines provided, but the number may have been somewhere in the mid-double digits. What relationship these military prototypes had to the ‘Radar Proof’ Longines watches, which were clearly intended for the civilian market, is not known. It is evident, however, that Longines was engaged in protecting their watches from the magnetic fields emitted by radar devices, and not only in the context of prototypes for the RAF.

No documents explaining why the RAF did not commission any more Mk. 11 watches from Longines or JLC have been found up to now. Oral tradition supports the conclusion the reason was twofold: a watch with a diameter of 44 mm was quite big for use in daily life, on duty as well as during leisure time and therefore not only uncomfortable, but also



Figure 6A. Dial of a Longines Mk. 11 6B/346 prototype.



6B. Markings of a Longines Mk. 11 6B/346 prototype.



Figure 6C. Markings of a Longines 'Big Indian' (this watch is very similar to the Mk.11).

damage-prone (see page 15 for how the Mk. 11 was used in the RAF). Additionally, the cal. 15.68N was not as easy to service as the IWC cal. 89.

Shortly thereafter, apparently, the Indian Air Force purchased a small batch of watches nearly identical to the Longines Mk. 11 prototype, which collectors nicknamed the 'Big Indian'; at least, in 1952 the watches were shipped to an Indian address. The Longines reference for this watch was 6111-2 and these watches were fitted with a 14.68N calibre – the 'non-hacking' calibre. For that reason these watches no longer complied with the Mk. 11 specification. Accordingly, only the ref. 6111-1 prototypes were marked 6B/346 on the case back (and the identification number xxx/49, which was typical of the RAF), while the watches for the Indians were only marked with the broad arrow and a serial number, **Figures 6a to 6c.***

More information about the Longines Mk. 11 can be found in a variety of military watch internet forums. However, even in those specialised forums, information about the Longines Mk. 11 is sparse. Longines itself has nearly no information available, especially on the 'hacking' Mk. 11 version.

1.2.2. The Smiths Mk. 11, the 'real Mk. X' and the Mark Nomenclature

Much more is known about a different Mk. 11 candidate which also did not go further than tests: the Smiths Mk. 11. The British Armed Forces became aware of their dependence on the Swiss watch industry starting in November 1942 at the latest, when deliveries of war matériel from Switzerland could be made to the Allied Forces only through enemy territory. There was therefore a strong strategic desire to establish British suppliers for war matériel which was, up to then, not available in the UK (amongst other supplies for precision watches). At that time, Smiths seemed to be the only manufacturer that was suitable for establishing an independent British watch industry. During WWII, however, the company was

already working at capacity building instruments for aircraft and land vehicles as well as detonators, all of which were no less important (detonators for incendiary bombs as well as AA grenades used to contain small clockwork mechanisms in order to set the time of explosion). In order to move the project for an independent British watch industry forward, Smiths received commissions for the delivery of both G.S.T.P. pocket watches and 6E/50 pocket watches during WWII. The former were watches intended for general use by the British Army, the latter were watches intended for the many observation posts that had to notify RAF Fighter Command of approaching German aircraft. However, only prototypes of the Smiths G.S.T.P. were issued; regarding 6E/50 watches Smiths was evidently unable to deliver even prototypes before the end of the war. The respective orders were cancelled in 1945 because the end of the war turned the shortage of watches for the British Armed Forces into a surplus. Smiths had developed a new 19-ligne pocket watch calibre for this order.

The smaller version of this pocket watch calibre, which was reduced to 12 lignes and referred to as the 12.15 calibre, went into production in 1944. It was not, however, a centre-seconds calibre as required by the RAF for navigational wristwatches. Converting this movement to centre-seconds and getting it ready for serial production would have taken a fair amount of time, so the RAF created a new specification for a sub-second navigational wristwatch in order to give Smiths a chance to gain experience with the serial production of wristwatches. Its name: Mk. X, stores ref. no. 6B/300. A total of 2,500 of these watches were ordered at the end of 1944. Some test models apparently had been delivered, and a handful survived (some of the surviving watches have a centre-seconds hand; it is unknown whether they already had a centre-seconds hand when delivered to the RAF or had only later been converted to centre-seconds).

IWC famously, and to some extent ironically, adopted the name Mk. X for the IWC w.w.w. in the 1990s, not being aware of the fact that (i) a w.w.w. is not an Air Force but an Army watch and (ii) this Smiths watch had already been assigned the designation 'Mk. X' more than 50 years earlier. IWC was so

* In this article, xxx always stands for the two to four digits military ID of the individual watch unless otherwise stated.

successful with this misnomer that the name Mk. X remains associated with the IWC w.w.w. among collectors to this day, and is, at times, no less incorrectly applied to all w.w.w. watches.

Due to the end of the war, the 'real' Mk. X – the Smiths 6B/300 – never entered series production. Instead, the RAF sold off thousands of surplus stock 6B/159 watches from well-known watch brands.

The existence of the 'real' Mk. X gives reason to spend some words on the designation 'Mark' or 'Mk.' respectively and how 'Marks' were counted in the RAF. When it was established, the RAF designated all items of equipment, from entire aircraft all the way to the small pieces of equipment such as watches, goggles, firearms and compasses which complied with the same specification, as 'Mark'. The various 'Marks' in the beginning were sequentially counted with roman numerals. From 1942 to 1948 the RAF switched to Arabic numerals. When Arabic numerals were introduced into an area, equipment that had already been assigned a 'Mark' designation with roman numerals at first retained its old designation with roman numerals. Starting in 1948, however, every object was given Arabic numerals. This included older items that had been designated with Roman numerals up to that point, though pre-existing documents were updated only if there was more that needed to be changed than just switching the old roman to the new Arabic numerals. As a result, for example, the re-issue of the A.P. 1275B² in 1950 listed the Mk. VII A, Stores Ref. No. 6B/159 in the table of contents as the Mk. 7A, but chapter 10, in which the 6B/159 is described, refers to it as the Mk. VIIA, because there was nothing else in chapter 10 that needed to be changed. The only correct designation for the Smiths 6B/300 Mk. X, therefore, is with a *roman* numeral (it was never issued, so the 'Mk. X' never had to be switched over to 'Mk. 10'), while the correct designation for the 6B/346 from IWC and JLC, which was first procured in 1948, is Mk. 11 with *Arabic* numerals.

Back to the Smiths Mk. 11: Regardless of temporary excess stock of watches, by the end of WWII the British Armed Forces remained interested in re-establishing an independent British watch industry. The Smiths 12.15 calibre wristwatch was not eligible for consideration for an



Figure 7. General Service Wristwatch 6B/542 Smiths and Omega with later MoD dial.



Figure 8A. General Service Wristwatch 6B-9101000 Hamilton dial.



Figure 8B. General Service Wristwatch 6B-9101000 Hamilton markings.



Figure 9A. General Service Wristwatch 6B-961-4045 Smiths dial.



Figure 9B. General Service Wristwatch 6B-961-4045 Smiths markings.

improved navigational watch, the Mk. 11, as it was not precise enough and was not equipped with the required centre-seconds hand. For this reason, in 1950 the British Armed Forces once again stressed that it was important and urgent to task Smiths with the development of a navigational watch with centre-seconds in order to reduce Great Britain's 'total dependence on Switzerland'. Nevertheless, the decision was taken to continue moving towards this goal slowly but steadily. Initially, Smiths focused on converting the 12.15 calibre to

indirect centre-seconds. In 1954, this modified movement was delivered to the RAF as the 'non-hacking' calibre 27 C.S. under the specification 6B/542 (later 6B-9101000 and 6645-101000), where it competed with the Omega 6B/542, **Figure 7**, and later with watches from Hamilton, **Figures 8a to 8b**. From 1967, an improved, 'hacking' version of this watch was supplied to all three branches of the British Armed Forces under the W10 specification as Wrist watch, G.S., **Figures 9A and 9B**, stores reference numbers W10/6645-99-961-4045,



Figure 10. Development of the Smiths calibre 12.15, 27CS and the 'hacking' W10 for the British Armed Forces;



Figure 11A. Smiths Mk. 11 prototype dial.



Figure 11B. Smiths Mk. 11 prototype movement.

6B-9614045 or 0552/6645-99-961-4045. (The latter often have the leading 'W10' struck out, thus 'converting' them into Royal Navy watches.) On the civilian market, the movement was extremely successful, in particular under the names Everest and National.

After the struggle finally to produce high quality watches, from pocket watches to the 12.15 and the 27 C.S. calibres, **Figure 10**, by the mid-1950s it seemed the time had come for Smiths and the RAF to start thinking about a new movement that would replace the IWC Mk. 11. The necessary leap in precision, however, required a new calibre with direct centre-seconds to be designed from scratch. Three prototypes were produced and sent to the RAF for testing, **Figures 11a and 11b**. At the end of the day the Smiths failed to pass the tests conducted by the RAF and the watchmakers at the Chronometer Department at the Royal Greenwich Observatory for two reasons: the watches were not capable of being adjusted to the required positional and isochronal rates, and they were too complex technically and therefore costly to service both in terms of time and effort.* The

reasons for non-acceptance were given at a meeting with representatives from Smiths held at Herstmonceux at which the representatives of Smiths were shown the IWC as the calibre doing better. The RAF reacted by stopping the project for finding a successor to the IWC Mk. 11, instead keeping it in service until 1981.

More details on the Smith Mk. X and Mk. 11 can be found in David Read's article 'The National 15. The decline of British watchmaking and the role of Smiths in a hope for recovery'.³

ENDNOTES

1. Kenneth Gordon, 'Zulu Time – The British Military General Service Wristwatch', *Horological Journal*, vol. 154 (Oct 2012) pp460–464 and vol.154 (Nov 2012) pp494–497.
2. Air Publication 1275B, Instrument Manual (Navigation Instruments).

* Contrary to its name, the Royal Greenwich Observatory moved from the London Borough of Greenwich to Herstmonceux in Sussex by 1948 and only returned to Greenwich in 1998, and then only as part of the National Maritime Museum, not as a working observatory.

3. David Read, 'The National 15. The Decline of British Watchmaking and the Role of Smiths in a Hope For Recovery', *Antiquarian Horology*, vol.38 (2017), p74 et seq.

Man is (Still) Not Lost

*Revisiting the Mark 11 Navigational Wristwatch
Part 2: Maintenance, Incabloc, Movements and Cases*

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2.1. New Insights on the Mk. 11

After the first order placed with IWC and JLC was fully delivered in 1949, the RAF took around a year to evaluate its initial experiences with the new Mk. 11 and the input from the discussions on the specification of a new general service wristwatch (later designated by the RAF 6B/542). Documents on this evaluation process have not been found as yet, but (i) oral traditions confirm ongoing tests and (ii) modifications to both movements and cases have been observed. This time allowed for the discussion of improvements, and eventually the one-year pause in the order sequence was able to be concluded.

2.1.1. Maintenance of the Royal Air Force Mk. 11 by the Chronometer Department

The key to understanding a number of questions regarding the RAF Mk. 11 lies in understanding the practical procedures for servicing the Mk. 11 watches by the Chronometer Department and the watchmakers it employed. The Mk. 11, both IWC and JLC, were originally serviced only by watchmakers from the Chronometer Department of the Royal Greenwich Observatory at Herstmonceux Castle (internally nicknamed 'the Zoo', picking up the English pronunciation of the last part of Herstmonceux) as well as by the manufacturers (the RAF documents say 'manufacturer', but it appears more plausible that the watches were not sent to Switzerland, where the makers IWC and JLC were based, but to the watchmakers of Goldsmith & Silversmiths in London, the company that *supplied* the Mk. 11 to the RAF). The Board of Admiralty was in charge of overseeing the Chronometer Department, and the department itself was responsible for maintaining the Royal Navy's marine chronometers, chronometer watches and deck watches. Service of the Mk. 11 was soon contracted out to qualified watchmakers because the watchmakers in the Chronometer Department (up to 12 in the early 1950s and rising to 25 in the 1970s) were not capable of maintaining all of these watches themselves. Usually there were ten Mk. 11 watches from the same manufacturer being serviced at the same time. The movements were taken out of the cases; the cases were cleaned and serviced by support staff, the movements cleaned and oiled, repaired where necessary and, finally, precisely adjusted. All watches were tested for luminosity by storing them away from light for 24 hours and only then examining the luminosity in a dark room with a special device, the Luminosity Comparator, stores ref. no. 6C/580. The reason behind that test was that in the 1940s and 1950s, the RAF used a luminous compound of 70 microgrammes radium per gramme with the rest being zinc sulphide, according to the relevant specification RG 467. Zinc

sulphide crystals break down under the bombardment of rays given off by the radium, resulting in a decline in luminosity of a third within a year. If instructions for improvements, referred to as mods (short for modification order) had been issued, every watch coming in for service was updated to the latest standard. The most famous of these updates were the switch to the post-1952 dial together with the corresponding hands, as well as changes to the crystal. What is less widely known is that there exists an updated version of the balance, with adjustment weights on the balance arms, which allowed for a more long-lasting fine-tuning. However, the latter appears not to be an RAF mod; maybe IWC equipped its own service department (which from time to time was involved in servicing Mk. 11) and other third-party repairers with these updated balances, **Figures 12A and 12B**. Service also had to replace the dial and hands frequently, mostly due to rust on the soft iron of the dial, but also for loss of luminosity. Once all of this work was completed, the movements would be returned to the cases. The seals and glasses were always replaced, initially solely because lead seals were used, which can't be re-used. The tests conducted for each and every watch before clearance for re-issue comprised, amongst others, water-tightness at ground pressure and under reduced air pressure as described in Part 1 of this article (*HJ* March 2020).

In this service procedure, it was not important which movement came from which case and such information was neither required nor recorded. As a result, the movement that was finished first was installed into whichever case was also finished and close by. With blocks of ten watches being serviced at a time, this means there was only a ten per cent chance that a movement would be re-fitted to the case in which it first arrived. This chance sank to one per cent after the second service, and so on with every additional service. The result, which is well known to all collectors, is that today, nearly all IWC Mk. 11 movements are no longer mounted in the cases in which they were originally delivered by IWC to the RAF. Quite often this fact is more than obvious: collectors will quite often, for example, encounter a movement that was manufactured in 1952 in a case from 1951 (with an xxx/50 marking).

The Chronometer Department didn't keep all watches and chronometers serviced and ready for issue, but only quantities sufficient to cover the normal demand of Navy and Air Force. Amongst the watches in stock, which the Chronometer Department preferred to be issued and serviced for obvious reasons, were those which had proven to be both well-performing and easy to service. Some other Mk. 11, especially many lacking shock-protection, mainly sat in stock as war reserve and underwent only a few services.



Figure 12A. Box with spares for an IWC Mk. 11 cal. 89, closed.

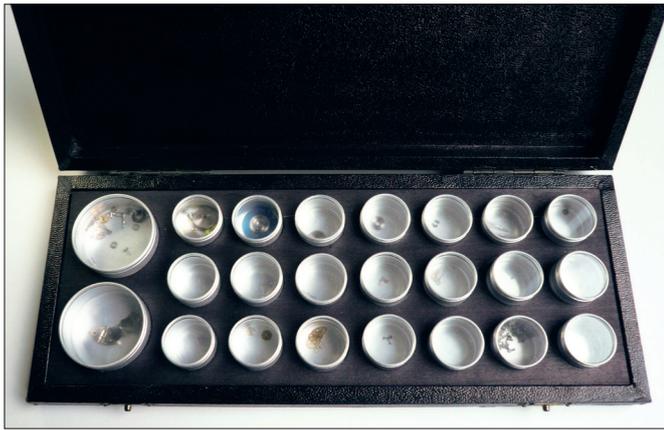


Figure 12B. Box with spares for an IWC Mk. 11 cal. 89, open.

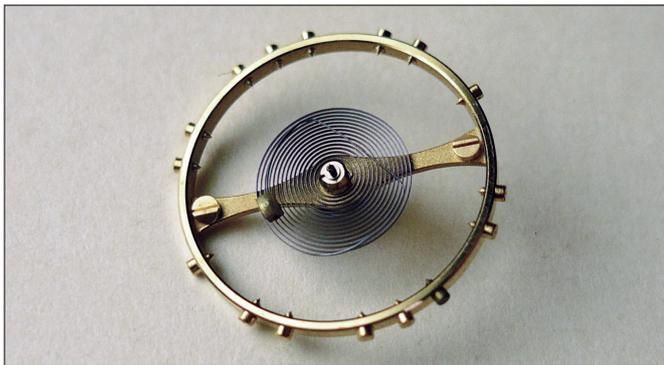


Figure 12C. Late spare ready-to-use balance with spiral and balance shaft for the IWC Mk. 11.

2.2. Evaluation 1949/1950 and the Introduction of the Incabloc

As mentioned before, the RAF evaluated wearers' experiences with the first batch of watches from 1949 (order year and marking on the watches: xxx/48) and the input from the discussions held in parallel regarding the demands on the new general service wristwatch. Only after the evaluation had been done were additional Mk. 11 watches ordered, at the end of 1950 (marking: xxx/50). The respective trials were conducted by D. W. Evans at Herstmonceux Castle, who later was also in charge of the tests of the Mk. 11 prototypes by Smiths. Both Incabloc and non-Incabloc movements underwent wear and 'rough treatment' tests. It was found non-Incabloc movements were more stable until subject to a blow when a damaged/



Figure 13. 1948 IWC cal. 89 'anglaise' with broad arrow given on the centre bridge without Incabloc.

bruised staff would cause a rate change. On Incabloc movements, it was found that settings would sometimes fail to return to their correct positions, because of friction. After discussion, it was decided in future to order watches with the Incabloc device.

The tests conducted by the RAF are mirrored in the production figures of IWC. After manufacturing test batches, IWC started serial production of Mk. 11 movements with four series of 600 pieces of calibre 89 movements in 1947 and 1948. These are recorded in the IWC ledgers as 'cal. 89 12 lig. S.C. Angl.', with the last abbreviation being interpreted as 'Anglaise', denoting 'English style', **Figure 13**. According to the IWC production ledgers, all of these movements lacked a shock-protection device. However, a few exceptions are to be noted; some Mk. 11 movements from the third and fourth batches showed up which do have Incablocs. Close examination led to the finding they were not at any point in time converted, but were produced with Incablocs. Tracking those movements has shown IWC delivered them as part of the normal, non-Inca batches shipped to the RAF in 1949. Being a part of normal deliveries in that year, these watches obviously were not special shipments for tests in the process of improving the original specification. It appears, therefore, that these watches were delivered as teasers for the RAF, as IWC was by then already producing the calibre 89 with an Incabloc shock-protection.

When discussing the specification of the British Army w.w.w. during WWII and later the initial specification for the RAF's Mk. 11, the British watchmakers deemed a shock protection device too costly, both in terms of the purchase

price and the time to service/repair such watches. They instead complained about warped cases and cases that were not tightly sealed, allowing moisture and dirt to penetrate the watches, causing extra maintenance costs. But when the three services in 1950 discussed the specification for the new general service wristwatch they were no longer in line regarding this question. The Air Force reported that manufacturers (names unspecified) had, without being asked, submitted movements with shock-protection devices and that said manufacturers had stated that shock-protection for high-end watches like the Mk. 11 were already standard in the industry. The representative of the Air Force took the position, obviously after the test referred to above had been conducted, that the advantage of fewer broken balances after heavy-duty use and mishandling outweighed the additional time to service an Incabloc watch. In the end, the Air Force convinced the other services to make a shock-protection device part of the specification for the Wrist watch, G.S. (6B/542; 6645-101000). The RAF therefore changed its position regarding shock-protection devices between 1948, when the first Mk. 11 orders were placed, and 1950. This may have been because of IWC's unasked provision of sample Incabloc watches, and later convincing the procurement officers, with respect to both cost of purchase and service as well as to sturdiness.

In parallel to the discussions with their colleagues from Navy and Army, D. W. Evans of the Chronometer Department conducted the trials and was, together with the Officer in Charge G. Ricketts, involved in all evaluations and working closely with manufacturers and the procurement agencies. D. W. Evans also tested the Longines Mk. 11 test samples and in the end the decision was made to go ahead with only one supplier: IWC. Surely JLC could have produced the cal. 488/Sbr with shock protection as well had it received an order for one. The same applies to Longines. Realistically, therefore, we can assume that the RAF's decision to purchase only IWC Mk. 11 henceforth had to do with the fact that the RAF wanted to focus on the smallest number of manufacturers and calibres possible, unlike during the war with the ATP, 6B/159 (Mk. VII) and 6B/234 (Mk. VIII). Oral tradition supports this. Various documents show that when it came to choosing which calibre to procure from those which met the accuracy requirements, ease and cost of service played a decisive role.

Regarding the latter point, IWC's cal. 89 bridge design was superior to the JLC cal. 488/Sbr and the Longines cal. 15.68 N. So sufficient precision, sturdiness of case and movement, serviceability and a proper size for daily service made the IWC the choice for the RAF.

It appears, however, that IWC had hoped to convince the RAF of the advantages of a shock-protection quickly. The identification numbers for the IWC Mk. 11 watches that were ordered in 1948 went up to 2100/48. This means that IWC apparently produced 2,400 Anglaise movements in 1948, but failed to deliver a few hundred of these watches to the RAF as ordered in 1948. This raises the question of what happened with the missing movements and why.

One of the authors runs a quite extensive database on the Mk. 11. This database does not contain a single IWC Mk. 11 with a movement number between 1.162.801 and 1.163.200, which corresponds to the last third of the second series of cal. 89 Angl. This was a reason to look again into IWC's documents to find out who purchased these movements. It turned out that the first two batches of Anglaise movements, i.e. series 2067 and 2068, running from 1,149,801 to 1,150,000 in some

Sertissage			
	Entrée	Sortie	Entrée
1162601	28. Okt 1948	20. Nov. 1948	20. Nov. 1948
1162607	28. Okt 1948	20. Nov. 1948	20. Nov. 1948
1162613	28. Okt 1948	20. Nov. 1948	20. Nov. 1948
1162619	28. Okt 1948	20. Nov. 1948	20. Nov. 1948

Figure 14. Clipping from the *Serienbuch* (series book) of the fourth production batch IWC cal. 89 Anglaise.

documents, explicitly were marked as 'sans Inca' (without Inca). The same applies to Series 2089, which comprises the range of movement numbers from 1,162,001 to 1,162,600, while Series 2090 received the remark 'sans Inca' only for the first 200 watches and the rest, i.e. numbers 1,162,801 to 1,163,200 got Incas, **Figure 14**. Tracking down the last 400 movements with Incabloc, it turns out that all were sold to other customers, none to the RAF (or more precisely: none to Goldsmiths & Silversmiths, their intermediary).

It appears, therefore, that IWC produced 400 cal. 89 Anglaise with Incabloc, but the RAF was not yet ready to accept that the Incas were preferable, needing time to think. So IWC decided not to wait, but to sell these Anglaise movements to other customers. However, if we look at the maths, four batches of 600 movements each, minus 400 movements, which were sold to civilian customers, leaves 2,000 movements; given that the military identification numbers for IWC Mk. 11 of the order year 1948 go up to 2100, this is a first, but not final, indication that the military IDs of IWC Mk. 11 did not start at 1, but rather started at 101.

Another improvement resulting from the 1949/1950 evaluation conducted by the RAF would be modifications of the cases. To understand that, though, we first need to discuss a topic that is capable of electrifying collectors.

2.3. Which IWC Mk. 11 Movement Belongs to Which Case?

It has already been mentioned that when military timepieces were serviced, no one bothered to note which movement arrived in which case and as such, nobody made sure that it went back into that same case. Actual manufacture, however, was a different story with most watchmakers. During series production of military watches, with very few exceptions (one of these being JLC), movement 1 was installed in case 1, movement 2 in case 2, and so on, so that each production batch results in the same relationship between the case number/stamped-in ID and the movement number. This would suggest that this rule also applied to the IWC Mk. 11, and that this relationship between the movement and the cases was fragmented by mixing them up when they were sent in for service. However, a sufficiently large database enables the identification of various patterns, while statistical methodology offers tools to differentiate between sheer coincidences and concrete correlations.

As a result, the authors have been able to determine with

certainty which movements left Schaffhausen in which cases for the RAF watches that were ordered in 1948, and later also for the watches that were ordered in 1950 and 1951. The same conclusions could be made for watches that were ordered in 1952; unfortunately not with certainty, but with a high degree of probability. This is plausible and was to be expected: all but a few Mk. 11s from the year 1948 were manufactured without shock protection, and therefore were more likely to be damaged during daily use, for example during a military operation in which the crew required precise times for navigational purposes. For that reason, the Chronometer Department was reluctant to distribute watches without shock protection (and, in part, prevented these watches from being handed back accidentally by storing them without dials). Since these watches were issued less frequently, they were also returned for service less often, and therefore the chances were higher that the movement would not end up in a different case during service. The watches from 1952 were sturdier with respect to case (see below) and movement, therefore preferentially issued and, as a result, the individual 1952 watch came in for service more frequently than the 1948 watches. The 1952 movements, therefore, ended up in different cases more often than those in which they were originally mounted.

The difference between military ID and movement number varies, and is not constant within the same order year, but only within the same manufacturing assembly run. In the event that a larger order was split into multiple assembly runs (as with the 1948 order), then the difference varies from one batch to another. For the first assembly run of the first order year, i.e. 1948, comprising 1,200 watches, the following formula can be used to determine which movement was originally installed in which case using the case number xxx/48: if 1,148,700 is added to the military ID on the case back, the result is the original movement number. As the first-issued IWC Mk. 11 (and not merely a test prototype) bears the movement number 1,148,801 (the first movement from the overall IWC production series 2067: cal. 89 Anglaise), this answers the question as to which military ID was assigned to the first IWC Mk. 11: 101. This also confirms the assumption that was described earlier in this text that, based on the total number of movements sold, the count did not begin at 1 but rather at 101: 2,400 cal. 89 Angl. were produced, minus 400 movements that are not listed in the Mk.11 database and were later found to have been sold to civilian customers results in 2,000 movements for the RAF. Since the IWC Mk.11 ordered in 1948 were given IDs that range up to 2,100 but only 2,000 movements were sold, the subtraction results in the first number assigned was 101. For the second batch of watches that was ordered in 1948, the difference between the case number and the original movement number is 1.160.700.*

A corresponding correlation cannot be determined for JLC watches because JLC did not use this type of chronological numbering for the Mk.11 watches or w.w.w.s that were commissioned by both the British and the Australian Armed Forces.



Figure 15. Case back of a Mk. 11, order year 1948, with most of the pittings polished away.

2.4. Case Modifications

The IWC MK. 11 produced in 1948/9 differ from the watches that were produced subsequent to 1950 not only with regard to the shock protection.

A major point of criticism was the quality of steel chosen for the first IWC Mk. 11. Long-time collectors who are familiar with the market from a time in which, unlike today, watches were not so meticulously refurbished before being offered for sale, remember that the watches from the order year 1948 stood out due to their distinctive pitting, a type of corrosion resulting in small brown-black to black 'craters' in the steel. When the 1948-era IWC Mk.11s eventually made their way to the civilian market, they initially appeared with small black dots covering the case-backs. The reason for the pitting was sweat from the wearer's skin, which led to this type of corrosion in the steel. The Royal Navy experienced similar problems with divers' watches. Nowadays, sellers try to polish out this pitting so that, in the best case scenario, only a few small dots remain visible, **Figure 15**. IWC Mk. 11s from later years do not show this behaviour because they were made from a steel that contained fewer sulphates. It is possible that the Royal Australian Air Force (RAAF) placed greater importance on the quality of the steel from the start, which would explain why the RAAF did not order any IWC Mk. 11s in 1948, but rather JLC Mk. 11s, and (most likely given the advantages in terms of service and spare parts stock) why they remained loyal to JLC when it came time to order more watches during the Korean War in 1953.

IWC changed not only the quality of steel: numerous collectors have noticed that there exist thinner and thicker Mk. 11 cases from IWC. Without having any other information as to why, collectors often assumed that the differences are the result of excessive polishing in order to eliminate deep marks resulting from military use. Others had the impression that the thinner cases more frequently contained movements from the year 1948.

It is true that many of the Mk. 11 cases currently on the market have been heavily polished to erase scratch marks, from time to time resulting in very different looks of the same watch when viewed from one side than when viewed from the other. This fact also makes it difficult to identify different case thicknesses clearly from the outside. But different case thicknesses (referring generally to the distance from the front of the watch to the case back) naturally also have consequences for the parts inside the cases. A series of tests measuring the

* IWC planned and conducted its production in batches, which were sequentially numbered. The batches comprised 200, 300 or 600 watches, no more. The first 1,200 calibre 89 Anglaise movements are therefore, bookwise, from two batches: series 2067 and 2068.

various parts of the inside of the cases determined that all measured movement retaining rings had the same height, as did all the measured soft iron covers that were installed between the movement and the case back. However, the threaded rings that were used to secure the glass tightly against the top of the case exist in three different heights: 1.5 mm, 1.8 mm and 2.1 mm. The rings of 1.5 mm and 1.8 mm were used with RAF watches, the 2.1 mm only in watches issued/sold from the late 1950s onwards. As (i) during RAF service the case band, threaded ring and case back were strictly kept together and only the movements were swapped into other cases and mixed as discussed earlier, and (ii) the RAF always ordered glasses of the same dimensions, the slightly taller ring worked perfectly with the slightly higher cases and the standard crystal. With non-RAF watches employing the 2.1 mm ring, the 0.6 mm difference exceeded the actual difference in the thicknesses of the cases as the flange or step of later versions of the crystal used was somewhat thinner, meaning that the glass fastening ring had to be somewhat thicker to compensate. As dealers and civilian watchmakers are generally not aware nowadays of the fact that there exist retainer rings and crystals in different dimensions, these differences tend to cause trouble which the watchmakers at Herstmonceux and their out-worker contractors never encountered.

Nevertheless, the fact that three different sizes of these rings exist verifies that three different case versions circulate, regardless of significant variances as a result of polishing. This also explains another phenomenon familiar to many IWC Mk. 11 collectors: some watches rattle when they are moved. The rattle results from the fact that the glass fastening ring is too low, allowing the movement, which is not fixed inside the case (except by the winding stem) to move slightly. Placing a small piece of paper between the case back and the soft iron cover of the movement stops it from rattling. (It would, of course, be better to use a retainer ring of correct size or a thicker glass, but it is especially challenging to get the correct retainer ring these days). Conversely, in many Mk. 11s, the rounded spring steel cone securing the soft iron cover on the movement has been pressed in (which is particularly frustrating because up to now it has been impossible to repair this defect properly). The reason for this is that the glass fastening ring and/or the glass used on the watch is too thick: in this case, the distances in the case no longer match up, and when the case back is securely screwed on, the round spring steel cone is dented.

Having determined that there are three different Mk. 11 case thicknesses, this automatically led to further questions as to which case thickness should be attributed to which manufacturing year. When posing this question the first time, we didn't know that case backs, case bands and retainer rings were kept together during service. It seemed likely, therefore, that if movements and cases had been mixed up, then the case band, case backs and retainer rings were mixed up too, leading to the fallacious conclusion that, for example, even though the case back is marked xxx/52, this did not necessarily allow us to conclude that the top of the case also came from the order year 1952.

Based on this working hypothesis, the conclusion was drawn that if a watch fulfilled *all* the following criteria, then it

appeared decisively more likely that, on the whole, it is still in its original condition:

- It has a movement that is installed in a case in which the case back is the one originally supplied by the factory
- The movement does not rattle
- The spring is not pressed in

So the watches recorded in the database were re-grouped, this time based on age and thickness. The result confirmed the assumption that the earliest watches had the thinnest cases and that later, more material for the case and lugs was requested (or simply used by the manufacturer Huguenin Frères without a special request). The third and thickest case was developed for the RAAF (Royal Australian Air Force) in 1957, and later used for civilian versions as well. As mentioned above, we later learned from former Herstmonceux watchmakers that the case backs during military service remained with the case band and the retainer ring. So this re-grouping was in vain, though it led to the correct result.

In this context, collectors must be addressed directly. Due to the fact that nearly all IWC Mk. 11 have been polished at least once, and often much more frequently throughout their lives, the external differences in thickness can vary greatly between individual watches. For this reason, the external thickness of the watch is not a reliable indicator as to which generation the watch belongs, in particular in the case of RAF Mk. 11s, which had only two generations with a difference in thickness of only 0.3 mm. An unpolished or slightly polished case from the first, thinner generation may have the same thickness as an average to thoroughly polished case from the second, thicker generation, not to mention errors in measurement when comparing two different watches. Clear indicators of the authenticity of the case are whether the movement rattles in the case, whether the round steel spring on the interior of the case back is deformed, or how thin or thick the lugs seem when viewed from the side. The aforementioned conclusions are therefore not the result of observing individual watches, but rather the result of the fact that when all of the measured watches were charted on to a graph, this produced three different peaks shaped like Gauss curves in which each peak represents a specific case thickness, and the distance between the peaks of these roughly corresponds to the measured difference between the thicknesses of the retainer rings (the third and thickest case version with only a slight increase in height as the increase in height of the third version of the retainer ring partly compensating a thinner glass). As with a Gauss curve across the total population, the peak of the curve does not preclude one single element in the entire population from exhibiting a totally different value; accordingly, the authenticity of a single IWC Mk. 11 case cannot be judged only by the thickness of the case as measured today. However, since polishing will never make a case thicker than it originally was, a case that is thick today could never have originally been part of a 'thin' 1948 version of the Mk. 11, while a case that is thin today could have originally been part of the second generation, or, albeit significantly less likely, part of the even thicker third generation, of watches.

Part 3 will appear in the May issue of the HJ

Man is (Still) Not Lost

Revisiting the Mark 11 Navigational Wristwatch Part 3: Civilian Watches and the RAF

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Which and how many civilian Mk. 11 were sold by IWC and which air forces flew with which versions of which series of Mk. 11?

3.1. Civilian Mk. 11 (Except BOAC)

Given the fact that the Mk. 11 went on to become a legend among military navigational watches, it may seem strange to start with the *civilian* versions. As demonstrated below, however, the boundaries in certain areas are fluid, and therefore it seems sensible to start out by separating the truly civilian Mk. 11 from those that only seem to be intended for civilian use.

For a long time, the general view was that there were four series of civilian Mk. 11 watches, three of which had numbered cases and the fourth with un-numbered cases. First, it should be said that there are only two series of numbered cases: the series with the case numbers 1,726,701 *et seq.* and 1,892,951 *et seq.* The alleged third numbered series is actually the result of transposed digits when recording the numbers of the second numbered series.

The civilian Mk. 11 pieces with un-numbered cases do not derive from one series only, but were produced at different points in time between 1951 and 1967. This can be concluded from several details. Perhaps some of these cases were not produced for the civilian market, but rather were sent to the RAF as spare parts or were leftovers from production runs planned with some reserves regarding the number of pieces. When comparing the number of Mk. 11 movements that were produced in the respective years with the scope of the deliveries to the Royal Air Force, the Royal New Zealand Air Force (RNZAF) and the Royal Australian Air Force (RAAF), it is clear that before 1957, no substantial number of watches could have been manufactured for civilian use. This corresponds to the fact that there are no known civilian Mk. 11s with the 'white 12' dial (except for BOAC) used by the RAF from 1948 to 1952. It is impossible to determine exactly how many civilian Mk. 11 were produced and sold without case numbers. In total, un-numbered civilian IWC Mk. 11 watches are seen on the market about as often as watches from the Royal New Zealand Air Force or the South African Air Force.

When it comes to numbered civilian cases, IWC's case ledgers for both series contain relatively few entries and only sales that were made to civilian retailers, including a company in Milan, a company in Colombo, and the IWC branches in Frankfurt and London. It was assumed that the watches that were not entered into the ledger as sold were in fact not sold; if watches with case numbers appeared on the market that were not recorded as sold, it was assumed that IWC employees had

simply taken these cases, or that they had been sold by the kilo at a time when no one was left at IWC who cared about these old stocks of cases and movements. As we will demonstrate below, this may hold true on the whole. Apparently, however, there were also military deliveries that were not entered as sold – possibly without the intent to hide or conceal anything.

The database specified above (which is not suitable for publication because it would give counterfeiters too much information and comprises data retrieved under a confidentiality agreement) contains notable anomalies:

For the second series of numbered cases (starting with the case number 1,892,951), the number of watches from this series that have appeared on the market is significantly smaller than the number entered in the ledger as sold – namely less than five per cent. This percentage corresponds to the empirical values observed with other valuable watches generally: considerably less than ten per cent, normally less than five per cent, of the watches recorded as sold in the manufacturers' books show up on the market decades later. Moreover, the Mk. 11 from this series that did appear on the market were all consistent: if they were offered as *military watches*, then there were many reasons to assume that they were counterfeit or a jumble of parts from several different watches. Contrasting with this observation, those that were offered as *civilian watches*, on the other hand, were recognisable as coherent watches from the 1980s based on their movement numbers, dials, hands etc. For this reason, we can safely assume that all watches from this series that were sold were actually purchased by civilians. However, it appears one small batch of watches was sold to a by now unidentified organisation: there exist some watches, which are very faintly engraved in the margin of the back, 'IX-nn' ('nn' representing a one- or low two-digit ID).

In terms of the first numbered series, starting with the case number 1,726,701, we see a completely different picture: the number of watches turning up on the market *not recorded as sold* was *greater* than the number of watches that were entered in the ledger as sold! Even more conspicuous: from the 19 watches having cases recorded as *unsold* that showed up on the market *and* for which *all data* could be retrieved, 16 (!) had either a movement that originated from a series of movements that was already established to be for the military, or a movement that, according to the IWC ledgers, was issued to either the South African Embassy, Garrard & Co. Ltd (the preferred supplier of the British Armed Forces at that time), or IWC London. Of these 16 watches, five had an AF marking (South African Air Force), while three others were not wristwatches but rather camera watches (10AF/807). So eight remained that had movements qualifying for a Mk. 11 but were unmarked, which does not comply with military standards. This quota cannot be applied to the entire first series of numbered cases. On the

contrary, the ledgers denote not only unsold cases, but also numerous cases recorded as sold as stated above: all sold to civilian retailers, in particular an Italian one and another in Ceylon. The Italian retailer bought Mk. 11 at a time when the RAF had already started to sell off mechanical wristwatches. So it is not very plausible that he acted as a shell vendee for the embargoed South African Air Force (at this point of time – the early 1980s – no military purchaser other than South African is to be taken into account): it would have been easier to buy such watches cheaper, more unobtrusively and in greater quantities from UK military surplus dealers.* On the contrary, the watches for the retailer in Ceylon were shipped years before the embargo on weapons for South Africa was put in place. So South Africa could have bought the watches without the diversion via Ceylon, South Africa at that time still being on friendly terms with the UK Armed Forces. Regarding watches in cases recorded as unsold, the numbers are too low to draw statistically significant conclusions.

In terms of the camera watches, **Figures 16A and 16B**, collectors will know that a watch marked 10AF/807 was fitted with a Mk. 11 movement and a Mk. 11 case back, but with an entirely different case in the weapon recorder of the RAF Lightning interceptor (as an aside, this was the first and only interceptor built in the UK capable of exceeding Mach 2). In its Stores Reference Vocabulary, the RAF laconically refers to Stores Ref. No. 10AF/807 simply as ‘Watch, modified Mk. 11’. With the exception of the case backs, the cases of these camera watches were not produced by IWC, but rather by the RAF itself or, more likely, by Vinten, the manufacturer of the camera for the weapon recorder. The recorder, located under the aircraft’s spine, filmed a second screen of the Lightning’s airborne radar including lamps indicating the status of various weapons systems, allowing the reproduction of dog fights the aircraft had been involved in. The December 2005 edition of the *Horological Journal* contains a detailed description of the weapon recorder and the IWC 10AF/807.⁴ The RAF did not purchase any additional movements from IWC for its camera watches, but rather used movements from Mk. 11s that it felt were no longer required. These RAF camera watches feature the typical RAF markings, in particular the broad arrow, the Stores Ref. No. 10AF/807 plus the ID of the particular watch. They generally used Mk. 11 screw-on case backs without a case number. There are also other versions with a numbered case back. In total, probably between 320 and 350 of these watches were made. Because the weapon recorder was part of the Lightning’s AI 23 Ferranti airborne interception radar, which was only introduced after the Lightning was first commissioned, the RAF camera watches without case numbers can be dated back to the early 1960s.

Of the additional camera watches with numbered case backs and known movement numbers discussed here, only one contained a movement that could be attributed to the RAF. It was, however, a movement without shock protection and therefore not suitable for the operating conditions of the camera watch. For this reason, we can assume that this watch is a combination of different watches. In contrast, the case back markings of the camera watches with numbered cases

* Shell vendee: A person who purchases on behalf of a third party, though pretending to act on their own account. Armed forces of embargoed states especially cannot buy equipment directly; they need intermediaries who buy in their own name but on behalf of the embargoed state.



Figure 16A. Dial of an RAF camera watch, 10AF/807.



Figure 16B. Markings of an RAF camera watch, 10AF/807.



Figure 16C. Camera watch with not yet identified markings, circa 1967.

generally do not correspond to those of the RAF camera watches. Sometimes the British marking scheme was only partially adopted, sometimes only the movement number is engraved in the case back, **Figure 16C**.

The order for the first numbered Mk. 11 cases was placed with IWC’s case supplier in January 1966. Around this time, the Royal Saudi Air Force ordered Lightning interceptors including the AI 23 Ferranti radar, as did the Kuwaiti Air Force soon after. As a result, the required number of camera watches had needed to be manufactured for these interceptors. A batch of various Mk. 11 movements that were manufactured in 1966 and delivered to Garrard & Co. Ltd. in 1967 probably included the movements required for those aircraft. A number of different types of these camera watches have been found in recent years, containing movements from this 1967 delivery and case backs with numbers from the above-mentioned first order of numbered Mk. 11 cases, as well as typical military markings that cannot be attributed to the RAF. We can realistically rule out the idea that non-engraved case backs of existing civilian wristwatch cases were used to create counterfeit camera watches. One would have to have not only the left over, highly specialised parts for camera watches and coincidentally also have movements that were sent to Garrard & Co. Ltd, but one would earn less money with this counterfeit than one could get for a civilian Mk. 11 wristwatch. For this reason, we can assume that these are original camera watches for the Royal Saudi and Kuwaiti Air Forces that used original, later-manufactured Mk. 11 movements and Mk. 11 cases from the case order that was placed in early 1966. Before this order was placed, IWC likely incorrectly anticipated what was coming, or otherwise there

was likely a misunderstanding, resulting in Schaffhausen ordering complete Mk. 11 cases from its case manufacturer rather than just case backs. This situation may be the reason why the cases were not recorded as being sold: the cases that were in storage were nearly complete and all that was missing were the backs. For this reason, perhaps, they were not entered as sold (hoping that they could be used for other references). We will most likely never know the reasons why the sale of the numbered case backs for camera watches was not recorded. The identification numbers of these watches and the number of Lightnings ordered by Saudi Arabia and Kuwait indicate that around 180 of these watches exist.

In 1967, according to the IWC movement ledgers, a total of 35 movements was delivered to the South African Embassy in Bern (in the same way that the SAAF undertook for complete Mk. 11s in 1961). At the same time, at least five cases from the series 1,726,701 *et seq.* exist that are marked 'AF', the mark of the SAAF, and contain military movements. These movements are either part of the 35 movements described above, or part of a batch of movements sold to the South African Embassy in 1961. It is a striking coincidence that the movement numbers in watches sold to the South African Embassy pop up in cases marked AF in a way consistent with the markings and numberings of the South African Air Force. This cannot be the result of (a) dealers swapping movements sold to the SA Embassy in such cases or (b) forgers producing such cases to house movements sold to the SA Embassy as those movement numbers are not known to the public.

The authors therefore deem these watches to be genuine South African Air Force Mk. 11. However, there exist watches with similar or near to identical markings with movements of (put modestly)debatable background, not recorded as sold to South Africans.

For this reason, given what we know today, we must assume that a significant number of watches from the case series 1,726,701 *et seq.* were sent to the armed forces of various countries – to South Africa as a Mk. 11 wristwatch, to Saudi Arabia and Kuwait as 10AF/807 camera watches with movement numbers 1,811,xxx and also to the RAF as unmarked case spare parts.* However, we also find debatable watches in the field, which pretend to be of military origin but can't be confirmed to be military. So wristwatches with military markings from this series of cases are 'hot potatoes', so to speak. Every collector should think twice about whether to take the risk of buying a watch that IWC will perhaps not confirm to be authentic.

Naturally, none of the Mk. 11s that were sold to civilians in numbered cases included the broad arrow on the dial. These watches were manufactured at a time when radium was no longer used in the dials. However, the dials did not feature the encircled 'T' of the RAF but rather, in the original version, 'T Swiss T' was printed at the bottom of the dial below the 6, indicating the use of tritium. There are no known civilian white 12 dials if the BOAC is excluded from the definition of civilian watches. The civilian dials that were originally installed in the watches differ significantly from the dials that were later produced as spare parts in terms of one aspect: both

are printed with 'T Swiss T', but on the original dials, the words 'International Watch Co.' are printed a bit above the 10 and the 2, while the replacement dials that were manufactured later in the late 1980s and early 1990s have this text printed exactly between the 10 and the 2. In the meantime, 'T Swiss T' has disappeared from the *replacement* dials since tritium is no longer used and has been replaced with other, safer, materials. It is similarly easy to separate original hands from after-sales hands. On the original hour and minute hands, the part of the aperture for the luminescent material closest to the dial centre terminates in a triangle; on the after-sales hands, the aperture is squared-off at this position.

On the whole, the second series of numbered Mk. 11 cases apparently did not make its way into the military. These cases were used for watches sold to civilian customers, while the unsold cases were either scrapped or sold to employees or other interested parties at scrap prices. Regarding the first series, about a third of these were sold to civilian customers. A substantial number was used for camera watches for Kuwaiti and Saudi Lightnings, though this sale remained unrecorded. Regarding those, which are in themselves consistent as watches marked SAAF on the case and bearing a movement recorded to have been sold to the South African Embassy, there is near certainty that the watches are authentic. However, those not consistent (especially those in cases), not recorded to have been sold and containing movements recorded as unsold, at least for the time being have to be deemed third-party put-togethers from cases sold by IWC in a clearance sale of excess stock (if not simply taken by employees without notification).

3.2. Royal Air Force (RAF)

3.2.1. The Mk. 11, the RAF Canberra and V-bombers

The Mk. 11 was procured by the RAF at a time when the RAF still owned a large number of four-engine propeller bombers. However, when the Mk. 11 started its military service, it was already clear that the future would not involve large fleets of slow propeller aircraft carrying great numbers explosive and incendiary bombs. Rather, small groups of agile, jet-propelled bombers, together with the use of electronic counter measures (ECM), would break through the radar belt of the Iron Curtain and be able to drop conventional or, if necessary, atomic bombs on to Russian cities and institutions.

In the 1950s, Russia did not yet have radar monitoring throughout the entire country. It had only a radar-monitored strip of land on the outer borders of the Warsaw Pact, around the largest cities and particularly important facilities. As a result, once the radar belt along the edge of the Iron Curtain had been penetrated, an RAF plane flying over the Soviet Union would be 'invisible' if it avoided the larger cities and other radar-protected areas, as long as it did not give itself away. Since WWII, Bomber Command had been painfully aware of the fact that it was possible to locate a plane by simple means if it emitted radio waves or radar beams. The RAF had not initially realised that the Germans were homing on the H₂S beams (the etymology of this nickname for the airborne ground-scanning radar referred to in the text is unclear, but it is sometimes also written as H₂S, without the subscript) emitted by the British navigation radar, which allowed them to guide the German night fighters to the RAF bombers and to shoot them down in considerable numbers. For this reason, in the early stage of the Cold War, the RAF was interested

* The xxx here refers not to a military ID, but simply denotes, as with military IDs, that the serials come from the range of 1,811,001 through 1,811,999. Not all 999 movements from this movement numbers range are military – many are civilian.



Figure 17A. Working station of a NavRad in an Avro Vulcan RAF nuclear bomber.



Figure 17B. Working station of a NavPlot in an Avro Vulcan RAF nuclear bomber.



Figure 18A. Periscopic sextant from an Avro Vulcan RAF nuclear bomber.



Figure 18B. Periscope of a periscopic sextant.

in navigation methods that would not reveal the presence of their aircraft through radiation and would also allow for precise positioning on long-range sorties. The only method that satisfied these requirements was astro-navigation – the naval practice of determining the position of a vessel by observing the stars.

In the early Cold War, both the RAF English Electric Canberra (a medium bomber able to carry nuclear weapons and also used for reconnaissance) and the RAF V-bombers (Vickers Valiant, Handley Page Victor and Avro Vulcan) were out of reach of Russian AA guns. Their MIG interceptors and surface-to-air-missiles were simply not able to reach this height. That changed in the early 1960s, when the U-2 was shot down. From that point onwards, bombers had to stay below the enemy radar and approach their targets at low altitudes.

The crew of the bigger V-bombers consisted of two pilots, the Air Electronics Officer (AEO), who was responsible for the electronic counter measures (ECM) to overcome the Russian defence belt along the borders of the Warsaw Pact, and two navigators – the NavPlot and the NavRad, **Figures 17A and 17B**. After the RAF switched from high altitude attacks to low level approach due to improved Russian AA measures, the NavPlot was responsible for getting the aeroplane to a specific point: namely, the starting point of the low-altitude bombing run. The tools that the NavPlot had to get the aircraft to this point were two special periscopic sextants (one each on the port

and starboard sides) **Figures 18A and 18B**, his Mk. 11 and astronomical tables. From this point on, the bomber would then head to its assigned target, the NavRad responsible for guiding the pilot to it. For this purpose, the NavRad required a downward-facing navigation radar, hence the name NavRad. He had memorised the topographical features and landmarks visible on the radar screen between the start of the bomb run and the target, and could therefore quickly provide the pilot with precise information on the plane's location. However, in order for this to work, the NavPlot had to bring the plane to the determined starting point of the bomb run with such great precision that the NavRad would quickly know with certainty exactly where the plane was at any moment, and in particular where the next hill or other obstacle that needed to be avoided was located in the event of a low-altitude attack.

During WWII, the No. 8 (Pathfinder Force) Group was an elite unit made up of the best RAF navigators. Its task was to mark the targets of the raid by bonfires, which average navigators of the following main bomber forces could head towards, increasing bombing accuracy. The No. 8 Group therefore became legendary. During the Cold War, the crews of the Canberras and V-bombers were a similarly elite unit and eminently respected throughout the RAF, as they lent it the level of believability required for mutual nuclear deterrence. At any time, on a 24/7/365 basis, some V-bombers were fully fuelled and armed on standby, ready to scramble within four minutes after the alarm was given and to respond

to any Russian attack. The ability to deliver a counter-attack depended on the ability of NavPlot and NavRad to guide the pilots to the target. In turn, this ability depended on their navigational equipment, with the Mk.11 amongst other tools providing exact time. The Mk.11 being known as the V-bombers' 'crew member made of metal' and the backbone of the UK nuclear deterrent made it the myth other navigational watches such as the 6B/159 never became. Other legends were the EE Canberra crews conducting reconnaissance flights over Russia until 1962, when the Russians managed to shoot down an American U-2. To make such reconnaissance missions a success, not only were good photographs of Russian airfields and other military establishments required, but also a precise report of *where* and *at what exact time* these pictures had been taken – a task that required navigational skills and equipment that were both high-grade. In 1963, 'Blue Steel', a predecessor of today's cruise missiles, entered into service. This had an inertial navigation system accurate to within 100 metres and allowed the crew to tie the aircraft systems to the missile's navigation unit. This saw astro-navigation, officially still the main navigation system, lose importance as the crews, with their 'hands-on' mentality, started to make use of the missiles' guidance systems to plot their flight plans rather than establishing their positions by complex and challenging celestial navigation.

3.2.2. Figures, Dials, Hands and Other Details

A variety of new, detailed findings has emerged regarding the number of IWC Mk.11 that were issued to the RAF. In summary, we can report that the RAF:

- in 1948, ordered 2,000 IWC Mk.11 with military IDs ranging from 101/48 to 2100/48 (IWC was evidently notified early that this order would definitely be placed, as production of these movements started in 1947), and
- ordered another 2,000 Jaeger-LeCoultre Mk.11 in 1948 with military IDs ranging from 2101 to 4100, and
- received all 4,000 of these watches in 1949. To avoid mixing up the military IDs and the manufacturers' case numbers, the watches show only the military ID on the outside, and inside only the movement number.
- In 1950 the RAF ordered another 900 IWC Mk.11s with IDs ranging from 101/50 to 1000/50 and received them in 1951. A comparison of identification numbers of watches that had been observed in the field with the total number of watches issued to the RAF reveals that once again, in this year as well as in the watches ordered in 1948, the military identification numbers can have started only with 101/50. It is likely that only 855 watches from this order were delivered.
- In 1951, the RAF ordered another 2,000 IWC Mk.11 with IDs ranging from 101/51 to 2100/51 and received almost the full order in 1951 and 1952. We assume here that the military IDs assigned to the watches from this order also did not start with 1 but rather with 101, an assumption that is supported by the fact that there is no IWC Mk.11 in the above-mentioned database that was ordered between 1948 and 1952 and has an identification number lower than 101.

- In 1952 the RAF ordered presumably another 2,300 IWC Mk.11s with IDs ranging from 101/52 to 2400/52; these watches were delivered in 1953, with any leftover watches possibly delivered in 1954. The order was not filled completely. Maybe it was not possible to regulate all 2,300 watches in a timely manner in accordance with the strict requirements, but it is more likely that those watches were instead directed by the RAF to the RNZAF and/or other Commonwealth Air Forces due to urgent needs. For the watches ordered in 1952, we can once again assume that the military IDs started at 101 rather than at 1.
- From 1959 onwards, the RAF used 320 to 350 'modified Mk.11s', marked '10AF/807' and evidently containing movements from excess stock of Mk.11 wristwatches as camera watches for the weapon recorder of Lightning interceptors. As far as we can tell, the cases of the camera watches were not produced by IWC, but rather by the RAF itself or, more likely, by Vinten, the manufacturer of the camera of the weapon recorder. The recorder filmed a second screen of the Lightning's on-board radar and the status of various weapons systems so that aerial battles could be reproduced.
- From 1966 to 1968, another 180 camera watches were manufactured for the Royal Saudi Air Force and the Kuwaiti Air Force. For the most part, this second series used new movements and new case backs from the case series 1,726,701 *et seq.* Moreover, some of the case backs from this series were sent to the RAF as spare parts.

Based on the figures, the numbers ordered were evidently based on the three- to four-digit numbers of bombers that were used for attacks in the second half of WWII. For the Cold War with its jet-propelled atomic bombers and long-range reconnaissance aircraft, there was a surplus of navigational watches, which allowed the RAF largely to avoid issuing Mk.11s without shock protection. Instead, it kept these in storage.

Dial Types

We know that the RAF used three different dials: (1) the first generation of dials of both IWC and JLC has the number 12 printed in white in the 12 o'clock position (the so-called 'white 12') with radium luminous compound, (2) the dial that was in use after 1952 with the triangle in place of the 12, also with radium (the 'post-1952 dial') and (3) the same dial, used from around 1963, but this time with tritium luminous compound and stamped accordingly with the encircled T (the so-called 'encircled T dial'), **Figures 19A to 19C**. Sometimes the dials would be stamped only with a T without a circle around it. JLC watches with an encircled T on the dial are rare, while the post-1952 dial is the most commonly encountered dial on JLC Mk.11s. Variants can be spotted within these types of dial. For example, there exist IWC dials where the line indicating the 55 minutes position points directly at the first figure of the numeral 11 placed under the 55 minutes marker, while with other dials the 55 minutes marker ends a little bit to the left of the numeral 11. Accordingly, the inscription 'International Watch Co.' is in a slightly different position from time to time.

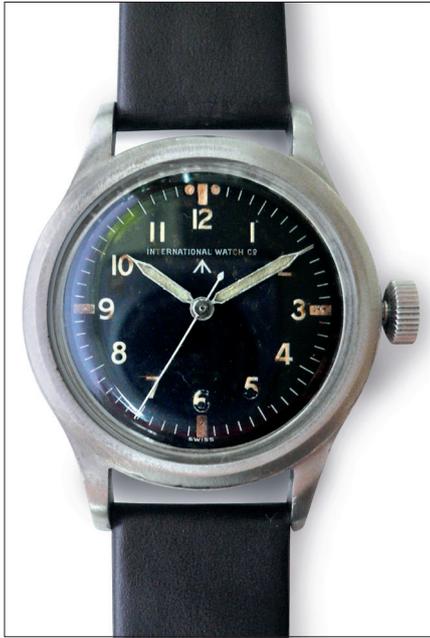


Figure 19A. IWC Mk. 11 RAF 'white 12' dial, in use 1948 through 1951.



Figure 19B. IWC Mk. 11 RAF Standard dial, 1952 to 1963.



Figure 19C. IWC Mk. 11 RAF 'encircled T' dial, 1963.



Figure 20. Non-original 'white dial' and 'black dial' made from brass instead of soft iron.

On some dials the leading letter I of 'International' is directly under the first figure of the numeral 11, sometimes slightly offset to the left. Another variation is the so-called 'hooked 7', a version where the left edge of the horizontal bar of the figure 7 terminates in a short downward stroke, forming a little hook. Later on we will come to the reasons why this originally rare version was seen on the market quite often about two years ago.

In addition, a series of well-known white dials still show up on the market, *which are not made of soft iron* but rather of brass, and they have black counterparts of the same design which are also made of brass, **Figure 20**. We know that these dials are replicas that were made by retailers who purchased at auction mechanical watches without dials, which had been taken out of service by the British Armed Forces, including Mk. 11s. These retailers then had corresponding white and black dials produced, in order to complete these watches and to have a selection of different dials available. As these dials were not made by the manufacturer, nor under the direction of the MoD (and the Mark 11 in any case was never fitted with

a non-IWC dial as we have mentioned), these watches cannot be considered fully original. They also no longer comply with the RAF's Mk. 11 specification in two ways: (1) the specification explicitly stated that the dial must be matt black, and (2) that the dial must be made of soft iron in order to protect the watch against magnetic fields. The rapid increase in prices for original Mk. 11 dials over past years suggests that, given the significant drop in the prices of watches with white dials in the past years, most white dials have been replaced with original dials.

However, there exists also a small number of IWC Mk. 11 with white dials (not to be confused with the white dials described above) that match the original military dials in every way except for the colour and, in particular, are made of soft iron and were even produced by the same (OEM) manufacturer, **Figure 21**. The watch in this image is in unusually good condition; most of the other white soft iron dials show more significant signs of ageing. By all accounts, these white soft iron dials were produced in the 1960s or 1970s; certainly before the after-market ones described

earlier, and certainly not recently. Rumour has it that they were used on Royal Navy submarines. These rumours may be based on the fact that the chronographs and also one specific three-handed watch that were used by the British Armed Forces normally had a black dial, but that a variant with a white dial and without radioactive luminosity existed for use on nuclear-powered submarines. However, the watches with white dials that were intended for use on submarines had a special Stores Reference number and a different specification from their counterparts intended for normal operations. In this regard, the situation for these watches (and the Mk. 11) was different from that of the old RAF 6B/159 navigational watch: the latter's specification did not include a colour, a certain material for the dial or the case,

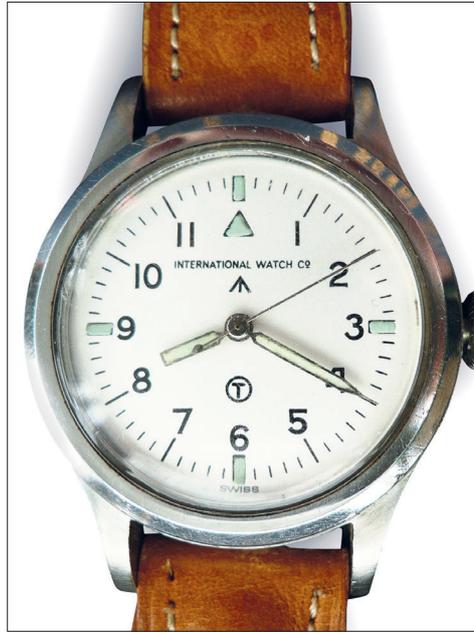


Figure 21. IWC Mk. 11 'white soft iron dial', use unknown.

or a particular luminescent material or lack thereof. For this reason, in 1956, when various 6B/159 watches from the three brands that had proven to be the best – Omega, Longines and JLC – received new steel cases as a replacement for the original cases, which had been susceptible to corrosion and constantly experiencing problems with water-tightness, they could also switch from a white to a black dial with radium luminous material without issuing a new Stores Reference number: the colour of the dial, the presence or lack of luminous compound, and the material used for the dials were not part of the specification for the 6B/159, and therefore these changes did not result in a change in the specifications for these watches.

In terms of the Mk. 11, there is no known special specification nor individual Stores Reference number for a white-dial version. For the time being, we must therefore assume that the white soft iron dial, though similar to the original military dial, is not originally from the military. We do not have any further information on this dial.

Last, but not least: in the past, IWC Mk. 11 with an atypically-printed dial showed up here and there (although this is no longer the case today), **Figure 22**. These genuine military dials were originally intended to be used as replacement parts for the General Service Watches from Hamilton, Stores Ref. No. 6B/9101000 (without stop-seconds) or 6B/9614045 (with stop-seconds). The Stores Reference number 6B/9101000 is the old Stores Reference number 6B/542; correspondingly, most Omega 6B/542 watches are marked twice, the second time with 6B/9101000. For follow-on orders, the Omega watches were apparently too expensive, so the RAF instead purchased Smiths and Hamilton watches under this specification. These watches have some protection against magnetic fields and therefore the dial also has a protective function, but not to the same extent as the IWC Mk. 11. Since these Hamilton and Smiths were also protected against magnetic fields and, at least under the 6B/9614045 specification, were also equipped with stop-seconds, some collectors use the terms 'Hamilton Mk. 11' or 'Smiths Mk. 11',



Figure 22. Hamilton MoD dial, in late stage mounted as well on IWC Mk. 11.

while others have referred to these watches as 'the poor man's Mk. 11'; however, neither watch is as precise nor as well-protected against magnetic fields, which means they are not truly Mk. 11s. The Hamilton dials also fit the IWC calibre 89 in terms of their dimensions. For that reason, it is possible that once the Mk. 11 was downgraded to 'Watch, Wrist, General Service Watch', the RAF started to install unbranded dials procured for Hamiltons on IWC Mk. 11 watches. At least some dealers made use of the fact that Hamilton dials can be mounted in an IWC Mk. 11.

Furthermore, at least three series of civilian IWC Mk. 11 dials exist that look like military ones and comply with the military requirements, i.e. they are made of soft iron, are matt black with white numerals, show the typical post-1952 Mk. 11 font, have the broad arrow and frequently also the encircled T. These dials are replacement parts that IWC manufactured after around 1990 and that were used in watches that were brought in for service (hereinafter we will refer to these dials as 'after-sales dials'). This is the point at which the vastly different perspectives of a collector and of a watchmaker clash: IWC's number one priority is to ensure that the watches they service run precisely and without issues; after all, IWC is providing a warranty for watches serviced in Schaffhausen. Particles from the old luminous compound and even small rust particles from the soft iron, which is susceptible to corrosion, can come loose from old dials and watch hands, which could result in problems in the movement. It is also not possible to refurbish old dials because radium and tritium are both radioactive, and for reasons of occupational safety, employees are no longer permitted to carry out work on these old dials. For that reason, it is in IWC's interest to replace these dials and hands, while collectors are more interested in the authenticity of the watch, and therefore want to keep the old dials.

It is easy to identify the oldest of these IWC RAF after-sales dials because, just like the civilian counterpart without a broad arrow or an encircled 'T', they are printed with the words 'T Swiss T' underneath the 6 and with the words



Figure 23A. IWC Mk. 11, current after-sales dial.



Figure 23B. IWC Mk. 11 'hooked seven' with printed 'encircled T'.



Figure 23C. IWC Mk. 11 after-sales hands.

'International Watch Co.' at the top between the 10 and the 2, and not above the 10 and the 2 as in the original old dials. The second series of after-sales dials is not printed with 'T Swiss T' because the dials no longer use tritium lume, **Figure 23A**. However, a number of other details make it possible to determine that these are not original dials.

About two years ago, watches coming back from a service at IWC showed a replacement dial in a look referred to amongst collectors as the 'hooked 7'. Originally a quite rare version, all of a sudden substantial numbers of this version popped up on the market. Surprisingly, these are not twenty first-century production, but are old stock from the 1960s sitting still in the IWC stock, **Figure 23B**. Having spotted them, the decision was made to use them in the service department. Now, they are used up and so the flow of new 'hooked 7' has run dry. It is not clear whether these dials were ordered by IWC awaiting an RAF order that never got placed (e.g. a further hoped-for Mk. 11 procurement made IWC not only order the first series of numbered cases for, but also the dials) or were rejected by the RAF as the 'hooked 7' didn't comply with the RAF specification and the RAF insisted on an 'unhooked' 7. These dials are highly interesting with regard to two aspects: Firstly the 'encircled T' is printed on to these dials in the same way as the numerals (in this context, 'printed' means the T was added during the initial production of the dial by the Swiss manufacturer, while 'stamped on' means added later by RAF in the UK). So with these dials, the 'encircled T' was added during the initial production process, whereas normally the 'encircled T' was added later. This is easy to spot as the 'encircled T' added later is not as crisp as the printing of the numerals and the maker's name. So obviously from a certain point in time onwards, the RAF, when ordering new Mk. 11 dials as spares, asked IWC to supply them ex-factory with the 'encircled T'. That explains why some collectors have spotted watches with a printed-on 'encircled T'. Secondly, as these dials derive from an order for spare ones, it appears that the 'hooked 7' models can't be attached to a certain year of issue as often assumed, but are simply some kind of

originally-rejected typographic style in a certain order for spare dials. Those dials recently found at IWC are easy to spot as they look too good to have been fitted to any watch before and the luminous compound, obviously not already decades old, has been freshly added professionally.

After-sales hands can be identified by the fact that the aperture nearest the centre for the luminous compound terminates in a square and not in a triangle as with the original hands, as described earlier, **Figure 23C**. The MoD did source spare hands for this watch, produced by local firms. However, for the Mk. 11 the MoD strictly did not source *any replacement dials* locally, the exception being the Hamilton dials described earlier, after the Mk. 11 was downgraded to 'Watch, General Service'.

With JLC Mk.11, avid collectors know that some, in addition to the normal markings, are engraved 'B97'. There are plenty of hypotheses around, including the theory that this is a de-commissioning mark. We might add another hypothesis: The MoD lists an instrument modification 'B97 Watches, Wrist Mk. 11 Waterproofing glass case', approved on 20 January 1954. Unfortunately no leaflet about this modification is available, so we don't know in detail which parts were altered. Maybe the marking B97 was applied to indicate to the quartermaster that the watch had improved watertightness and to the service watchmaker that they should use a different set of spares.

ENDNOTE

- Colin Hall and Thomas Koenig, 'Watches in Air Force Cameras, Part 1', *Horological Journal*, vol. 147 (Dec 2005), pp468-471.

Part 4 will appear in the June issue of the HJ

Man is (Still) Not Lost

*Revisiting the Mark 11 Navigational Wristwatch
Part 4: Overseas Air Forces*

Khurram Khan
Thomas Koenig
Greg Steer

4.1 Royal Australian Air Force (RAAF)

There are not many new findings regarding the RAAF and their Mk. 11 navigational watches.

As reported in the article from 2004, extant manufacturing documentation states that Jaeger-LeCoultre (JLC) produced 2,950 488/Sbr calibres that were reserved for Mk.11s of which 2,930 were sold, according to the documentation, **Figure 24**. It is assumed that the RAF purchased 2,000 JLC Mk. 11s while the RAAF purchased a first series of 420 JLC Mk. 11s and then, in 1953, purchased another series of 600, resulting in a total of 3,020 watches. This is a bit higher than the number that were produced and sold according to the JLC archives.

Having a look on the website <http://www.markeleven.com> (a valuable resource for the JLC Mk. 11), one might think the data presented there gives the key to solving this contradiction: of the 2,930 JLC Mk. 11s that were sold according to JLC, 2,000 went to the RAF, as demonstrated by the identification numbers of the JLC Mk. 11 watches that are currently owned by collectors, which start just above 2100 and end just below 4100. The 600 RAAF JLCs from the *second* series (1953) evidently began with 1; in any case, we know of a number of different watches from this series with (at times low) two-digit identification numbers. On the other hand, the above-mentioned website does not mention any RAAF JLC watches from the *first* series with a two-digit military identification number. This would suggest that the RAAF may have started issuing identification numbers for the first series of Mk. 11s with the same system as the RAF, starting with the number 101. Then there would be 2,000 RAF JLC Mk. 11s, only 320 RAAF JLC Mk. 11s from 1949, and 600 RAAF JLC Mk. 11s from 1953, totalling 2,920 watches. However, the National Archives of Australia houses the Air Board Orders (ABO). The RAAF used this publication to call in watches for service that had not been sent in for service even though the defined time period had elapsed. In 1954, under the numbers of watches overdue for service, there are three JLC Mk. 11s from the first series with two-digit identification numbers. The hypothesis that the RAAF started the numbering at 101 in 1949, therefore, has to be discarded. In fact, it is clear that 420 JLC Mk. 11s were sent to the RAAF in the first series, and 600 in the second series.



Figure 24. Jaeger LeCoultre Mk. 11: RAF on the left, RAAF in the middle and to the right.

However, the authors have observed several JLC Mk. 11 with movement numbers outside the range of movement numbers provided by JLC as recorded in their production records. So an enquiry specifically about these movement numbers outside the normal range was made. It took JLC some time to answer. The heritage department responded that the production records on these movement numbers had been lost. So obviously more than the reported 2,950 movements cal. 488/sbr were produced, though we don't know the exact number due to the loss of records at JLC.

IWC supplied the RAAF with an additional 600 Mk. 11s in 1957 – the first and only IWC delivery to the RAAF, **Figure 25**. The ABO recalled another eight Mk. 11, one with an unidentified ID, the others with RAF markings. These watches probably came from RAF navigators who visited Australia with their plane, where they realised their watches didn't work properly and so got RAAF Mk. 11s issued from the depot and in return handed in their RAF Mk. 11s. Vice versa, RAAF navigators might have realised their watches didn't work while visiting an RAF airfield, and therefore received RAF Mk. 11 replacements.

All JLC Mk. 11s, both the RAF series and the two RAAF series, have the broad arrow marked on the movement and as part of the markings on the case back, but not on the dials of the RAAF watches. Another minor difference between the JLC RAF and RAAF dials is that, on the RAAF watches,



Figure 25. Markings of the Royal Australian Air Force.

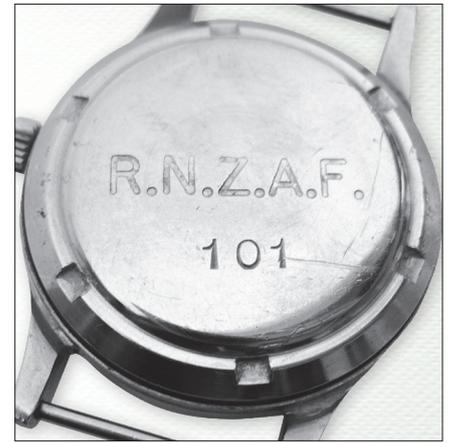


Figure 26. Markings of the Royal New Zealand Air Force, first series.

the upper part of the 3 with later dials is not rounded, but is instead horizontal, which is referred to as the ‘flat three’. JLC Mk. 11s have been found both with the ‘white 12’ dials as well as with the standard dials where the 12 is replaced by a triangle. The RAAF JLC Mk. 11s don’t have uniform hands; some are fitted with what are referred to as cathedral hands with a round, skeletonised tip on the hour hand, while some have the classic Mk. 11 hands with the short, ‘stubby’ hour hand. There are other additional JLC dial and hand variants that may have been manufactured by the RAAF itself as spare parts, including the so-called ‘pencil hands’; the authors are not making a definitive judgement on this matter in this piece. The RAAF IWC Mk. 11s do not have a broad arrow on the movement, the dial or the case back. All RAAF IWC Mk. 11s have the classic design that the RAF began using in 1952 with the 12 replaced by a triangle and, accordingly, the stubby hour hands. However, the dial is not printed with either the broad arrow or encircled T. All RAAF watches have the Stores Reference number G6B/346 (as a result of the slightly different nomenclature used by the RAAF).

There are rumoured reports of an additional batch of IWC Mk. 11 being sent to the RAAF in 1976, and there are examples seen that are engraved with NATO Stock Number (NSN) 6645-66-071-8382 xx/76 or xx/78. However, during the period in which they were qualified as ‘Watch, Navigational’ and later, after they were downgraded to ‘Watch, Wrist, General Service’ in November 1971, the NSN of the Mk. 11s was 6645-66-041-7754. On the contrary, that very NSN shown on these (total number six) debatable Mk. 11s, i.e. 6645-66-071-8382, showed up engraved professionally on a Lemania automatic chronograph, while on the six Mk. 11 the markings were not only executed unprofessionally, but also varied within them. In all cases for which the origins can be traced, those Mk. 11 marked 6645-66-071-8382 were delivered to IWC Frankfurt. Further research in the IWC archives did not result in any indication pointing to a delivery of IWC Mk. 11 to the RAAF during the second half of the 1970s. Observing all aspects – namely the Mk. 11 retaining the NSN 6645-66-041-7754 even after being downgraded to ‘Watch, Wrist, General Service’, unprofessional engraving, the availability of cheaper and more precise quartz watches in 1976 – there are reasons enough as a minimum, to question the authenticity of these watches.

4.2. Royal New Zealand Air Force (RNZAF)

Two series of Mk. 11s were sent to the RNZAF, both from IWC. Unfortunately, no delivery documents currently are known. Nevertheless, IWC used the fact that its watches were being used by the RNZAF for marketing purposes in adverts that ran in New Zealand at that time. The first series is marked with ‘R.N.Z.A.F. xxx’, making it easy to attribute it to the Royal New Zealand Air Force (‘xxx’ always stands for the three-digit military ID of the individual watch). The lack of delivery documents makes it difficult to determine exactly how many watches were delivered.

From the first series, 12 watches marked ‘R.N.Z.A.F. xxx’ are known. These have identification numbers between 101 and 195, **Figure 26**. However, of these 12 watches, 11 have identification numbers between 101 and 144, and the only higher number known is 195. We did not have the opportunity to subject that watch to closer inspection in its original form. The photos we have of the case back of the watch show markings that differ from the markings on the other 11 watches, in terms of both the owner marking ‘R.N.Z.A.F.’ and the shape of the numbers in the ID. Statistically, it is implausible that no fewer than 11 of the IDs from 101 to 150 have survived – in other words, more than 20% – while only one remains out of the next 50, or just two per cent. For this reason, the authors feel it is likely that the first series comprised just 50 watches with the identification numbers 101 to 150, and was delivered in 1952/1953 to the RNZAF via Goldsmiths & Silversmiths. A second partial series from 151 to 200 may have existed; however, at this time we have no sound basis for this assumption. The movement numbers all come from a block of 100 watches, of which the first 50 can be allocated to the RNZAF. We feel reasonably certain that the second 50 belong to the SAAF 1953 series.

The second RNZAF series is not evidenced by delivery documents either, as mentioned above but, unlike the first series, is not recognisable as a RNZAF watch at first glance. Nearly identical to the RAF case back markings, the watches in the second series are only marked on the case back with the broad arrow, the Stores Reference number 6B/346 and the identification number xxx/56. They were delivered to the RNZAF in 1957, **Figure 27**.

The watches with these markings that have been inspected are authentic beyond a doubt and are not counterfeits. As

we can extrapolate from different circumstances, they are also not part of a series of previously unknown British watches: initially, for seven of the nine known watches out of this series, it could be proven that they came from New Zealand. This is an unusually high percentage. Many of the watches that were sold un-refurbished came with reports from the seller that the watch belonged to a family member who was a member of the RNZAF. Given all of the stories that sellers regularly invent to make a watch more attractive, these sorts of reports should never be trusted when it comes to well-refurbished watches. However, if, as in this case, the watches are not refurbished, are described inexpertly and offered for low prices, this kind of report may be taken as a small indication of their authenticity. What appears to be decisive is that of the nine known watches from this series, three came from a delivery of 70 watches to Garrard & Co. Ltd. – the only batch that could be considered for this second series, given the delivery dates. Another movement came from a delivery of 600 watches to the RAAF, which is significant only due to the fact that the RNZAF and the RAAF both had their watches serviced by the same two Australian companies. Therefore, given the practices described above in terms of servicing these watches, the ones returned to the RNZAF and the RAAF could have been and must have been mixed together. Another watch has a movement from the first RNZAF series. The movement numbers for all other watches of this series are unknown; so every identified movement in a watch marked xxx/56 comes either from this second RNZAF series, the first RNZAF series or the series sent to the RAAF. Out of the 12 watches from the first series, two contain movements which can't be deemed original and another two movements that were originally issued to the RAAF. As the movement numbers of the watches sent to the RAAF and RNZAF are not publicly known, this excludes the possibility that the latter movements were swapped intentionally by dealers. As a result, this appears to be a sufficient basis to assign these watches to the RNZAF with a probability bordering on certainty.

It appears none of the movements of RNZAF watches from the first and for sure not from the second series is engraved with a broad arrow, though they originally had dials that were marked with broad arrows. However, during the course of the watches being serviced together with RAAF watches, it appears that no-one lodged a complaint if an (Australian) dial without a broad arrow was accidentally installed in an RNZAF watch. There is no 'encircled T' on the Australian or New Zealand dials.

In the RNZAF watches on the market today, alongside movements from the 1,245,xxx or 1,384,xxx series (the number in hundreds position is known, but intentionally not given here), that were originally allocated to the RNZAF,

* As in a previous footnote, xxx here does not refer to a military ID but denotes that the serials come from the range of 1,245,001 through 1,245,999.



Figure 27. Markings of the Royal New Zealand Air Force, second series.



Figure 28. Markings GAF/57.

some contain movements that IWC originally issued to the RAAF via Garrard & Co. Ltd.* This is evidently the result of these watches being serviced together. Of the 21 total known RNZAF watches, two contain movements with RAF movement numbers. Various details on these watches indicate that, after their military service, these watches were comprehensively refurbished. That was probably the moment when the RAF movements were 'swapped in'. If this was done based on the belief that a watch with a broad arrow on the movement would be easier to sell as a military Mk. 11, then it was clearly done without realising that the RNZAF Mk. 11 has no broad arrow on the movement.

What is striking is how many of the RNZAF watches have extremely shiny backs. Tests regarding the material show that the case backs haven't been coated or chromed but have been mirror-polished, a treatment resulting in increased protection against corrosion.

4.3. Ghana Air Force?

Time and again in reports or, even less frequently, at auctions, two watches marked 'GAF/57' and 'GAF/58' in addition to the RAF markings show up. These two watches bear the RAF ID 1423/52 and 2302/52; presumably they are not the only ones with this additional engraving, **Figure 28**.

There are three military interpretations of the three letters 'GAF'. Initially, and partly to this day, 'GAF' was the NATO slang for 'German Air Force'. However, the German Air Force never marked its equipment 'GAF'. For this reason, we can safely exclude this meaning. What can't be excluded is that the RAF unit set up to instruct pilots and navigators of the new German Luftwaffe, founded in 1956 and becoming operational in 1957/58, got watches marked like that for the RAF personnel involved. Another common interpretation of 'GAF', at least amongst watch collectors, is 'Ghana Air Force', obviously deriving from the fact that Ghana first gained independence in 1957. This interpretation is clearly shaped by the perception of many collectors that all abbreviations ending in AF and on a military watch must stand for Air Force; similarly, collectors assume that a slash followed by two digits always denotes a year. However, the Ghana Air Force was first established in 1959, and its official abbreviation is GHF, while GAF was used as the abbreviation for Ghana Armed Forces. Moreover, if GAF stood for Ghana Armed Forces and /57 stood for the year 1957, then the marking 'GAF/57'

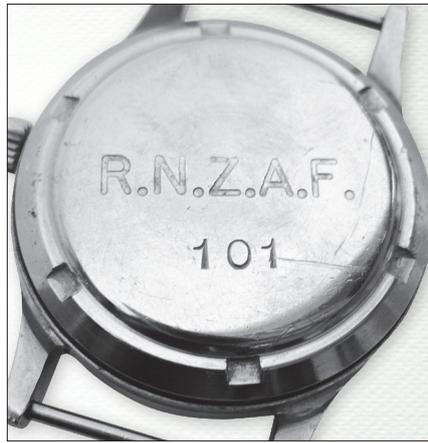


Figure 29A and B. Comparisons of the markings of the South African Air Force (left) and Royal New Zealand Air Force (right), both first series.

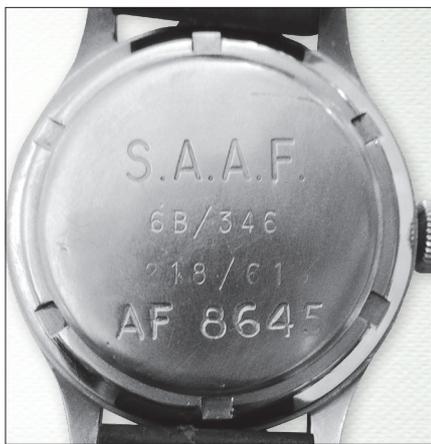


Figure 30. Markings of the South African Air Force, second series.



Figure 31. Markings of the South African Air Force, third series.

would make little sense because logically, this combination would allow for only a single watch per year. For this reason, the 'xx' portion of the marking almost certainly doesn't indicate the year, but must rather be the identification itself. Based on what we know today, 'GAF' standing for Ghana Air Force or Ghana Armed Forces is pure speculation. The third explanation for the meaning of the letters GAF is that they stand for Government Aircraft Factories, an Australian (primarily licence) manufacturer of aircraft that was founded in 1937 and was named Government Aircraft Factories, or GAF for short, from 1946 to 1986/1987, and belonged to the Australian government.[†] This raises the question, however, why an aircraft manufacturer that belonged to the Australian government and was located outside Melbourne would use watches that were clearly originally the property of the RAF instead of watches belonging to the RAAF. For this reason, we can be certain only of the fact that today, we have no plausible, let alone proven, explanation of the marking 'GAF/xx'.

4.4. South African Air Force (SAAF)

There are three known series from the SAAF.

[†] Regarding the term 'licence manufacturer': The Australians got the blueprints and maybe some key components of UK and US aircraft, and built them under the original manufacturer's licence down under.

The first is marked 6B/346 xxx/53. As discussed earlier, in 1953, the SAAF most likely received watches from the same production batch as the RNZAF from the first series. Similar to how the first RNZAF series is marked 'R.N.Z.A.F.', the SAAF watches from this series are marked 'S.A.A.F.' on the case back instead of a broad arrow. Both the method of applying the marks and the style of the characters 'R.N.Z.A.F.' and 'S.A.A.F.' and the font of the numbers of their military ID are nearly identical. For this reason, we must assume that the watches from the first RNZAF and SAAF series were marked in the same facility, either by the supplier Garrard & Co. Ltd. or the Chronometer Department at Herstmonceux, which then passed these watches on to the RNZAF and the SAAF, **Figures 29A and 29B**.

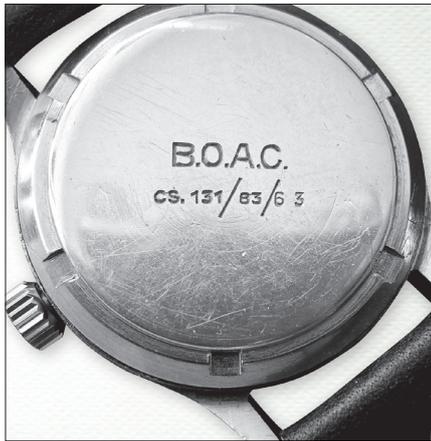
The first series of SAAF Mk.11 watches presumably comprised 50 watches. They were re-marked in the 1960s according to the new AF xxxx numbering put in place by the SAAF. These numbers replaced the old xxx/53 identification system. All watches from the first series received AF xxxx IDs in the 80xx range.

The second SAAF series comprised approximately 160 watches that are generally noted in the IWC ledgers as delivered in 1961/1962 to the South African Embassy in Bern. The

markings of these watches, 6B/346 and their military ID xxx/61 (sometimes xxx-61), were punched/stamped, whereas the later letters 'S.A.A.F.' and the new AF xxxx ID engraved. However, the engraved markings were less deeply engraved than those originally stamped. Because almost all of the SAAF watches show significant signs of wear, the engraved markings had frequently to be re-engraved. The later-applied AF xxxx ID in particular are often barely legible today. The AF IDs from the second series range from AF 85xx to AF 89xx, **Figure 30**.

The third series from 1967 comprised another 35 watches which, according to the IWC movement ledgers, were again delivered via the South African Embassy in Bern. The cases from this series were part of the first series of numbered cases and thus show case numbers on the inside of the case back. Outside, the only military marking is 'AF xxxx', given at the edge of the case back. The IDs range from AF 92xx to AF 95xx. It is unclear why these numbers cover a range of nearly 300 different identification numbers despite the small number of Mk. 11 supplied to the SAAF with this batch, **Figure 31**.

The xxx/53 and xxx/61 series are equipped with the standard RAF post-1952 dial with the corresponding hands and the broad arrow on the dial (not on the case back). Because the switch to tritium first commenced in 1962, they bear no encircled T. It would appear that the SAAF decided against converting the existing watches from radium to tritium dials. The 1967 series does not have a broad arrow on the dial nor



Figures 32. Markings of the BOAC, first series.



Figures 33. Dial variants, BOAC.

on the case back. As with all Mk. 11 movements made after 1956, the movements of the second and third series do not feature a broad arrow. There were too few watches from the first series still in existence to make any credible general statements about the markings of their movements.

On the whole, the Mk. 11 issued by the RNZAF and SAAF are the rarest military Mk. 11.

4.5. *British Overseas Airways Corporation (BOAC)*

BOAC was a British state-owned airline that took on a paramilitary character during WWII. The RAF was given first access to BOAC transport capacity, freight and personnel, and in 1941, BOAC was placed under the Air Transport Auxiliary (ATA), which transported military aircraft from factories and assembly plants to the active squadrons. In order to be allowed to fly to neutral countries, BOAC was not placed under the War Department or the RAF, but rather the Secretary of State for Air. It took on strategic importance due to its flights to Sweden (which was neutral during the war), where it was able to fly with unarmed de Havilland DH.98 Mosquitoes. These were another legend of the RAF, assigned only important tasks and with civilian registrations to bring in important goods for the British war industry, in particular ball bearings. This lent this flight route the nickname 'Ball-bearing Run'. On one of these flights, BOAC also flew Nobel Prize Winner Niels Bohr from Sweden, where he was living in asylum, because the British government wanted to discuss with him how close the Germans had come to building an atomic bomb. After WWII, one of BOAC's main tasks was to use its flying boats, and later its normal passenger aircraft, to keep Britain connected to its colonies. Due to its paramilitary nature during the war, BOAC was not particularly service-oriented, and the acronym was often translated as 'Better On A Camel'.

Unlike with the RAF, BOAC did not permanently issue Mk. 11 to navigators who would wear the watches day in and day out, during missions and in their leisure time. Rather, the BOAC Mk. 11 was issued as part of a set of instruments that were required for astro-navigation, and only for flights in which astro-navigation would be used (originally as the primary navigation method, later as a backup in the event that the primary navigation system should fail or experience a malfunction).

There are also no delivery documents for the watches that were sold to BOAC. However, it is possible to determine reliable numbers on the basis of the existing watches and IWC's manufacturing documents. Herstmonceux watchmakers report having serviced at least one batch of BOAC Mark 11s there, together with watches from the Armed Forces.

An initial series of 65 watches was delivered to BOAC in 1951. These are engraved with 'B.O.A.C. cs/131/83/xx' on the case back. On the inside they are not marked with a case number, but only with engraving markings, as with the RAF watches that were ordered in 1952 (which, in part, were already manufactured in 1951). According to statements made by two former BOAC pilots, which the BOAC/British Airways Museum unfortunately was unable to confirm, 'cs' stands for 'cartographic section'. We can assume that the number 131 stands for the set of astro-navigation instruments, while the number 83 stands for the included watch. This means that 'xx' would be the BOAC ID of the individual watch. However, this interpretation of the engraving is essentially an assumption and not a fact, **Figure 32**.

A total of five series was delivered to BOAC in 1956/57; the case back of each watch in these series was marked with the movement number of the movement that was contained in the respective watch when it left the factory. Evidently some BOAC movements ended up in different cases during service, but not nearly as many as with the RAF watches. The two series from 1956 and the first series from 1957 are marked 'B.O.A.C. PROPERTY' on the first line of the case back, and the respective (original) movement number on the second line. They do not have case numbers. The movement numbers are in the range of 1,371,9xx, 1,384,2xx and 1,417,5xx. The exact number of watches from these first three series is unknown; however, they are in the low two-digit range for each series, **Figure 33**. The second 1957 series comprises ten watches, starting with the movement number 1,435,5xx. The exterior of the case back is marked with 'SER.NO.', followed by the respective (original) movement number, and on the second line 'B.O.A.C. PROPERTY'. These watches likewise have no case numbers. The third series from 1957, comprising 20 watches, started with the movement number 1,446,4xx. These watches use the same engraving system as the first series: 'B.O.A.C. PROPERTY' on the top line, and the movement number of the original movement on the bottom. It appears BOAC Mk. 11 were, in part, serviced in Australia, because four BOAC



Figure 34. Markings of the BOAC, second series.

Mk.11 currently contain movements that were originally issued to the RAAF or the RNZAF. Unfortunately, there are also BOAC-marked watches that contain movements that belong neither to the BOAC nor to any military or civilian Mk. 11 watches, and are simply cal. 89 movements that have nothing to do with the Mk. 11.

At least the first 1951 series and, likely, the five 1956/57 BOAC Mk. 11 series were manufactured with the 'white 12' dial, which in most cases was later replaced with the well-known post-1952 dial when the watches were serviced. In any case, the original dials do not have a broad arrow nor the

encircled 'T', nor do they have the 'T Swiss T' marking under the 6 on the dial. Later, post-1952 dials and dials with the 'T Swiss T' marking at the bottom of the dial were used, most likely as part of servicing when the original dial needed to be replaced, **Figure 33**. But only the old 'T Swiss T' dials were used with the inscription 'International Watch Co.' over, not between 11 and 1.

There have been rumours that apart from BOAC, the Australian airline Qantas also used the Mk. 11; however, no proof has ever been found. Should this have been the case, then Qantas did not mark the watches that it supplied to its navigators as Qantas property, or only made use of the pool of the corresponding BOAC navigation sets.

Acknowledgements

We hope that we have offered the reader some interesting new information, and would like to thank all the people and museums who have helped us conduct the research for this article, especially the historic departments of IWC and JLC, John Griffiths, Robin Thatcher, David Read and Konrad Knirim, as well as numerous fellow collectors – there are too many to give their names here. Furthermore, we thank the team of the *Horological Journal* not only for publishing this lengthy article, but for fruitful discussions as well. We tried carefully not to infringe any copyrights for the pictures presented and hope that the people with whom we corresponded with were indeed the copyright holders.



AF 9405

SCARLETT

SCARLETT

SCARLETT

6B / 346
1946 / 48

SCARLETT

A.C. PROPERTY

SCARLETT

SCARLETT

6B/346
2057/51



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