

# COMBAT BIPLANES OF WORLD WAR II

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PETER C. SMITH

# Combat Biplanes of World War II

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# Combat Biplanes of World War II

A Personal Selection

Peter C Smith



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## Introduction

The biplane age is principally associated with the Great War (along with the triplane) and its immediate aftermath. Images of the Red Baron and other fearless aces duelling in almost medieval aerial aerobatics over the stagnant Western Front are the images that first come to mind. Or whirling battles with vividly coloured aircraft enmeshed in swirling dances of death in a circus of swarming aircraft. In truth the chivalry associated with these first air warfare combats was never that widespread while the carnage and slaughter inflicted was, *pro rata*, on the same ghastly scale as the rest of that hideous conflict. Over the years, in the 1920s 'barnstorming' era of the biplane the image changes from dedicated one-on-one legalized murder to derring-do of a different calibre with crazy and fearless men (and women too) dicing with death in aerial gyrations of a different nature, and daring flights around the world in machines composed of flimsy wires and struts, much as in the pioneering days of aviation.

By the time the Second World War broke out in 1939, the biplane in most countries' national air forces was a relic of that past age. The monoplane dominated both the fighter and the bomber arms, whether it be the British Hurricane and Spitfire, or the German Messerschmitt Bf.109 and 110 in the Battle of Britain; the British Blenheim and Wellington or the German Junkers Ju88, the Heinkel He111 and the Dornier Do.17, or even the crank-winged Junkers Ju87 – it was monoplanes that opened the war in the air and even Poland offered combat with the parasol-winged PZL P7 and P11 fighters and ground attack units equipped with the PZL 23 *Kara* and the 37 *Los*.

In Italy, it was the mass ranks of the Caproni, Fiat and Savoia-Marchetti monoplanes that Mussolini promised would dominate the skies over the Mediterranean. In the Soviet Union it was the same with the Rata fighter cutting her teeth in the Spanish Civil War and against the Japanese in the Far East in a couple of little undeclared 'incidents', while the Japanese themselves were drubbing the Chinese with the Mitsubishi Type 96 monoplane, and were soon to introduce the world-beating Mitsubishi *Rai-sen*, soon to earn fame as the Zero fighter, but still employed the Nakajima E8N floatplane aboard their heavy warships in the early stages of the Pacific War. In the United States the Curtiss Company was replacing its biplane Hawks with monoplane types, the Lockheed P-38 Lightning and Bell P-39 Airacobra, while the little Boeing P-26 Peashooter had been in service many years.

However, some biplanes *did* linger on in front-line service in many nations. It is to the shame of British politicians of this era that the majority of them were in RAF or RN service, showing just how neglected our defences had become. Indeed, in 1940, Britain was still designing warplanes of the biplane type, *viz* – the Fairey Albacore! But if the

British led the way in retaining obsolete machines, other nations also contributed to the total, surprisingly, the Luftwaffe of Nazi Germany and the Soviet Air Force as well. Even the Americans were still flying biplanes (the Curtiss Hawk) in 1939 and 1940, although these were replaced before she herself was forced into the war in December 1941, whereas the British continued to use such aircraft until 1945 and beyond.

Just as remarkable as their continued employment and longevity in combat roles was their resilience. Totally outclassed they might have been, but somehow biplanes continued to be of value, and some, like the Walrus, continued to be employed into the immediate post-war years.

It should also be stressed that this book does not pretend to list *each* and *every* biplane that took part in World War II; even the most fanatical rivet-counter among the critics would be hard-pressed to do that. I am well aware that the RAF still flew the Hawker Hind with No. 609 Squadron at Yeadon and the Hawker Hardy was still serving with No. 6 Squadron in Transjordan, the Blackburn Shark was with No. 4 AA Co-Operation Unit in Singapore as late as 1942, and with the Royal Canadian Navy until 1944, and that the Hawker Hart still flew in some services' air forces. The old Saunders-Roe London biplane flying boats served at Gibraltar in 1940 as did No. 240 Squadron, which also used some Supermarine Stranraers. Another seaplane survivor was the Supermarine Sea Otter, which was still in production in January 1946, a true survivor. Antique Fairey Gordons of No. 4 FTS helped rout the Iraqi Army at Habbaniya in May 1941. Also that the Fairey Fox was operational in May 1940 with the Belgians and others, that the French Breguet Bizerta flying boats were used by both their owners and requisitioned for operational use by the Luftwaffe during the Battle of Britain and that the Luftwaffe also used the Heinkel He.60 float-plane in Norwegian waters in 1941–2; also that the Dutch in the Netherlands East Indies still had the Koolhoven FK-51, and even that the Philippine Air Force was still flying the Keystone B-3 in 1942. One could go on, but the aircraft in these pages are the ones I have selected as meriting fuller descriptions and lack of space meant the line had to be drawn somewhere.

This book is a tribute to these dinosaurs of the skies and a memory of the brave men who flew them against all odds.

Peter C. Smith  
Riseley, Bedford, April 2014

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## Chapter One

### Avia B-534

One of the most advanced and civilized nations in Europe in the period known as 'between the wars', Czechoslovakia was established from the wreckage of the Austro-Hungarian Empire in 1918 as a democracy and remained one at a time when most European nations were turning into dictatorships. The nation thrived and one of the industries that blossomed was that of aviation, with firms that embraced the new technology and brought to it fresh ideas and designs and would, in the end, produce one of the most advanced and successful biplane fighters of all time. One of these firms was the *Avia Aksiova Spolecnost Pro prumysi letecký* (Avia Aksiova Aircraft Industry Company), which was originally established in 1919 by a quartet of engineers, designers and businessmen,<sup>1</sup> and produced a string of successful civilian and military aircraft, including the BH-3, a monoplane fighter, in 1921; the BH-6, a biplane fighter, in 1923; the BH-17, a biplane fighter, in 1924; and the BH-33, another, in 1927.

This innovative company attracted the attention of, and was subsequently absorbed by, the Škoda armaments giant in 1928. The original plant became the largest aircraft manufacturer in the country and the site was moved to Letňany, Prague, as it expanded. Fresh biplane fighter designs continued to flow, with the BH-34 of 1932 and the B-234 in 1932. Prague looked to France and Moscow for her protection, but continued to develop her own defences, and the culmination of these fighting aircraft came in 1933 with the outstanding B-534.

In the autumn of 1938 the Czech nation itself was sacrificed by its French ally and the British Government during the shameful period of appeasement at the Munich 'Agreement',<sup>2</sup> and the rump states that remained lost their final vestiges as an independent nation when Bohemia and Moravia were absorbed by Germany in the spring of 1939, without protest from either Paris or London, and Slovakia itself became an independent state. However, during the two brief decades of existence, the little country had led the way in biplane design, with the apex of its achievement being the Avia B-534.

Having hardly progressed much beyond the Great War stage, it had been decided by the Avia Board of Directors in 1931 to originate a more radical approach to fighter aircraft. The chief designer, František Novotyný, had had previous experience with the Military Aircraft Factory and Hawker in England, where he absorbed the techniques of steel and aluminium alloy construction that they were employing. When Avia's chief designer, Pavel Benes, left the company the year before Novotyný had been offered the vacant position and accepted it. He and the company decided on a multi-project approach to the problem. He brought this fresh thinking to the

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commercially orientated company, and this contrasted with the Czech nation's own Ministry of National Defence, whose obsession was with wooden aircraft, seemingly more concerned with keeping the state-owned Air Races unit in production, rather than providing modern fighter planes.

The B-34 made her maiden flight on 2 February 1932 with the 850hp (625.17kW) 12-cylinder VK-105 engine, an updated version of the Hispano-Suiza HS-12Ydrs but she was just the basis, the original genus, of Avia's myriad-approach pattern, the others being five more projected designs, the B-134, BH-234, BH-334, BH-435 and BH-534, all of which incorporated different engines, structural solutions and ideas. Comparison tests were done against the Praga E-44 (BH-44) and the Letov Š-231, both home-produced biplanes. The Letov, of which twenty-two only were built, was adopted by the Czech Air Force but quickly sold off to Spain as being inadequate; the E-44 was designed by Novotyný's predecessor, Benes, but did not come up to par.

Two prototypes were constructed, B-534 and B-534-1-2, which adopted the Hispano-Suiza 12 engine of the B-34.

From these sprang the B-534 Series I, which featured an open cockpit, with four machine-guns in two pairs mounted either side of the engine line on the upper wing. It had a metal instead of a wooden propeller. The initial contract was promulgated by the Ministry of National Defence on 17 July 1934 for forty-six machines and the orders that followed took the total to one hundred of this model. They received the serials B-534.2 to B-534.101 inclusive. The first machine of the initial contracts for 147 was delivered to the air force in autumn 1935. Further orders quickly followed and as the war clouds gathered a third in 1936, a fourth in 1937 and, when on the brink of extinction, a fifth in August 1938 for sixty-eight more aircraft, bringing the total on order to 445.

The Series II, was as before but with the machine-guns grouped in pairs either side of the engine in blister fairings; they also had under-wing racks for small bombs. Forty-six machines of this version were built and they were allocated serials B-534.102 to B-534.147 inclusive.

The Series III was similar but with an improved front engine air intake with greater streamlining with the air intake forward. The wheels were now fitted with factory-equipped mud-spats; forty-six were ordered, twenty were foreign orders. Only twenty-five Czech machines of this variant were completed and they received the serial numbers B-534.148 to B-534.173 inclusive.

The Series IV featured a fully enclosed cockpit, with the rear-sliding pilot's canopy extending along the raised after fuselage. An initial order was received for 134 of this variant, but eventually Avia produced a total of 252 in several separate batches as the tension with Nazi Germany ratcheted up, a second batch of fifty being followed by a third for another 87 in August 1938. They were allotted the serial numbers B-534.174 to B-534.445 inclusive, but not all were completed by the time the Germans took over.

With the designed Bk-534 (the k was for *kannonen*), it was planned to incorporate the 20mm FFS Oerlikon cannon firing through a hollow propeller boss. However, this weapon was never fitted due to supply shortage for this very popular weapon,

and instead the machine was armed with three 7.92mm machine-guns with one fitted to starboard and two to port. Initially the Government issued a contract in 1937 for fifty machines, with a supplementary order for four additional aircraft, and these were allocated serials Bk-534.501 to Bk.554 inclusive. Just prior to the Munich conference a second full order for a further sixty-six was placed in 1938 and they received serial numbers Bk-534.555 to Bk.534.620. By the time production began almost all of these went straight to the Luftwaffe. Some of these featured a castored tail-wheel in place of the normal tailskid.

The Avia was a staggered-wing, single-bay biplane fighter with the upper wing supported by N-shaped sloping struts by the lower wing and upper fuselage. The wings were of trapezoidal form cross-form, built from Dvuhlonzheronnoe<sup>3</sup> riveted steel with fabric covering and with ailerons on upper and lower wings. The bonded fuselage frame was likewise riveted and bolted, with removable metal panels forward and fabric covering abaft the cockpit area, as was the tail assembly, which had supporting ventral struts to the after fuselage. A deep radiator and intake was straddled by the fixed undercarriage struts, with oleo-springing and wide-bodied tyres and streamlined 'half-spatting', lacking on the early prototype, introduced. The second prototype introduced an enclosed cockpit, had a larger rudder and modified undercarriage fairings.

The Avia had an overall length of 26ft 10.75in (8.20m), a height of 10ft 2in (3.10m) and a wingspan of 30ft 10in (9.40m). The wing area was 253.61 ft<sup>2</sup> (25.56m<sup>2</sup>). The Series I had an empty weight of 3,053.40lb (1,385kg) and a fully laden weight of 4,217.44lb (1,913kg). The power-plant was the 850hp (625.17kW) inline Avia (ČKD) HS 12Y drs (the in-house, licence-built Hispano-Suiza HS12Y drs). The Series I achieved a maximum speed of 219.34 mph (353 km/h), with a climbing speed of 16,404 ft (5,000m) in 5.3 mins. She had a surface ceiling of 32,808ft (10,000m) and a range of 360 miles (580km). The Series IV had a maximum speed of 236.12 mph (380 km/h) and a ceiling of 34,777ft (10,600m). The armament of four 0.303in (7.92mm) calibre ×57 Vz.30 (MG.30(t) fixed machine-guns, with 250rpg, two of which were affixed to both sides of the pilot's cabin and the other pair, with 400rpg, also fixed, were emplaced in fairings on the upper wing, close to the Karman connections. There were six small *Pantof* racks under the lower wings, each of which could hold a 44lb (20kg) bomb. The Series II, III and IV differed from this in that the four guns, of the same type, were positioned either side of the cockpit, with 300rpg on the upper and 250rpg on the lower mountings.

## Czechoslovakia

The prototype B-534 made her maiden flight on 25 May 1933 with an Hispano-Suiza HS-12Ydrs, imported from France. The intended power-plant, the licensed, Czech-built HS-12Ydrs, was not yet available. When it was, trials and tests followed through to August 1933 with the second prototype piloted by Vaclav Koci. The new fighter was proudly put on exhibition on 10 September at the Army Air Day and drew much admiration for her clean lines. She established the Czech national speed record on

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18 April 1934, attaining a speed of 277.26mph (365.74km/h). Unfortunately, both prototypes were damaged by crashes in 1934, but although this caused hold-ups it did not affect the air force's decision to continue to production with the type. The majority of Czech warplanes still flew on the BiBoLi fuel, a mixture of Romanian oil (50%), alcohol (30%) and Benzol (20%), at a time when others were switching to high-octane. The ability to obtain supplies of this mixture proved more and more difficult once the war got underway and helped reduced operational availability in the end.

There was a year's delay between production and the first delivery to the Czech Air Force. The first batch was received by 4 Air Regiment at Kbely airfield, Prague, in October 1935. A second unit, 52 Air Regiment, began equipping at Avia on 14 January 1936 while six machines were posted to the Air Force Training Establishment. Negotiations with the Spanish Government for a contract for a number of these aircraft probably contributed to the delay, but thereafter the Czechs got better service, and 145 machines had been delivered by January 1937 with a further 130 the year afterwards, the 2 Air Regiment changing over that year.

Comparative, if unofficial, tests were conducted against the Luftwaffe's latest fighter aircraft prototypes at the Zurich Air Show in 1937, being measured against the Bf.109 V-8 and V-13, which outshone it, although the Avia outperformed the Henschel Hs.123 V-5. However, as production flowed the B-534 eventually equipped no fewer than twenty-one front-line Czech fighter squadrons, she never got the opportunity to fight for her country of origin, but only for other nations.

There was constant tension with Hungary over disputed territory in Ruthenia that almost led to war and this continued when Slovakia split away.

### Germany service

Once they had been taken over by the Germans, all production of the Avia assembly line was halted on 15 March 1939, with 443 aircraft having been completed from the total orders for 534, seventy-two remaining incomplete. B-534 serial numbers allocated were in the range 501 to 620. The Avia aircraft joined other Czech warplanes at Merseburg, Erding, near Munich where they were assigned to Luftwaffe units or to Germany's allies and were organized on the *Avia Lehrganag* (conversion course) at *Deutsche Fliegershule* at Herzogenaurach (Herzaura), Bavaria, for selected German pilots to train on the new acquisitions. In order to provide a steady flow of spare parts the Kunovice airfield plant near Uherské Hradiště was geared up and stocks were held at Olomuc (Holomóc), Moravia, Luftwaffe air depot.

The Luftwaffe incorporated some of these as training aircraft, notably with Theo Osterkamp's I/JG.51 at Bad Aibling from July 1939. Some were re-built with all-round vision cockpits, and served with the *Flugzeugführerschule A/B 115* (FFS A/B 114) under *Kommandeur* Major Otto von Laghmaier, at Wels, Austria and at the *Flugzeugführerschule A/B 114* (FFS A/B 114) under *Kommandeur Oberst* Bruno Wentscher, at Zwölfaxing.

Some Avia B-534s were utilized as improvised *Nachtjagdwaaffe* (Night Fighter) aircraft when these 'Wild Sau' units were first being established in a hurry and being filled with whatever was available. In July 1940 both the 3/JG 70 and the 3/JG 71 at Friedrichshafen (*Bodensee*) by Lake Constance, commanded by *Staffelkapitän Oberleutnant* Heinz Schumann, employed the B-534s briefly before they were replaced with Bf.109Ds early in 1940.

Other B-534s were used as glider tugs with the *Luftlandergeschwader 1 (LLG.10)* under *Oberstleutnant* Gustav Wilke, and were fitted with a strong hook and associated towing gear for the large type DFS-230A (DFS = *Deutsche Forschungsanstalt für Segelflug* – German Research Institute for Sailplane Flight) troop and cargo carrying glider, proving especially useful when they were employed in supplying the German ground forces encircled in the Demyansk Pocket ('*Festung Demjansk*') on the Eastern Front south of Leningrad (St Petersburg) in the awful winter of 1942. The German troops were cut off on 9 February but the DFS-230s with their one-ton cargoes of food and supplies, helped maintain them until they were relieved on 5 May.

Ironically, for being built by a nation 'without sea' during 1940–41 two Avia Bk-534s were employed during catapult trials by the OKL for the *Fleugzeugträger* (aircraft carrier) *Graf Zeppelin* then under construction for the *Kriegsmarine*. Serial No. 594, with German registration D-IWNF, was used from 10 August 1939 by the unit under *FF Dipl-Ing* Sebastian Reccius for rope-restricted landing tests; the second, serial No. 534, with registration D-IUIG, was used from 4 October 1939, to test the cable restriction test landings. Both aircraft were fitted with carrier-type folding tail-hooks for these trials at *Erprobungsstelle See (E-Stelle)* at Tavemünde on the Baltic Coast.

During the making of the propaganda film *Kampfgeschwader Lützow* a few B-534s were painted up as imaginary Polish PZL-11c biplane fighter planes complete with mock unit insignia.

## Bulgaria

Although Bulgaria was one of many countries that were legally bound by the Versailles Treaty not to operate military air forces, once Adolf Hitler had shrugged that off with the creation of the *Luftwaffe*, and been allowed to get away with it, the smaller nations lost no time in following suit. In 1937 the official formation of the *Bulgarski Voennovazdushni Sili* (BVVS – Bulgarian Air Force) was announced. When it was decided to add a second fighter unit, the *2 orlyak Istrebitelen* (2 Fighter Regiment) was formed, and seventy-eight Avia B-534s, Series IV, were purchased via the *Wirtschaftsgruppe die Luftfahrtindustrie* in Berlin. Of this group, sixty equipped the *2 Isrebitelen orlyak* (2 Fighter Regiment) with the 212, 312, 412 and 512 *Yato* (squadrons) at Karlovo airfield, near Apriltsi, six formed a staff unit and the remaining twelve went to the training unit at the same base. The Bulgarian pilots nicknamed the B-534 *Dogan* (Hawk). In 1940 2 Regiment was transferred over to Bozhurishte, Sofia, to try and stop reconnaissance flights by Yugoslav Dornier Do.17s.

In March 1942, the 6 *Orlyak* under the command of General Avia Kjustenil was formed as a mixed unit, with both B-534s and Bf.109Es, the biplanes being allocated to the 612 *Yato* at Vrazhdebna, Sofia, and 622 *Yato* at Bozhurishte. Their main mission from that summer was the interception of US Army Air Force Consolidated B-24 Liberator four-engined bombers who were making determined attacks on the vital oil installations at Ploiesti in Romania. On 1 August 1943 six B-534s from 612 *Yato* and four from 622 *Yato* were scrambled at 1225 to intercept a large bomber force, part of the ‘Tidal Wave’ assault that took very heavy losses, but only two of the B-534s, with *Podporuchyks* (Ensigns) Daskalov and Vaptzarov as pilots, managed to close even within sighting distance of the high-flying B-24s over the River Danube and even they could not get close enough to attack. The Avias were just too slow. Nonetheless they were scrambled again at 1500 to meet the same bomber formations making their way back to their bases. Four B-534s from 612 *Yato* and seven from 622 *Yato* intercepted between Vratza (Vratsa) and Ferdinand (now Montana) in north-west Bulgaria, at an altitude of 9,845ft (3,000m) but again they took a long time to close and attack and heavy defensive fire was met, causing several Avias so much damage that they crash-landed and were destroyed after running out of fuel in the effort. Conversely, the thick hides of the B-24s seemed impervious to the B-534s’ machine-guns even when hits were scored.

Clearly outclassed, the Avias of the 622 and 623 *Yato* were replaced by Bf.109G2s and G6s and Dewoitine D520 fighters and, finally, the 612 *Yato* as ground-attack machines and were also employed against the communist-backed partisans, until the surviving aircraft were sent to reinforce the 2/2 *Shturmovy orlyak* (Ground-Attack) Regiment. By 30 August 1944, there were still nineteen Avias on establishment, only nine of which were operational. Many of these were destroyed on the ground in the period July–August.

On 7 September 1944, under the young Tsar Simeon II, the Bulgarian Government pulled out of co-operating with the Axis and the B-534s were turned against their former allies. Between 10 September and 12 November the Avias flew 211 combat sorties, mainly ground-attack missions during which they claimed to have destroyed twenty-four heavy guns, fifty-two trucks and four tanks. They also flew sixty-two fighter escort missions, mainly protecting Bulgarian Ju.87 dive-bomber missions. They operated to the last in the area of Tzurkvitza village near Kyustendil, on the Serbian border, but lost serial 62 on 15 September, serial 19 on 18 September and serial 58 on 24 September. On 10 November a final air-to-air encounter between six B-534s and six German Bf.109s left one damaged aircraft from each side. By 1 January 1945 2 Regiment was operating in Hungary with just six operational Avias while some rejoined 2 *Istrebiteleen orlyak* (2 Fighter Regiment). The B-534 was not finally pensioned off until the summer of 1945 with the end of the war in Europe.

### Greece

Greece was a poor nation and surrounded by potential enemies, especially Turkey to the east and Bulgaria to the north, while Italy, which occupied the Dodecanese

Islands and Rhodes in the Aegean, outflanked her to the south. She could spread her limited resources as best she could but fortunately a few of her richest sons were also fierce patriots. One such was Giorgos Koutarellis, a millionaire expatriate businessman living in Egypt, who purchased outright two Series II Avia B-534s, serial numbers 534.1001 and 534.1002, which he presented as a gift to the Greek Government at a ceremony held at Dakeleia airfield on 18 August 1936. They joined four existing Avia BH.33s already on hand in the *Polemiki Aeroporia* (Hellenic Air Force). They were known as the 'Donation of Koutarellis' and received the serial numbers ΔΚ1 (1001) and ΔΚ2 (1002). They were based at Sedes, Thessaloniki, with 1 Flight of 20 *Mira Dioxes* (Fighter Squadron).

During their early service careers these two machines were used to train up new pilots and were not finally called into operational service until 9 December 1940, when they joined 24 *Mira Dioxes* (Fighter Squadron). On 24 January 1941 ΔΚ1 made a forced landing and suffered very heavy damage. The wreck was transported to the *Κρατικό Εργοστάσιο Αεροπλάνων* (KEA – State Aircraft Factory) to be repaired and restored to service, but she never flew again. Her sister, ΔΚ2, survived her until 19 April 1941, when she was caught sitting on the ground at Amfikleia, Phthiotis, air base by strafing attacks by Messerschmitt Bf.109Es and, along with many other 24 *Mira* machines, was totally burnt out.

## Hungary

During the brief 'war' between Slovakia and Hungary over the disputed territory of Carpathian-Ruthenia in March 1939, one Slovak B-534, that piloted by Joseph Zachar, was damaged by AA fire and had to crash-land in a Hungarian-occupied area. This machine was relatively intact, hauled back to a workshop and restored to full working condition, which included a strengthened wing structure and the fitting of stabilizers. The Hungarians allocated the serial number G.192 to this aircraft and conducted a series of tests and air trials with her against the Italian-supplied CR.32 and CR.42s of their own air force. They concluded that, overall, the Avia was an inferior aircraft, particularly in respect of maximum speed and climb rate. Once these comparative tests had been completed the Hungarian air force had no further interest in her, and, in 1943 they discarded her, handing her over to the Gliding and Aero Club at Győr (Ráb) airfield in north-west Hungary, as a glider-towing aircraft with the civilian registration HA-VAB. When the Soviet army overran Győr in May 1945, she was among the aircraft destroyed in the chaos.

## Slovakia

The *Slovenské Vzdušné Zbrane* (SVC – Co-Belligerente Slovak Air Force) was formed when Slovakia broke away from Czechoslovakia on 14 March 1939. They took over seventy-nine Avia B-534s and eleven Avia Bk534s, which formerly belonged to 3 Regiment, and formed three fighter squadrons with them with 11 and 12 *Letka* at

Piešťany, Tmava, and 13 *Letka* at Vajnory, in north-eastern Bratislava. They were soon called to action with the border dispute with Hungary that broke out immediately, but Hitler intervened and imposed a settlement that favoured the latter.

Hungary occupied disputed Ruthenia on 23 March 1939. Next day twenty B-534s, ten each from 12 and 13, were pitted against *Magyar Királyi Honvéd Légierő* (Royal Hungarian Air Force) units that included Fiat CR.32s from the I/1 *Ijász* from 23 March for the next four days. The Avia pilots had been instructed never to open fire first, even when Hungarian aircraft overflew their territory on reconnaissance missions pending an invasion. However, this restraint was not applied by Hungarian dissidents in the region, who, on 23 March, claimed two B-534s shot down by ground fire. That of Joseph Zachar crash-landed and was captured by Hungarian troops.

On 24 March three B-534s from Slovakian 49 *Letka*, commanded by *Porucik* (Lieutenant) Ján Prháček, engaged three Hungarian CR.32s of I/1 *Vadászszázad* above Szobránc (now Sobrance). In the ensuing melee *Főhadnagy* (Lieutenant) Aladá Negró shot down Prháček and *Örmester* (Sergeant) Sandor Szojak shot down *Desiatník* (Corporal) C. Martis near Lúcky, Kösice, while the third B-534 escaped unharmed. That same afternoon further aerial clashes occurred, two further B-534s being shot down by CR.32s, *Rotmajster* (Sergeant) Ján Hergott close to Bánovce nad Ondavou, Trenčín, and František Hanovec at Szojak, Senné. A third, piloted by *Desiatník* Martin Danihel of 45 *Letka*, was badly damaged and crash-landed near Brezovica nad Torysa, Trenčín.

After four days' fighting, during which a total of seven B-534s were lost in action, the Germans stepped in and imposed a cease-fire and the 'Border Treaty' of 28 March, the First Vienna Award.

During the German invasion of Poland in September, the Slovakian Avias carried out fighter escort missions on a few Junkers Ju.87 combat sorties. They claimed to have destroyed one Polish fighter but lost two B-534s to Polish anti-aircraft fire.

After this brief taste of action the surviving Avias were relegated to second-line duties, chiefly reconnaissance patrolling and pilot training duties. This period of calm vanished when the Panzers rolled into Soviet-occupied territory in June 1941 with Slovakia as a willing ally. On 6 June the 12 and 13 *Letka*, each with eleven Avias, flew across the mountains into the Ukraine where they came under the control of *Luftflotte* 4 (4 Air Fleet), commanded by *Generaloberst* Alexander Löhr, and were again assigned escort duties for the Junkers Ju.87 along with another Luftwaffe biplane, the Henschel Hs.126, working with the *Aufklärungsgruppen* (Reconnaissance Groups) 3.(H)/*Aufkl. Gr* 32 and the 32 (H) 4/ *LufAufkl. Gr*.32. Here they undertook a variety of missions, but mainly acted in the ground-attack role as well as fighter patrolling.

The Slovak B-534s performed commendably within their limitations, and between June and 16 October 1941, they flew 1,119 combat sorties, which broke down into ninety-one fighter escort missions, mainly escorting Slovakian Junkers Ju.88 bombers; plus fourteen ground-attack and fourteen dive-bombing attacks. The Avias were involved in fifty-eight air-to-air fights during which they claimed to have destroyed four Soviet fighters. The first of these kills was claimed by Josef Pallenicek.

At the end of this period the Slovak Avias returned home and were gradually replaced by Bf.109s. The B-534s continued to find useful employment in back-area missions, such as anti-partisan patrols, which steadily increased in intensity.

When the tide turned and the Red Army began to remorselessly roll westward after the Kursk battles in the summer of 1943, Germany's allies on the Eastern Front began to nervously re-adjudge their position. On 31 August 1944 there was a Communist-inspired uprising in Slovakia and fighting lasted throughout September. Colonel Viliam Antoniov Talský's part in it ensured that the Czech air force was deeply involved.<sup>4</sup> Many Avia pilots went over to the Russians, while a few of the remainder tried to hold together as a cohesive force but switched allegiance and began to attack their former allies. They took control of four B-534s and a single BK-534 from the *Letecká škola Slovenských vzdušných zbraní* (Slovakian Air Training School), commanded by Major Ondrej Ďumbala, at Trenčín, for this purpose.

During this confused period, with neither friend nor ally being completely certain of how things stood, the last biplane victory was claimed by Slovak pilot František Cyprich. He was conducting a test flight with a B-534 (serial 217) that had no radio fitted, at Tri Duby (now Silač), on 2 September and, while landing, was informed a hostile aircraft was approaching. It turned out to be a Hungarian-crewed Junkers Ju.52 3m transport, piloted by *Főhadnagy* (Lieutenant) György Gáchi, *en route* to Krakow, who, seeing the yellow markings that signified Axis aircraft, and knowing nothing of the Slovak change of sides, naturally assuming the B-534 to be friendly, was taken by surprise when it made two attacks on her. Badly damaged, and with two of the crew killed and two badly wounded, the Ju.52 was forced to crash-land near Banská Bystrica, the surviving air crew and their seven passengers, including two high-ranking officers, managing to join up with Hungarian troops. František Cyprich later made several more claims of kills, but all these were in monoplane fighters. German land forces arrived at the airfield in October and overran it, but not before the two surviving B-534s were burned by their crews and destroyed.

## Soviet Union

It is claimed that as many as eight B-534s were acquired by the NKVD's clandestine spy squadron and used to monitor Luftwaffe aircraft over the frontier area during the build-up to Barbarossa in 1941.<sup>5</sup>

## Preserved aircraft

1. A mainly replica aircraft, but with several original parts, is preserved at Košice Airport, Slovakia.
2. Another replica is exhibited at Prague Military Museum at Kbely airfield.

## Chapter Two

### Fairey Swordfish

Between the years 1918 and 1940 British naval torpedo-bombers had hardly improved in any way for more than two decades. The tale was a dismal one. With the Sopwith T1 Cuckoo under the driving force of visionaries such as Murray Fraser Sueter,<sup>1</sup> the Royal Navy had led the world in the development of this form of sea warfare. The Cuckoo was a single-seater biplane powered by a single 200hp (149.13kW) Sunbeam Arab engine, and she had a top speed of 103mph (165.76km/h) at an altitude of 2,000ft (609.6m). The Cuckoo could carry a 1,086lb (492.60kg) Mk.IX 18-inch torpedo externally and she first entered service in July 1918, a total of ninety being delivered by the time of the Armistice. The Admiralty had plans to attack the German High Seas Fleet, which had been skulking in its home ports since the Battle of Jutland and refusing to fight, by sending in a striking force of 120 of these machines from five aircraft carriers. This would have been a spectacular attack, pre-dating and far exceeding both Taranto and Pearl Harbor by more than two decades, but the war ended before it could be implemented. The last of the Cuckoo type were not finally retired until 1923 and served aboard the carrier *Argus*.

Even before the war terminated the Admiralty was actively seeking a torpedo-bomber that could carry a much more powerful weapon, the 1,423lb (645.46kg) Mk.III torpedo, which carried a 50 per cent larger warhead and should have proven a far more lethal ship killer. The result was two further torpedo-bombers. The Blackburn Aeroplane & Motor Company, at Brough, Yorkshire, came up with the Blackburn, which had a top speed of 91mph (146 km/h), while Short Brothers, designers of a series of successful torpedo-launching seaplanes, produced the N.1B Shirl, which had a top speed of 92mph (148 km/h). In July 1918 these were trialled against each other with torpedo drops in the River Humber. Only three Blackburns were ever built, but the Shirl, coming out on top, had an Admiralty order for 100 placed. However, this was later cancelled and production was concentrated on further Cuckoo orders.

Meanwhile, the Blackburn Company developed the T1 Swift as a private venture in 1919. The Swift, designed by Major Frank Arnold Bumpus, appeared in 1920 and underwent trials at Gosport and then engaged in deck trials aboard the *Argus* piloted by Flight Lieutenant Gerald Boyce. It was innovative, having a split undercarriage to facilitate torpedo dropping and a self-sealing fuel tank, one of the earliest examples. She attracted much attention, being sold to Brazil, two being bought by Japan, three by Spain and even the United States purchased a couple. An improved version of the Swift was the Blackburn T2 Dart, which had the same 450hp (335.56kW) Napier Lion engine and a maximum speed of 110mph (177km/h) at sea level. She had a range of 410 miles (660km) and 118 were built, including one prototype. Again, trials aboard

the carrier *Argus* in 1921 led to her adoption as the standard British carrier-borne torpedo-bomber and orders for 117 resulted, serving with the fleet aboard both *Argus* and the newly converted *Furious* between 1923 and 1933. They showed their potential when, during combined fleet exercises off the Isle of Wight on 9 September 1930, fifteen Darts from Lee-on-Solent, achieved eight direct hits with dummy torpedoes on the fleet, including the new battleships *Nelson* and *Rodney*. This was a far greater potential threat than the much-touted and farcical bombing 'tests' of Billy Mitchell in the States, but received almost no publicity whatsoever.

The Royal Naval Air Service (RNAS) had become part of the RAF in 1918 and the Air Ministry operated all aircraft from the fleet's carriers; in consequence, the development of naval aircraft underwent a dramatic decline. It was regarded as a backwater by the RAF hierarchy, and was granted minimal funding.<sup>2</sup> One Air Marshal, appointed head of Coastal Command, expressed the view that he could not see the sense of approaching a ship target at 200mph (321.86 km/h) and then attacking it with a weapon that could only run at a speed of 40mph (64.37 km/h)<sup>3</sup> The potential power of the torpedo-bomber totally passed him by. Little wonder then, with such attitudes, that Great Britain's commanding lead in this field was allowed to wither and die.

The next stage of development was the Blackburn Velos, developed from the Dart and powered by the 450hp (335.56kW) Napier Lion V engine, as a floatplane. She was a three-seater with twin floats and had a top speed of 107mph (172km/h). Sixteen of these machines were sold to the Greek Navy as coast defence aircraft but she was not adopted by the British. Blackburn continued to develop the torpedo-bomber at this stage, with the elegant Ripon, which became the Dart's replacement. The Ripon was powered by a 750hp (560 kW) Napier Lion XIA engine and had a maximum speed of 126mph (202km/h) but had exactly the same range as the Dart. She first entered service in August 1929 proving most popular with her aircrews, but only ninety-four were ever built, including two prototypes, between 1928 and December 1933, a fair indication of the lack of effort devoted to the Fleet Air Arm. She remained the mainstay of the fleet between 1930 and 1935.

The Blackburn Baffin followed and she was powered by the 565hp (421.32kW) Bristol Pegasus engine, achieving a top speed of 136mph (218.87km/h). Her maiden flight was in June 1933 with Flight Lieutenant Arthur Mitchell William Blake at the controls.

The termination of the Blackburn domination of the British torpedo-bomber concepts came with another biplane design, this one from the design team at Fairey Aviation. However, far from being a breakthrough in design, she was yet another biplane, wire-and-struts aircraft that simply followed in the long line of British types that plodded on down the decades adding 10mph (16 km/h) or so to each succeeding model. She was different, however, in that she was to earn fame and renown, not for innovation or design, but for the longevity of her service and her truly outstanding war record. This was the famous and beloved Fairey Swordfish.

## Design and development

The Torpedo-Spotter-Reconnaissance (TSR) concept that had dominated inter-war naval air thinking as defined by the Air Ministry, probably reached its apex with the Swordfish, but the concept itself was flawed, the three roles hardly being compatible. It was more a case of restricted funding forcing service thinking into producing ‘maids-of-all-work’ designs to spread what limited cash there was as widely as possible. Unfortunately, as with the Skua (a dive-bomber expected to act as a fighter aircraft – and wrongly judged as such by posterity) and the Fulmar (made-over light bomber design into a second-rate fighter), such aircraft usually proved ‘masters of none’. Certainly they suffered in comparison with their equivalents in the Imperial Japanese Navy and United States Navy, where the sailors retained control of their aircraft and built specialist machines for specific tasks, machines that were a decade in advance of British naval aircraft types.

The origins of the Swordfish can be traced back to an enquiry from Greece for the *Polemikó Naftikó* ( Hellenic Navy) to be provided with a coastal torpedo-bomber to replace the existing Fairey III F still in service in the early 1930s. This being so they turned naturally to the Fairey Aviation Company at North Hyde Road, Hayes, London, and their chief-designer, Marcel Lobelle, a former Belgian army officer, who was in process of working on two carrier-type aircraft projects, both incorporating the orthodox single-engined, steel-strip-and-tubing with fabric-covering, biplane technology of their day. The enquiry engendered a Private Venture (PV) design adaptable either for a two-seater torpedo-bomber or a three-seater spotter-reconnaissance machine, the TSR II, and which became colloquially known in-house as ‘The Greek Machine’.

The Fairey PV was initially powered by the 638hp (478kW) Armstrong-Siddeley 14-cylinder, twin-row, air-cooled Panther VI radial engine, and made her debut flight from the Fairey-owned Harmondsworth field,<sup>4</sup> on 21 March 1933 piloted by Chief Test Pilot Flight Lieutenant Chris Staniland.<sup>5</sup> In July 1933 the TSR II. was re-engined with Roy Fedden’s 635hp (474kW) 9-cylinder, air-cooled, Bristol Pegasus IIM, and re-designated as the TSR II. Meanwhile, the Air Ministry had issued their S.15/33 specification, which called for a ‘Naval Carrier-Borne Torpedo/Spotter/Reconnaissance’ aircraft, which Fairey’s design seemed a viable contender for.

Before things developed along those lines, however, on 11 September 1933, the TSR I. went into an uncontrollable spin and Staniland used up yet another of his nine lives by baling out just in time. This crash was in some ways providential for Fairey because it enabled them to come back with an amended design more attuned to the Air Ministry’s requirements and Lobelle, aided by Horace Frank Chaplin, had come up with a re-jigged design, the TSR II. Fairey had eventually submitted not one, but ten differing schemes to meet the earlier Air Ministry S. 9/30, seven of them being conventional biplanes, while three of them were monoplanes. The latter pair, schemes 9 and 10, would have had enormous advantages over the TSR II, for they featured an all-enclosed cockpit, (a most-desirable feature, which was not to appear on the Swordfish until the very last variant, some 110 Mk. II and Mk. IIIs being retro-fitted with enclosed cabins for use by the Canadians, not introduced until ten years later),

fixed spatted undercarriage (akin to the earlier Junkers Ju.87 and civilian racing types), telescopic sight, radio and aerials, a smaller, sloping tail-plane, with the entire forward fuselage being metal, with composite structure aft like the Hurricane. They were to offer them up again as alternatives to what later became the Albacore. Sadly, these all proved too visionary for the Air Ministry.

The TSR II machine had an additional fuselage bay and because the centre of gravity (CG) had been suspected as a major contributory factor to the accident with the original, the upper wings were given a 4 per cent sweep to restore the balance. She had her maiden flight on 17 April 1934 and she was submitted to the Air Ministry. There followed a rigorous testing programme at Martlesham Heath, which engendered criticism of stalling potential and a large number of minor modifications. In the interim trials with float-equipped TSR IIs were commenced in November 1934 and were followed by test catapult launchings and sea recovery conducted with the battle-cruiser *Repulse*. On the successful conclusion of these experiments the floats were removed and wheels refitted. Competitors for the new specification included the Blackburn T9 (later to become the short-lived Shark) and the far more visually pleasing Gloster TSR 38, with an in-line engine, but the latter fell out of the reckoning being marred by slow development. The upshot was an order for eighty-six aircraft being awarded to Fairey on 23 April 1935, followed, rather tardily, by an order (contract No. 402278/35 to specification 38/34) for three pre-production (development) aircraft in August, the first being airborne on 31 December 1935. K5661 served at the Technical Development Unit (TDU) at Gosport between November 1938 and May 1942.

The Fairey Swordfish (serial K5936), as she had now been christened, made her debut in July 1936, when she joined No. 825 Squadron aboard the carrier *Glorious* as No. 978. In November of the same year the first Mk. I (serial K8360, coded G3C), went aboard the *Glorious* with No. 812 Squadron and later served in No. 825 Squadron between 1937 and 1938. These were followed by 150 further Mk.Is ordered under contract No. 534297/36 to specification 38/34. The steady flow of Swordfish that followed saw the replacement of both the Fairey Seal and the Blackburn Baffin by combining their mission sets, while the Blackburn Shark, also ordered into production, barely lasted a twelve-month period in active service.<sup>6</sup>

While all around her aircraft design was moving forward at an unheard of pace and technological advances were altering the face of military aviation almost daily, in the world of the Fairey Swordfish construction methods had not advanced much in two decades. What she *did* have, however, was an all-metal basic structure mainly of steel tubing, which was overlaid with fabric. Her three-man aircrew (pilot, observer (optional) and telegraphist/air gunner –TAG), were exposed to all the elements in open cockpits with the barest minimum of shielding, which in operations that mainly centred on the North Atlantic and the Arctic, would have been risible if it were not so unnecessary. The straight empennage was braced by a single tail-wheel and had an uncompromising vertical fin with no flair. The wing assemblies featured parallel strutting, with single bays and cabling, and while the re-aligned upper wing had a mild dihedral the lower remained level. For restricted carrier hangar stowage, both wings

were hinged at the roots for folding backward. The majority of surfaces were rounded off and contoured where possible.

A comparison with her contemporaries, the Japanese Nakajima 'Kate' and the United States Navy's Douglas TBD-1 Devastator, are revealing of the gulf between them and the Fleet Air Arm.

Aircraft	Type	Crew	Cockpit	Top speed	Normal range	Power plant
Douglas TBD-1	Monoplane	3	Enclosed	206mph (331km/h)	435 miles (700km)	1 × 900hp (672kW)
Nakajima B5N-1	Monoplane	3	Enclosed	235mph (378km/h)	1,237 miles (1,990.75km)	1 × 1,100hp (750kW)
Fairey Swordfish	Biplane	2/3	Open	139mph (224km/h)	576 miles (878km)	1 × 775hp (578kW)

Undoubted anachronism that she was, the 'Stringbag' was to outlive both her rivals in front-line service and was also to see off her immediate successor!

The Fairey Swordfish in classic form featured the 775hp (578kW) Bristol Pegasus IIIM3, 9-cylinder, radial air-cooled, supercharged engine as its power plant, apparently attached to the fuselage in the words of one wit, '...as an afterthought...' The later models of the Mk.II introduced the upgraded 750hp (560kW) Pegasus 30 engine. This engine drove a three-bladed, fixed-pitch Fairey-Reed metal propeller, which had replaced the TSR II's two-bladed prop. This combination gave her a speed of 139mph (224km/h) at an altitude of 4,750ft (1,450m), an advance over the Cuckoo of twenty years earlier of 26mph (41.84 km/h)! Certainly, at encounters like the Battle of Spartivento, against a head wind and trying to get into position against fast Italian heavy cruisers fleeing at 33 or 34 knots flat out, it was a long, long haul under constant fire to get a Swordfish into any kind of attacking position. During the war as the ordnance loadings grew and changed, and additional equipment was incorporated into that antique body, with a 1.5m wavelength Air-to-Surface-Vessel (ASV-II) Mk. X centimetric radar pod strapped between her legs, ASR equipment, and such, even the upgrading of the main engine to the Pegasus 30 proved inadequate to easily assist the burdened-down old lady airborne and with the Mk.III, she was equipped with the RAE's Rocket Assisted Take-Off Gear (RATOG). With this assistance, a pair of solid-fuel rockets on each side of the fuselage, slanting inboard for maximum effect and the rocket exhausts positioned under and astern of the lower main-plane, an initial normal take-off run of 100ft (30m) ensured sufficient forward momentum for the pilot to depress the rocket ignition button on the control column and power her off within 270ft (82m) of firing.

She had a wingspan of 45ft 6in (13.87m), with the lower main-plane being 43ft 9in (13.34m), and a wing-folded width of 17ft 3in (5.26m). She had an overall length of 36ft 4in (11.07m) and a height of 13ft 5.75in (4.11m). The gross wing area was 607ft<sup>2</sup> (56.39m<sup>2</sup>). The empty weight for the Mk.I was 4,700lb (2,132kg), while the loaded weight was 8,100lb (3,674kg). The fuel capacity of the Swordfish was a main fuselage-

mounted tank with 155 Imperial gallons (705 litres), with a gravity tank containing a further 12.5 Imperial gallons (57.1 litres). In addition, a 60-Imperial gallon (273.1-litre) auxiliary tank could be carried by omitting the observer from the aircrew; or it was possible to ship a 69-Imperial gallon (314.1-litre) auxiliary tank in lieu of the torpedo armament. Normal range with a torpedo up was 576 miles (878km), but this could be extended to a maximum of 1,030 miles (1,658km) with all tanks and just two crew. She had a service ceiling of 10,700ft (3,260m).

Defensive armament varied, but was usually a single fixed, forward-firing 0.303in (7.7mm) Vickers machine-gun, housed in the starboard fuselage and with either another 0.303in (7.7mm) Vickers 'K'/VGO (Vickers Gas Operated) machine-gun or a 0.303in (7.7mm) Lewis gun with 600 rpg, mounted on a Fairey flexible mounting located in the rear-cockpit. As a conventional torpedo-bomber the Swordfish carried a single 1,610lb (730kg) 18-inch (45.7cm) Mk.XII aerial torpedo beneath the forward fuselage. This weapon had a dual speed setting for 43 or 48mph, (69.20 or 77.24km/h), a range of 3,500 yards (3,200.4m), and a 388lb (156kg) warhead, with dual contact/magnetic influence detonator settings.

Alternative offensive loads were legion, but the chief weapons were, as a bomber or anti-submarine aircraft – two 500lb (226.8kg) bombs under the fuselage and two 250lb (113.4kg) bombs under the wings with alternative loadings of a single 500lb (226.8kg) bomb beneath the fuselage and two more under either lower wing or combinations of up to eight 100lb (45.35kg) anti-submarine bombs, or two to four 450lb (220kg) depth-charges; as a minelayer, a single 1,500lb (680kg) sea mine. Later in the war the Mk.II Swordfish was strengthened with metal under-skinning to carry eight 60lb (27kg) rocket projectiles or 25lb (11.34kg) solid-head armour-piercing (AP) projectiles with 600 yards (549m) effective range against submarines caught on the surface or small surface warships such as minesweepers, R-boats and S-boats.

The Swordfish, when she first appeared, with her tangle of wires, struts, colossal appendage of fixed undercarriage and bracing wires, 'tacked on' engine and great planks of wings, certainly did not inspire any aesthetic feelings among onlookers. In truth, it was easy to understand why she became, almost inevitably, known and loved by her more normal *epithet* – 'Stringbag'. That affectionate, if derisory, name, indicating a random jumble of objects loosely held together, fitted her appearance perfectly but, thanks to her young aircrew, she was to turn that label into a source of pride and renown in the years ahead.<sup>7</sup>

What the Swordfish did have going for her, as a weapon of war, was not just her adaptability (she was designed as a torpedo plane but was often used as a makeshift dive-bomber down to as low as 200ft above sea level, her frail structure holding together simply because the assembly of wires and struts kept her vertical air-speed to around 200 knots), ability to absorb punishment (as the *Bismarck* episode showed, explosive AA shells went *through* her rather than *into* her more often than not), short take-off distance which proved so vital for escort-carrier operations, (she could leave their short flight decks and be pulled into a climbing turn at just 63mph (101 km/h) with ease)

and simplicity of construction in the over-stretched British aircraft manufacturing industry, but, in common with most of the biplanes featured in these pages, an agility and durability in service that was second to none. Thus she proved to be the last British biplane in active combat service.

### Mk.I

The first batch of 104 were produced from 1936 onward (serial numbers K8346 to K8449 inclusive), the lead aircraft first joining No.812 Squadron aboard the carrier *Glorious*. Seventy-eight of these machines remained on charge in September 1939.

A second batch of twenty-seven (serials K8860 to K8886 inclusive) appeared from April 1937, and soon joined the FAA, of which the first (serial K8873) arrived at Gosport Torpedo Training Unit (TTU) in April.

Some 150 Swordfish Mk.Is were ordered against contract No. 534297/36 to specification 38/34. Serial numbers L2717 to L2866 inclusive began arriving in November when L2717 arrived at Heathrow. Of these, 150 were still on charge in September 1939. A further sixty-two Swordfish were ordered against contract 6712134/37 to specification 38/34 and received the serials L7632 to L7701 inclusive, the first (serial L7651), arriving at the TTU, Gosport, in March 1938. By September 1939 just fifty-two remained on charge.

Orders continued to be placed at regular intervals, and contract 743308/38 to specification 38/34 called for another fifty-two Mk.Is, which had serials L9714 to L9785 assigned to them. Serial 9767 went to No.701 Squadron and, equipped with floats, joined the battleship *Warspite* in December 1938. All fifty-two were still on charge in September 1939. The next contract issued was No. 9363679/38 to the same specification, and these were given the serials in the range of P3991 to P4279 inclusive. In June 1939 P4010 joined No. 810 Squadron's 'A' Flight; in August P4409 joined her and in September P3992 joined No. 825 Squadron aboard *Glorious*. Of this group, 176 had been received on charge as at September 1939.

Blackburn sub-contracted the next batch, ordered against contract B31192/39, and started building them at Sherburn from 1940, with the aircraft receiving the serials in the range V4288 to V4719. Of this batch V4288 was delivered on 1 December 1940, followed by V4289 on 29 December, the rest following during 1941 when float-fitted V4289 went to No. 700 Squadron and served aboard the battle-cruiser *Repulse* from February. The final order for the Mk.I, again, was awarded to Blackburn under contract B31192/39, and received the serials in the range W5836 to W5995. The first twenty-seven from this order arrived at 82 MU in October 1941.

### Mk.II

The Mk.II omitted the provision for floats, and later there was little requirement for these once the escort carrier programme got underway. Contract B31192/39 went to Blackburn, the batch receiving serials in the range DK670 to DK792. They

were delivered between November 1941 and April 1942, DK674 being taken into No. 786 Squadron in February 1942, DK696 by No. 823 Squadron the same month, DK673 into No. 833 Squadron in May and DK670 by No. 811 Squadron in June of that year.

These were followed, under contract B311923/39, by a further batch, which received serial allocations in the range HS154 to HS678, and deliveries commenced in May 1942. Of these twenty went to HMS *Korongo*, the Royal Navy Aircraft Repair Yard (RNARY) at Athi Plains, four miles south-east of Eastleigh airfield, south of Nairobi, Kenya, which was first commissioned in September 1942.<sup>8</sup> From that distribution centre, HS164 went to No. 810 Squadron and HS161 to No. 811 Squadron, while HS154 joined No. 833 Squadron at Gibraltar in November 1942. Many RNARY-stocked Swordfish survived and were still serving many years after the war.

The next contract awarded to Blackburn was B31192/39 and these Swordfish were delivered from May 1943 onward and were allocated serials LS151 to LS461, of which LS153 joined No. 819 Squadron in June 1943. These were followed by serials in the range NE858 to NF414. They were distributed out to the squadrons from December 1943, when NE861 joined No. 735 Squadron, NE858 joined No. 835 Squadron and NE863 joined No. 811 Squadron, both in January 1944. The Royal Canadian Navy (RCN) received a large quantity of this order, taking serials NF338 to NF413 inclusive, which equipped Nos 119 and 415 Squadrons.

### Mk.III

This mark featured the ASV Mk.XI radome. They also came under contract B31192/39. They had serials in the range NR857 to NS484 but NS204 was the final one of one hundred that were actually completed before the contract was terminated. Delivery was from July 1944 onward with NR859 going to No. 835 Squadron at Worthy Down that month. Likewise, the entire batch allocated serials in the range RL435 to RL933 was cancelled in its entirety.

### Mk.IV

There was officially no such beast, but the fitting of canopies to Mk.II and Mk.III's for Canadian service led to the unofficial term being widely used.

By the war's end, production from the Blackburn Aircraft plant at Sherburn-in-Elmet, Selby, North Yorkshire, numbered 1,699 of the total 2,391 Swordfish produced. Inevitably, the Swordfish built by Blackburn became known in the fleet as 'Blackfish'.

### FAA Squadrons

No. 810 NAS had its Blackburn Sharks replaced by Swordfish in September 1939, and twelve of them joined the carrier *Ark Royal*. They served in the Atlantic and then took part in the Norwegian campaign, bombing Værnes airfield, Trondheim, on 25 April

1940. They accompanied the *Ark Royal* to Gibraltar with Force 'H' and at the Mers-el-Kebir operation attacked the Vichy-French battle-cruiser *Strasbourg*, but failed. At Dakar, Senegal, the Vichy-French battleship *Richelieu* was attacked, but again without success. The Swordfish carried out raids against Cagliari airfield, Sardinia, took part in the naval battle of Spartivento, attacked the Tirso Hydro-Electric Dam, Sardinia, on 2 February 1941, but only three out of eight aircraft were able to launch their torpedoes due to intense flak, and they failed to bust it. The fourteen Swordfish also attacked the Azienda Oil Refinery at Leghorn and Pisa airfield on 9 February, while others laid mines off Spezia for the loss of one aircraft, while the battle-fleet bombarded Genoa. They transferred to the carrier *Illustrious* in March 1941, going out to the Indian Ocean with her and attacking the Vichy-French at Diego Suarez, Madagascar, before returning to *Ark Royal* via Durban. There followed Malta convoys, the blockade of Brest and the hunt for the *Bismarck*, and the unit left *Ark Royal* prior to her loss and served at Jamaica until April 1943 when No. 810 NAS finally became a Fairey Barracuda unit.

No. 811 NAS on the outbreak of war was aboard *Courageous*. When she was lost, survivors helped form No. 815 NAS. No. 811 reformed at HMS *Daedalus*, RNAS-on-Solent in July 1941 but with the Vought SB2U Vindicator dive bomber (known as the Chesapeake in the Fleet Air Arm). However, they were converted to Swordfish in November 1941. They were then based at RAF Bircham Newton, Norfolk, conducting coastal, anti-shipping sorties and minelaying under RAF Coastal Command in 1942. On 21 February 1943 they embarked aboard the escort carrier *Biter*, but when she was damaged they went to HMS *Nightjar*, RNAS Inskip, not re-embarking on *Biter* again until 12 January 1944 and here they covered UK to Gibraltar convoys until August 1944. They resumed duties with Coastal Command from RAF Limavady (Aghanloo), Londonderry, Northern Ireland, for a period then re-embarked yet again for final convoy escort work until October, before disbanding in December 1944.

No. 812 NAS equipped with the Swordfish in 1936, replacing the Blackburn Baffin aboard the carrier *Glorious*. In 1940 the unit was transferred to RAF Coastal Command for minelaying and bombing operations until March. She embarked aboard the carrier *Furious* for Mediterranean operations and the farcical attack on Petsamo, Liinahamari, Finland, Operation 'EF', on 30 July 1941, where the harbour was found to be almost bare of shipping and the Germans ready and waiting for them. The squadron lost no Swordfish and transferred to *Ark Royal*, taking part in Malta convoy operations and returning to the UK in April 1942, again under RAF Coastal Command, working over the Channel. On 18 December 1942 No. 812 NAS merged with No. 811 NAS, and then converted to the Fairey Barracuda.

No. 813 NAS was embarked aboard the carrier *Illustrious* and took part in numerous Mediterranean convoy operations and sank the destroyer *Zeffiro* and the 3,955-ton freighter *Manzoni* at Tobruk, badly damaging the destroyer *Euro* and two other freighters in this attack on 5 July. They also took part in the Taranto attack in November 1940. From July 1943 the unit worked out of North Front airfield, Gibraltar. The unit lost Swordfish WS843 when she landed in Spanish Morocco in error and her aircrew

were interred. A Flight was detached to Tafaraoui airfield, Algeria, and later took part in the invasion of Sicily (Operation *Husky*) with the Northwest African Coastal Air Force (NACAF) in July 1943. The squadron was then embarked aboard the escort carrier *Campania* for Russian convoy work. Their high point was the destruction of the *U-365* in the Arctic.

No. 814 NAS spent most of the early war period embarked aboard the carrier *Hermes*, hunting German raiders in the Caribbean, South Atlantic and Indian Oceans, and attacking the Vichy French battleship *Richelieu* at Dakar and supporting the suppression of the Iran uprising before joining the Eastern Fleet in March 1942. Assigned to the Madagascar operation, 814 NAS was landed from the *Hermes* at China Bay in order to arm them with torpedoes as a reserve air striking force against the Japanese carrier force known to be approaching Ceylon in April. In the event they were not so sacrificed, although several were destroyed when China Bay airfield was bombed. In December 1942 the squadron was formally disbanded at HMS *Ukussa*, RNAS Katukurunda, Ceylon.

No. 815 NAS formed on 15 October 1939 at Worthy Down from survivors of Nos 811 and No. 812 NAS Swordfish from the sunken carrier *Courageous* and operated from there until May 1940. In May 1940 they covered the Dunkirk evacuations and then were embarked aboard the carrier *Illustrious*, serving at all her famous Mediterranean battles including minelaying missions off Benghazi, and attacks on Rhodes and Tobruk and the Taranto raid, until the carrier was damaged by Stukas off Malta in January 1941. The squadron then served from shore bases at Eleusis, near Athens, Greece and Maleme, Crete and in North Africa and also was engaged in the Syrian campaign, where an excellent result was obtained on 16 June when five TSRs of No. 815 NAS sank the large Vichy-French destroyer *Chevalier Paul* off Sidon. The squadron was then assigned to No. 201 (Naval Co-Operation) Squadron RAF, at Malta, from where they took part in the invasion of Sicily from 10 July 1943. After Operation *Husky* they squadron was disbanded, being reformed later with the Fairey Barracuda.

No. 816 NAS was based at RAF Perranporth, on Cligga Cliffs, north Cornwall, and conducted anti-submarine patrols in conjunction with RAF Coastal Command. The unit was reinforced during the D-Day operations in the summer of 1944 to counter increased U-boat activity trying to enter the English Channel.

No. 818 NAS was formed at HMS *Fieldfare*, RNAS Evanton, Ross and Cromarty, in August 1939. With nine Swordfish they embarked aboard the carrier *Ark Royal* for hunting operations off Norway and then transferred to the carrier *Furious* in time for the Norwegian campaign, her sixteen Swordfish unsuccessfully attacking three German destroyers, *Paul Jacobi*, *Theodor Riedel* and *Hermann Künne*, at Trondheim on 11 April 1940. Disembarked, the unit moved to Thorney Island and RAF Carew, Cheriton, under RAF Coastal Command control for operations over the Channel. The squadron then embarked aboard the carrier *Ark Royal* and with her went to Gibraltar taking part in the Mers-el-Kebir operation and the abortive attack on the Vichy-French battle-cruiser *Strasbourg*. There followed Malta convoys, operations against Spezia, the hunt for the *Bismarck*, where No. 818's Swordfish scored the torpedo hit that delivered

that ship up to the British battleships *King George V* and *Rodney*, and, in 1942, the unit converted to the Fairey Albacore.

No. 819 NAS was formed at HMS *Peregrine*, RNAS Ford, Sussex, in January 1940, with twelve Swordfish. The unit moved to the No. 4 RAF Bombing School at West Freugh, Wigtownshire, and then back to Ford. Embarked aboard the carrier *Furious* they took part in the Norwegian campaign, an early loss being U3L piloted by Sub-Lieutenant Sidney George John Appleby and Leading Airman Ernest Tapping, which was shot down in Ofotfjord on 12 April, the two aircrew being rescued by the destroyer *Grenade*, both injured. A detachment of six Swordfish was sent to RAF Detling in May from where it conducted searches for U-boats suspected of attacking the Dunkirk evacuation ships. The squadron was then embarked aboard the carrier *Illustrious* at Bermuda and went out to the Mediterranean with her, working from HMS *Grebe*, RNAS Dekheila, Alexandria, Egypt, from August. In September No. 819 Swordfish dive-bombed the Italian airfield of Calato on the island of Rhodes and the squadron also took part in the Taranto attack in November. When *Illustrious* was crippled by many bomb hits from Junkers Ju.87 dive-bombers off Malta in January, many of the squadron's aircrews were killed and aircraft destroyed in her hangars. The few surviving Swordfish were amalgamated into No. 815 NAS and No. 819 was disbanded.

In October 1941, No. 819 was reformed at HMS *Daedalus*, RNAS Lee-on-Solent, with nine Swordfish. These went aboard the escort carrier *Avenger* for deck landing training in June 1942. During July the squadron served under RAF Coastal Command flying patrols in the North Sea before embarking on the escort carrier *Archer* for convoy work, No. 818 NAS Swordfish sinking the *U-572* with rocket projectiles among the first successes with this weapon. In August 1943 the squadron went aboard the escort carrier *Activity* and with her another submarine, *U-288*, was destroyed. In April 1944 more Coastal Command work was undertaken flying night patrols over the North Sea and from June the unit was based first on the South Coast of the UK, and then moved over to the Belgian airfields at St Croix, Maldeghem and Knocke-le-Zoute from October onward where they operated under No. 155 and then No. 157 Wing, RAF. In February 1945 No. 819 NAS moved to Bircham Newton, Norfolk, where it was disbanded the following month.

No. 820 NAS had their existing Blackburn Sharks replaced by Swordfish in the autumn of 1937 aboard the carrier *Courageous*. In November 1938 the unit moved to the carrier *Ark Royal* until June 1941, serving in her famous exploits in the Mediterranean and the Atlantic until they were transferred to the carrier *Victorious*. The Swordfish went ashore in Iceland in November and were replaced by the Fairey Albacore.

No. 821 NAS had replaced their Blackburn Sharks with the Swordfish in September 1937, and in November 1938 were transferred to the carrier *Ark Royal*. After operating in the North and South Atlantic on anti-submarine and then German raider hunting operations, April saw them involved in the Norwegian operations. On 21 June attempts were made to attack the German battle-cruiser *Scharnhorst* which was returning to Kiel from Norway with an escort of four destroyers and four torpedo boats. Six Swordfish

located this powerful force off the Utsire Light (Utsira, Rogaland) and duly attacked, but no hits were made and two of the six Swordfish were shot down.

The squadron was reorganized at Detling in July 1941 and conducted anti-submarine operations in the Orkney Islands before going out to the Mediterranean in November. Here, No. 821 NAS was re-equipped with the Fairey Albacore.

No. 822 NAS was converted from the Blackburn Shark to the Fairey Swordfish aboard the carrier *Furious* in August 1937. By February 1939 the squadron was embarked in *Courageous* but was disbanded when that ship was sunk. The squadron was reformed in October 1941 with Swordfish but in March 1942 converted over to the Fairey Albacore.

No. 823 NAS had the Swordfish from 1937 and served aboard the carrier *Glorious* in the Red Sea and Indian Ocean during the early months of the war. The squadron served at Norway and five Swordfish went down with *Glorious* when she was sunk; the remainder were at RNAS Hatston with No. 821 NAS. On 14 April 1940 they attacked the two German destroyers *Bruno Heinemann* and *Friedrich Eckoldt* returning home from Trondheim, Norway, but without success. The unit was disbanded in December 1940 but was reformed at Crail in November 1941 with Swordfish embarking aboard *Furious* but shortly afterward converting to the Fairey Albacore.

No. 824 NAS serving ashore from the carrier *Eagle*, six Swordfish made a classic torpedo attack in the Gulf of Bomba, Tobruk, on 20 July 1940, sinking the destroyers *Nembo* and *Ostra* and the 2,332-ton freighter *Sereno*.

No. 825 NAS was serving at Dekheila and joined the carrier *Glorious* in September 1939, seeing raider hunting and convoy duties in the Red Sea and Indian Ocean before the vessel was recalled home in April 1940 to take part in the Norwegian campaign where she was sunk. Some Swordfish were ashore at RAF Hal Far, Malta, while the rest returned home with the carrier and were disembarked at HMS *Gannet*, RNAS Prestwick. They were transferred south via Worthy Down to Detling and Thorney Island airfields during the Dunkirk evacuation period under Lieutenant-Commander James Brian Buckley. Losses were heavy – eight of the twelve Swordfish, five on a single day on 29 May. Reinforced by spare aircraft and crews the squadron then embarked aboard the carrier *Furious* from her made night attacks on the ports of Trondheim and Tromsø in September. By February 1941 the unit was still aboard *Furious* off the Gold Coast, escorting troop convoys to the Middle East via the Cape, but she was recalled home in May 1941 to help with the hunt for the *Bismarck*.

On 22 May No. 825 NAS joined the carrier *Ark Royal* and took part in Malta convoy operations and raids on Sardinia until the carrier was sunk off Gibraltar in November. Those Swordfish that were not lost with the *Ark Royal* were assembled at Gibraltar but the squadron was disbanded. In January 1942 the unit was being reassembled at Lee-on-Solent under Lieutenant-Commander Eugene Esmonde when the Channel Dash episode, Operation *Cerberus*, took place between 11 and 13 February. The German battle-cruisers *Gneisenau* and *Scharnhorst* and heavy cruiser *Prinz Eugen*, steamed up the English Channel escorted by destroyers and protected by standing patrols of fighters overhead. Six of 825's Swordfish were flown to RAF Manston from where they

flew their forlorn hope mission. Their Spitfire escorts failed to protect them and the Swordfish were massacred by defending Luftwaffe fighter aircraft making attacks with their flaps fully extended to prevent overshooting their target, without the Swordfish being able to score any hits on the German warships. Esmonde received a posthumous Victoria Cross; only five of the aircrew survived.

The squadron continued re-forming at Lee-on-Solent and then joined the escort carrier *Avenger*, from which ship they fought through to Russia on convoy PQ18. They then worked under 16 Group Coastal Command from Thorney Island and Exeter airfields. In March 1943 the squadron embarked aboard the carrier *Furious* and carried out missions from Iceland and off Norway. With twelve Swordfish-IIIs they flew aboard the escort carrier *Vindex* and conducted further Arctic convoy work, the Swordfish sinking, or assisting in sinking, the *U-563* and *U-765* in March and June 1944. In August the twelve Swordfish rejoined *Vindex* and resumed Russia convoy escorting, and assisted in sinking the *U-354* on 22 August, *U-344* on 24 August and *U-394* on 2 September. The squadron then switched to the escort carrier *Campania* for further Russian convoy missions before their Swordfish were merged into No. 815 NAS.

No. 826 NAS first formed as a Fairey Albacore squadron at RNAS Ford, Sussex, in March 1940 and by 1941 was in the Mediterranean with the carrier *Formidable*, where some Swordfish-Is joined on 1 July 1940. The squadron, commanded by Lieutenant-Commander Wilfred Henry Gerald Saunt DSO, took part in the Battle of Cape Matapan in March 1941, damaging the battleship *Vittorio Veneto*, and later took part in the Mediterranean Fleet operations against Tripoli and Bardia. They attacked Luftwaffe bases at Scarpanto Island and when *Formidable* was badly damaged by return Stuka attacks, the squadron operated ashore from Dekheila, Egypt, and then in the North African campaign from Fuka and Ma'aten Bagush Camp, near Mersa Matruh, Egypt, in the desert. During the Syrian campaign in July 1941, the squadron operated from Nicosia, Cyprus, against Vichy French naval units working from Beirut. The last Swordfish left the squadron at the end of September 1941.

No. 828 NAS was another Fairey Albacore unit formed at Lee-on-Solent in September 1940. The squadron was transferred to Malta via the carriers *Argus* and *Ark Royal*, where they had some Swordfish-Is added to their strength at Hal Far airfield, under the command of Lieutenant-Commander David Erskine Langmore, the Swordfish operating from October to November against Axis supply convoys attempting to reinforce North Africa, but losses and accidents soon reduced the number of operational aircraft.

No. 829 NAS was yet another Fairey Albacore squadron, formed at Ford, Sussex, in June 1940. They took part in the Syrian campaign operating from Nicosia, Cyprus, with 815 and 826 NAS and between 31 May and 13 July 1941 these units flew 139 sorties. The squadron successfully attacked the Vichy supply ship *St Didier*, putting two torpedoes into her in Adalia (Antalya) harbour after she had earlier evaded patrols by disguising herself as a Turkish vessel. In August 1941 they had their Albacores replaced by ASV-equipped Swordfish and they embarked aboard the carrier *Illustrious*.

No. 830 NAS was formed from the Swordfish-I of No. 767 NAS detachment at Hal Far, Malta, in July 1940. They made their combat debut with a bombing attack on the port of Syracuse, on 30 June 1940 and attacked Axis shipping targets off Libya and dive-bombed an oil storage facility in Sicily.<sup>9</sup> In January 1942 the Swordfish-Is were replaced with Swordfish-IIs but, by March 1942, losses from varying causes had reduced the operational strength of the squadron to just three aircraft and it merged with No. 828 NAS, becoming Naval Air Squadron, Malta, as a flare-dropping unit. The combined unit was credited with the destruction of about thirty Axis ships with damage to fifty more, but, by March 1943, numbers again became so reduced that the squadron was disbanded, being reformed as a Fairey Barracuda unit in May 1943

No. 833 NAS was formed with Swordfish-Is at HMS *Daedelus*, RNAS Lee-on-Solent, on 8 December 1941, and commanded by Lieutenant-Commander Robert John Hilary Stephens. Swordfish-IIs were added to the strength from January 1942 onward. In January 1944 the squadron amalgamated with No. 808 NAS, being reformed in April 1944, under Lieutenant-Commander (A) Jack Gordon Large, again as a Swordfish-II outfit and operated over the Channel and North Sea sporting D-Day 'Invasion Stripes' for rocket attacks, but was disbanded in September 1944 at HMS *Gannet*, RNAS Eglinton.

No. 834 NAS was formed at HMS *Buzzard*, RNAS Palisadoes, Jamaica, in December 1941, operating Swordfish-Is under the command of Lieutenant-Commander Lionel Charles Brian Ashburner and Lieutenant Leslie George Wilson from the escort carrier *Archer* from USNAS Floyd Bennett Field, New York, and sailed for South Africa. They escorted transatlantic and Gibraltar convoys before being subordinated to 19 Group, Coastal Command, and flew patrols over the English Channel.

In July 1942 Swordfish-IIs joined the squadron and the unit was embarked aboard the escort carrier *Hunter* working in the Western Atlantic area on convoy protection and down to Gibraltar. A Flight was later transferred to the escort carrier *Battler* and with her took part in the Salerno landings in September 1943. The unit embarked aboard the escort carrier *Battler* for Aden and the Indian Ocean and flew anti-submarine patrols with Swordfish-IIs from Bombay, including the search for the German tanker *Brake* and three U-boats refuelling from her. After working from HMS *Ukussa*, RNAS Katukurunda, Ceylon, the squadron re-embarked aboard *Battler* between August and September 1944. The unit was finally disbanded, minus its Swordfish, back in the UK in December 1944.

No. 835 NAS was originally established at HMS *Raven*, Eastleigh, in February 1942 and then moved to HMS *Buzzard*, RNAS Palisadoes, Jamaica, on 17 January 1943. On 12 March the squadron moved to USNAS Norfolk, Virginia, and then joined the carrier *Furious*, leaving Norfolk on 3 April and disembarking at HMS *Daedelus*, RNAS Lee-on-Solent on 15 April. In June the squadron was at HMS *Sparrowhawk*, RNAS Hatston, and then moved to HMS *Blackcap*, RNAS Stretton, near Warrington on 22 September.

The unit was continually on the move, first to HMS *Landrail*, RNAS Machrihanish, on 29 January 1943, then conducted deck-landing trials and then escort duties