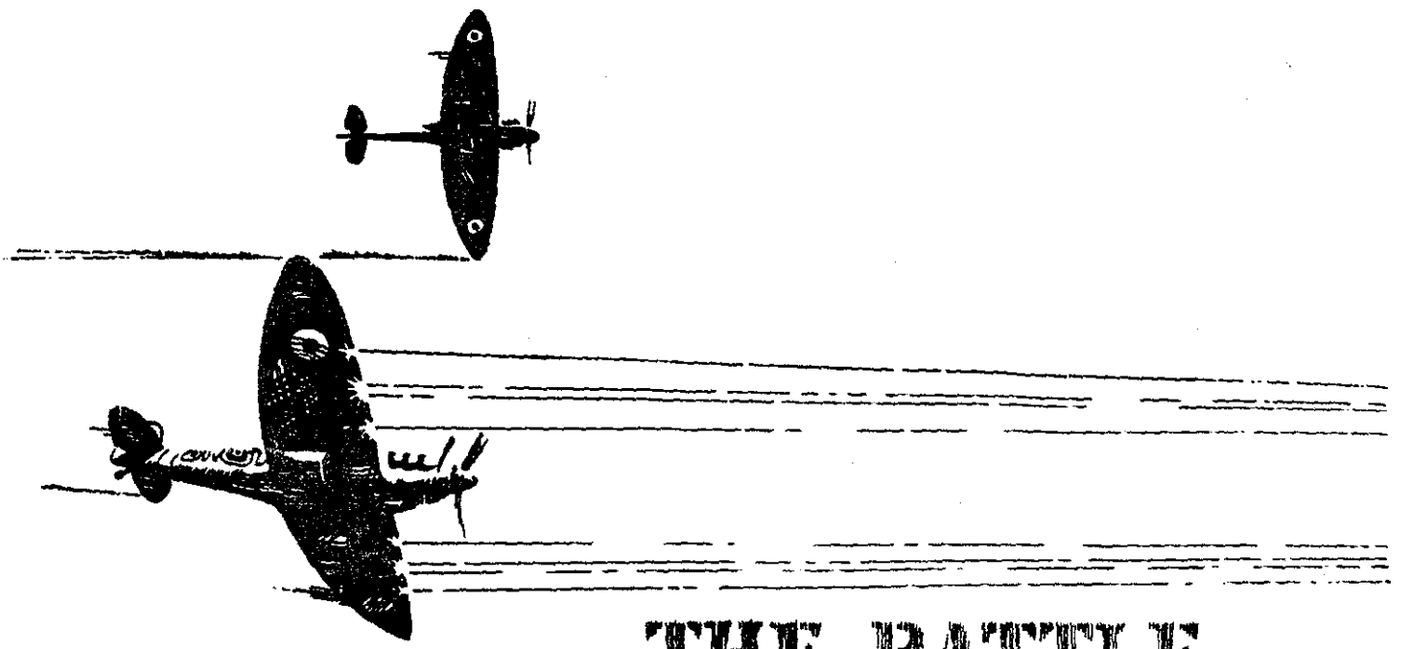
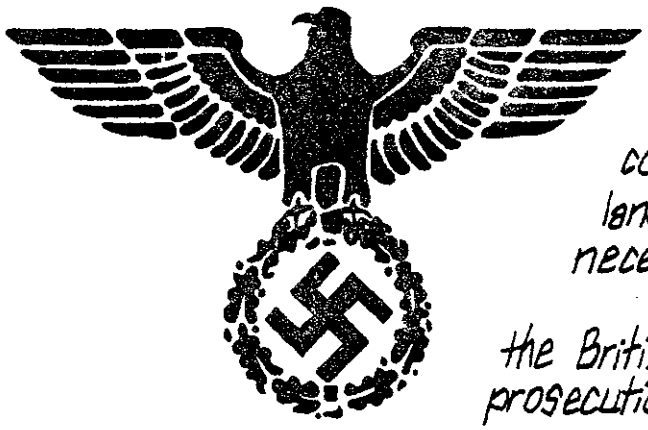


THE BATTLE OF BRITAIN 1940

NK TALLENTIRE AND DC PENNY



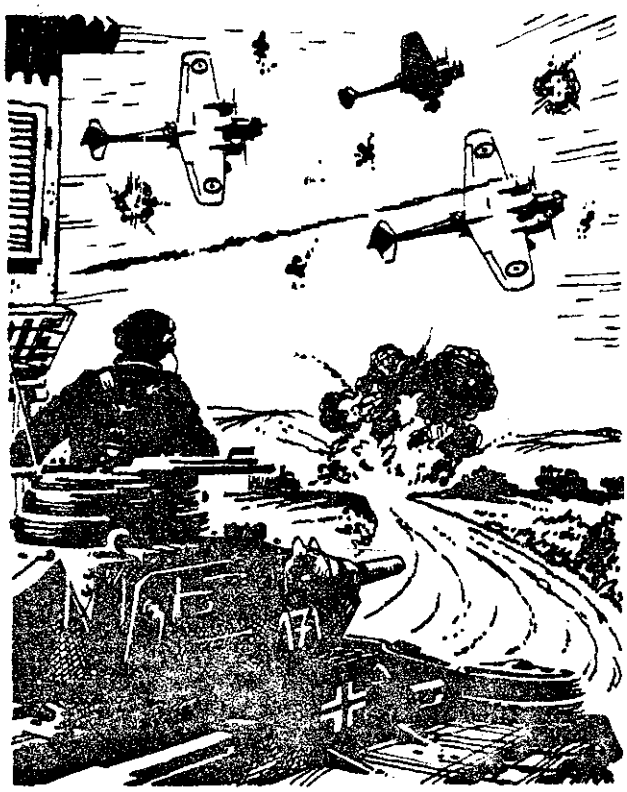
"Since England, in spite of her apparently hopeless military situation, shows no sign of coming to terms, I have decided to prepare a landing operation against England, and if necessary to carry it out.

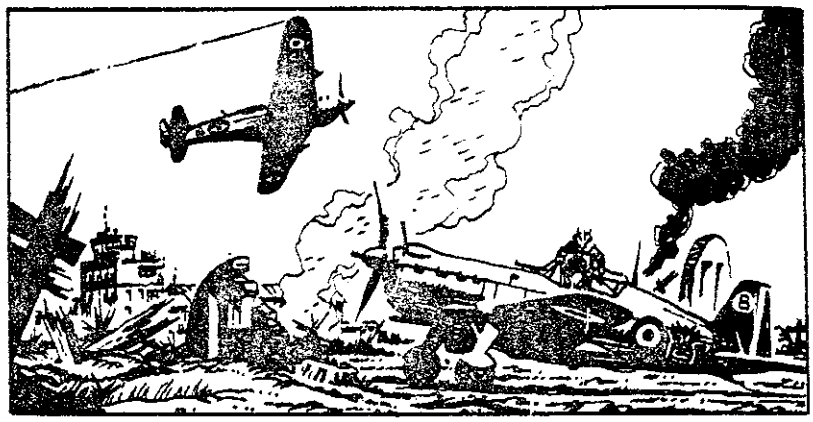
The aim of this operation is to eliminate the British homeland as a base for the further prosecution of the war against Germany, and, if necessary, to occupy it completely."

Adolf Hitler. Berlin, July 16 1940.
Directive No.16 (Operation Seelöwe).

The German attack on France and the Low Countries began on May 10th 1940. The French military planners expected any German attack to come through, either Belgium or across the river Rhine on the Franco-German border, as in the First World War. To meet these dangers two decisions were taken. The first involved the construction of a line of fortifications in Eastern France. They eventually stretched from Switzerland to the Ardennes and plans were made to extend these fortifications to the Channel coast. These forts - the MAGINOT LINE, were not complete by the Spring of 1940. The second decision taken by the British and the French was to prepare a plan to meet a German thrust into Belgium, by advancing to help the small Belgian Army. It was hoped to pin the Germans down before they reached France itself.

Few troops were facing the Ardennes because this area was considered impassable for tanks, but it was here that the blow fell. The German PANZERS, strong concentrations of tanks, burst into France, crossed the river Meuse and captured SEDAN before the Allies had realised what was happening. The Germans gained air supremacy and by advancing rapidly towards the English Channel, they cut off the British and French forces in Belgium. On 20th May the Panzers reached Noyelles on the Channel coast. By early June, the British Expedtionary Force was besieged at Dunkirk and had to be evacuated. On June 11th the French Government fled from Paris to Bordeaux and by the 14th the capital of France was in German hands. Defeatism had marred the French war effort from the start, now it destroyed the Government. Prime Minister REYNAUD resigned and was replaced by the aged Marshal PETAIN. The new Government made peace as soon as it could and France was out of the war by June 24th.....the Germans now turned their attention to England.

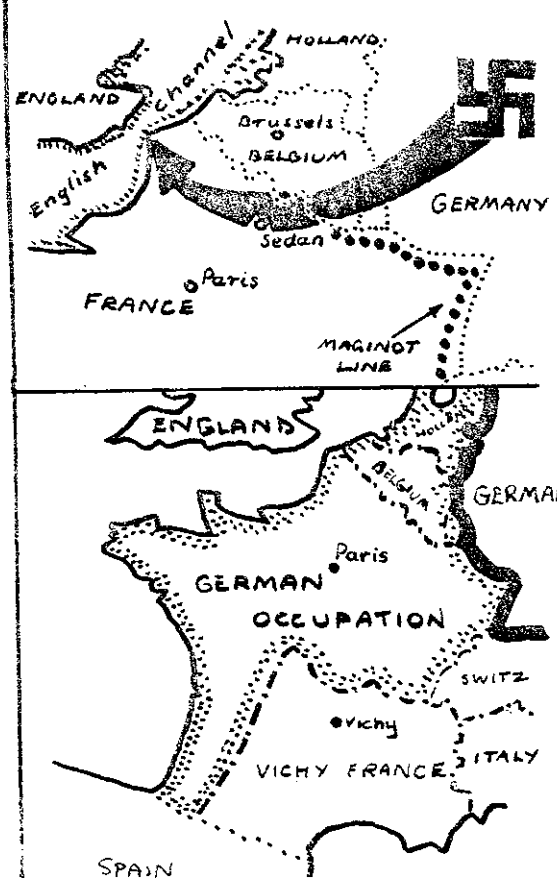


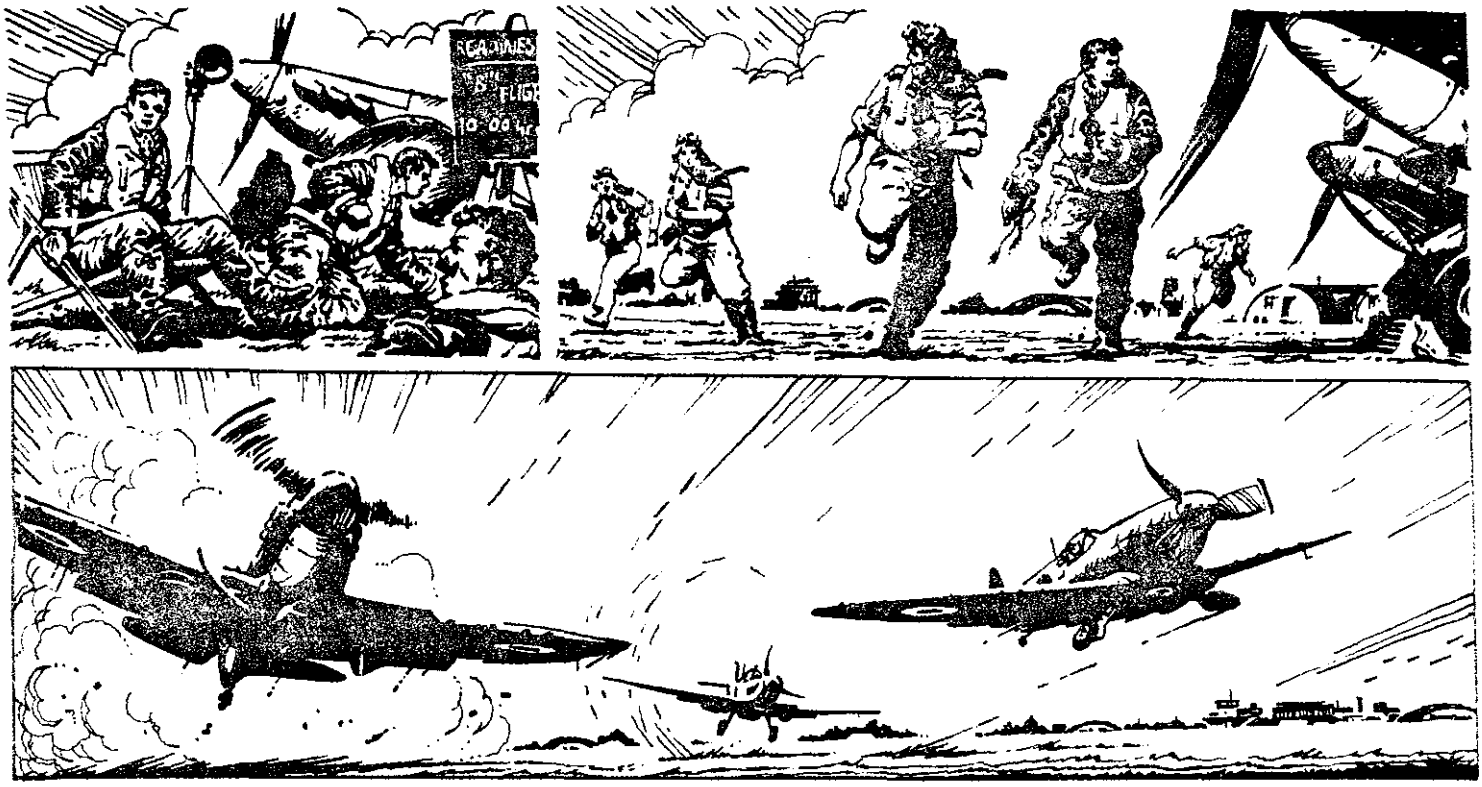


The German onslaught on France and the Low Countries proved to be catastrophic for the allied Nations. Nazi 'Blitzkrieg' tactics completely outclassed current French and British military ideologies and the Luftwaffe was very largely tailored to the 'Blitzkrieg'. The French Air Force was systematically destroyed on the ground and in the air by the Luftwaffe. Much of the equipment of the Armée de l'air was inferior to that of the Luftwaffe while the RAF's 'Advanced Air Striking Force' in France suffered badly, particularly in its Fairey Battle light bomber squadrons. Air Chief Marshall Dowding, the Air Officer Commanding of Fighter Command, foresaw, by May 16th 1940 the fall of France and managed to persuade the Government not to send any more squadrons from his depleted force to be frittered away on the Continent. Consequently, a barely adequate Fighter force was retained in England for what Churchill described as the impending 'Battle of Britain'. The drawings show (left) Amiot bombers of the French Air Force attacking German armoured units, and (top right) French Morane Saulnier 406 fighters of the 5th Escadrille, which in April 1940 was stationed at Chissey in support of the French 8th Land Army. Both types of aircraft illustrated were inferior to German aircraft. One unit lost 35 out of a total of 45 Moranes in a week.

THE PEACE OFFENSIVE - For a few weeks after the fall of France, Hitler hoped that Britain would make peace. CHURCHILL who had replaced Neville Chamberlain in May 1940 as British Prime Minister, inspired the British to resist and he had no intention of making peace with the Nazis, who were now seen as a force for evil that had to be destroyed.

On July 19th HITLER made a speech in which he offered peace, but the British ignored it. After that Hitler was unsure of what to do. The German Navy was too weak to land an invading army on the English coast and so Hitler turned to Goering, who commanded the German Air Force, the LUFTWAFFE.

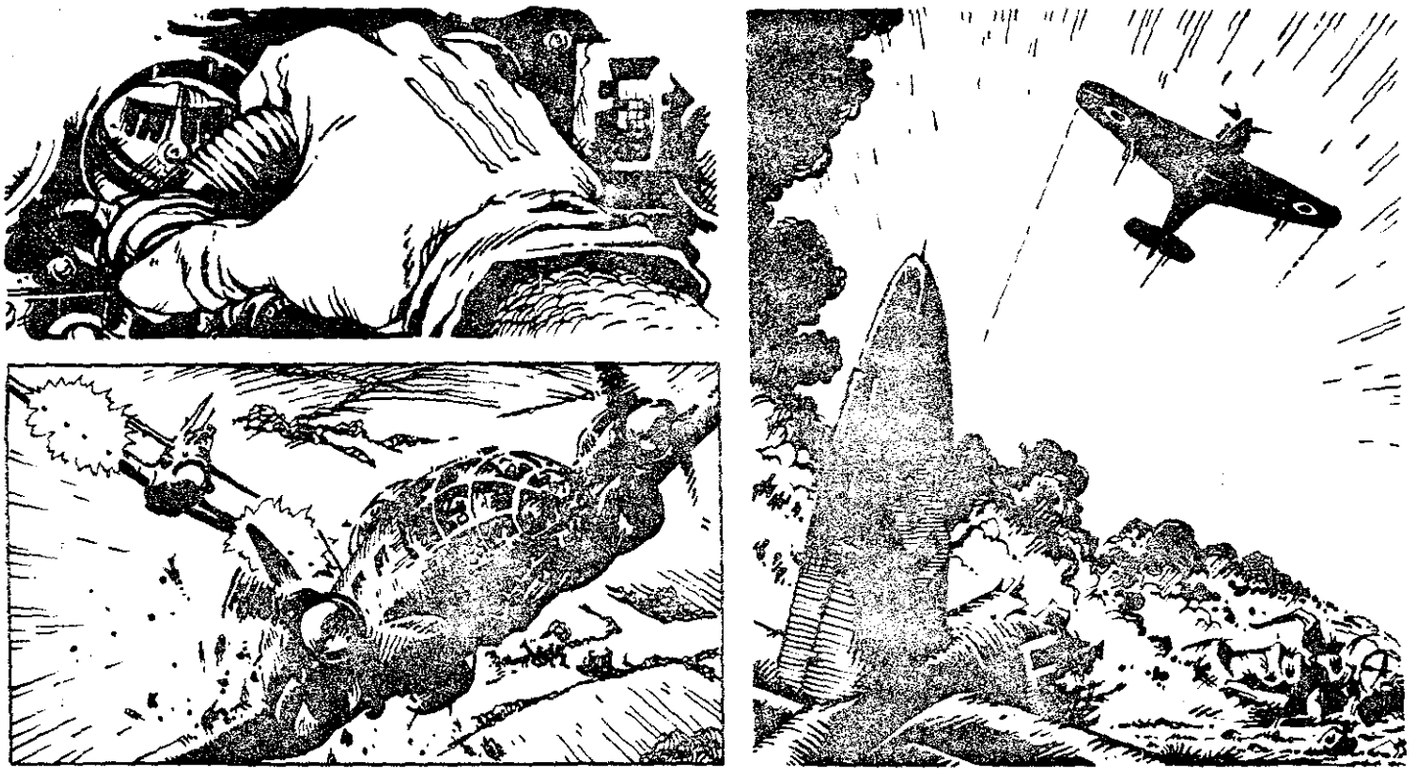




The sequence of drawings shows a 'Scramble' made by a Spitfire squadron. Although Dowding had carefully planned the disposition of his Fighter Groups and, with radar, had evolved a good system of Fighter Control the Fighter Squadrons were still employing tactics and formations taught before the war. Compact formations based on tight elements of three planes were flown while battle tactics were dependent on the fallacious belief that modern fighters were too fast for the dog-fight tactics of World War One. This policy produced disastrous results and the British adopted German fighter tactics. The Germans had, by 1940, evolved the perfect fighter formation. In the loose formations they, and later the RAF, flew they could maintain their positions more easily and cover one another more effectively. During the Battle the RAF developed this form of deployment and adopted what became known as the 'finger-four' formation.

INVASION PLANS - Herman Goering had been a First World War fighter 'Ace' and his Luftwaffe was a magnificent fighting force. It had just played a major part in the conquest of Poland, Norway and France. The MORALE of its pilots was very high. Goering decided to use his forces to destroy the ROYAL AIR FORCE - on the ground and in the air. When this had been done, the Luftwaffe could protect the invasion barges as they crossed the Channel to land an army in England,(Operation Sealion).

THE LUFTWAFFE - In 1940, the Luftwaffe was only five years old, but many aircraft prototypes had been secretly developed abroad before 1935. The men who helped Goering build up the air forces were interested in quick victories, so large bombers were not built, as these would only be of advantage for a long bombing campaign. So the Luftwaffe was mainly equipped with fighter planes and light bombers.



The series of drawings here shows the 'Classic' form of fighter interception. A Hurricane is shown destroying a Heinkel III bomber. 'Classic' interceptions, those most assured of success, are made from either dead astern or from dead ahead. Those from dead ahead were both dangerous and less likely of success because of the high closing speeds of the aircraft. 'Deflection' shooting required the pilot to assess the speed of his target, aim ahead of it, and open fire so that the aircraft he was aiming at, effectively, flew into his bullets. Deflection shooting was of prime importance in attacking aircraft that were taking evasive action and in making 'beam' attacks from the left or right of the target. Tactics developed rapidly throughout 1940.

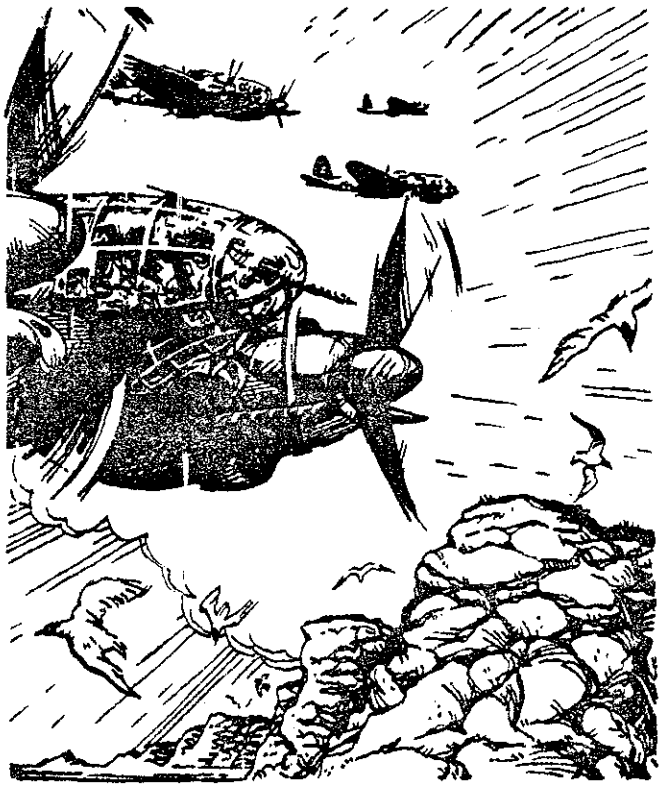
The Germans had large numbers of aircraft available for use. The LUFTFLOTTEN, (Air Fleets), 2 and 3 were stationed in France and Belgium, whilst Luftflotten 5 was in Norway. Between them, these airfleets had about 3,000 aircraft. Of these about 2,500 were ready for action when the battle began. On a normal day, the Germans could put about 800 long range bombers, and 820 fighters into the air.

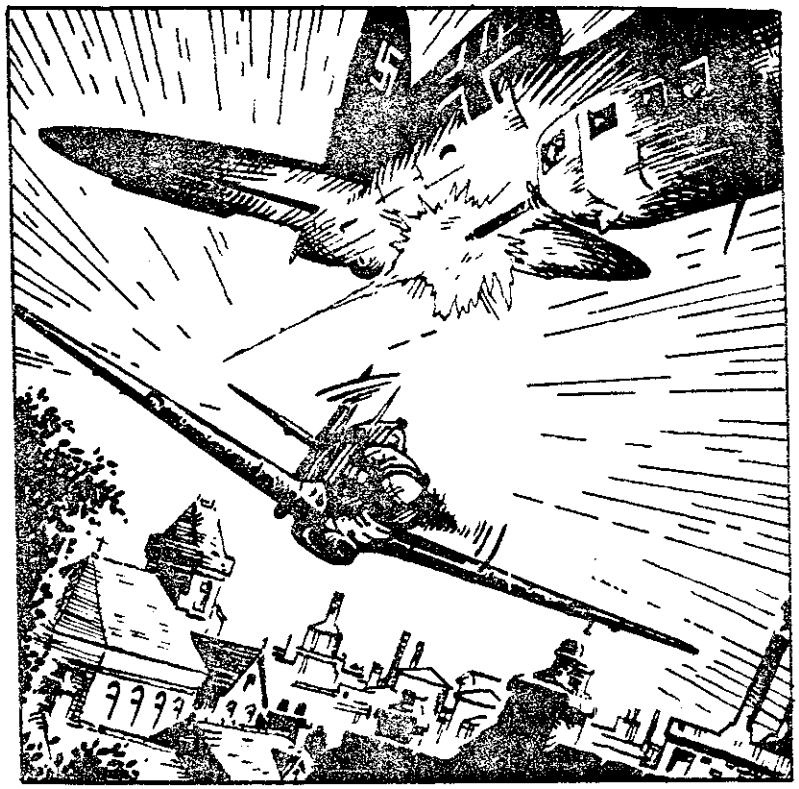
THE ROYAL AIR FORCE - The R.A.F. could muster I,200 planes in its front line strength. Of these, 800 were new Spitfire and Hurricane fighters.

Table Two - R.A.F. Fighters ;

NAME	ARMAMENT	SPEED
Supermarine Spitfire	8 x .303mg	36Imph
Hawker Hurricane	8 x .303mg	328mph

The Spitfire and the Hurricane were very powerful fighters. A two-second burst from their guns could tear an enemy aircraft to pieces and the R.A.F. had plenty of them. On the eve of the Battle of Britain, 500 fighters left the factories every month. The R.A.F.'s main shortage was to be in trained pilots.

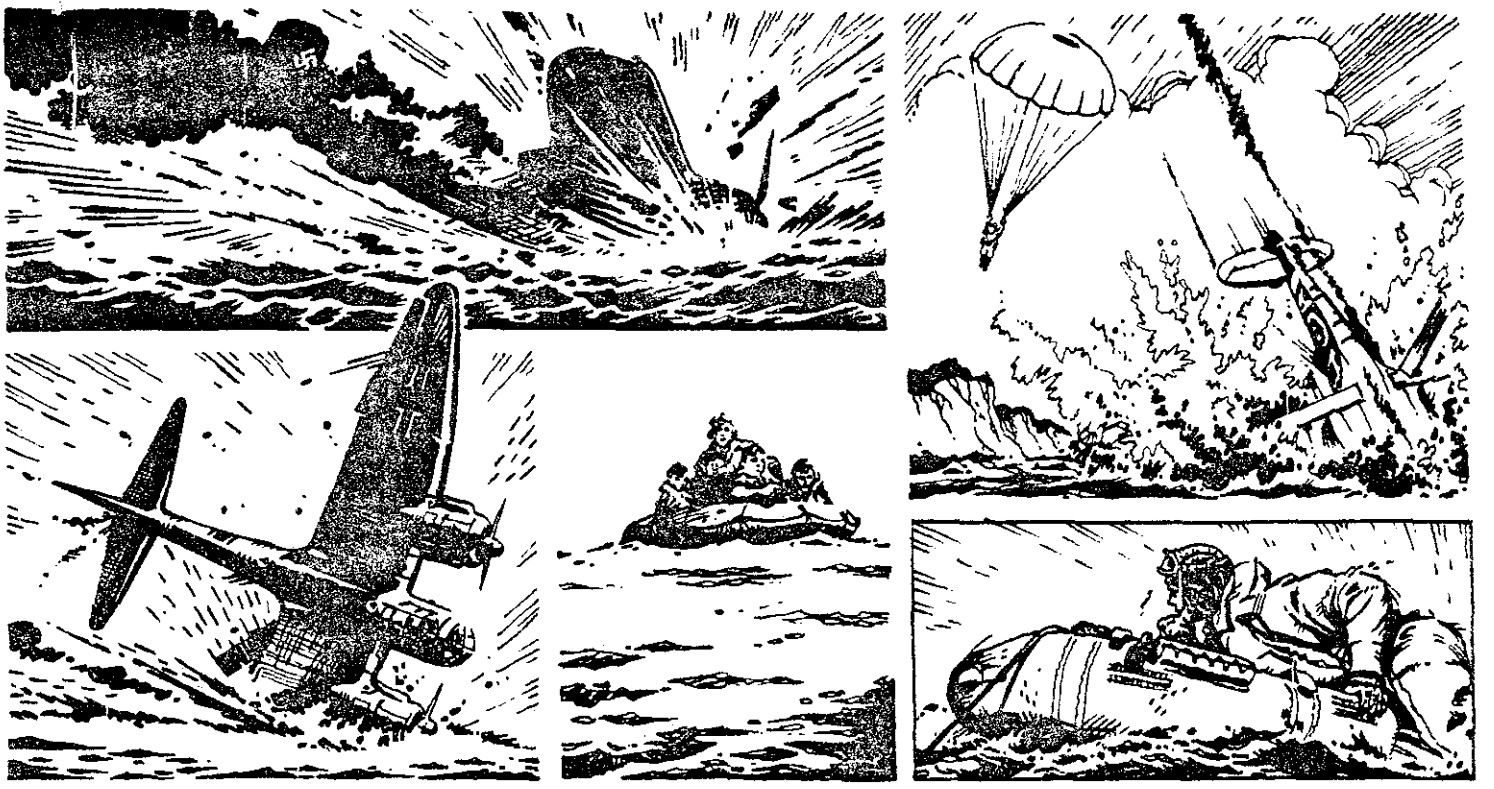




In order to intercept incoming raiders successfully it was imperative for the RAF to have fighters airborne in the right place at the right time. Radar was invaluable in this respect and, fortunately, Göering never appreciated just how vital radar was to Britain's Defence system. Radar could be confused however by the ploy of making feint raids or keeping aircraft airborne over the French coast so that they appeared as plots but never crossed the British coast. Often, low flying enemy formations did not appear at all on radar screens. In these instances visual sightings made and reported by men and women at Observer Corps Posts were to prove very useful in the plotting and interception of German raiders. The drawings show a low-level raid by Heinkel IIIs crossing the coast and a low level interception of a Heinkel by an RAF Hurricane.

Table One - AIRCRAFT OF THE LUFTWAFFE.

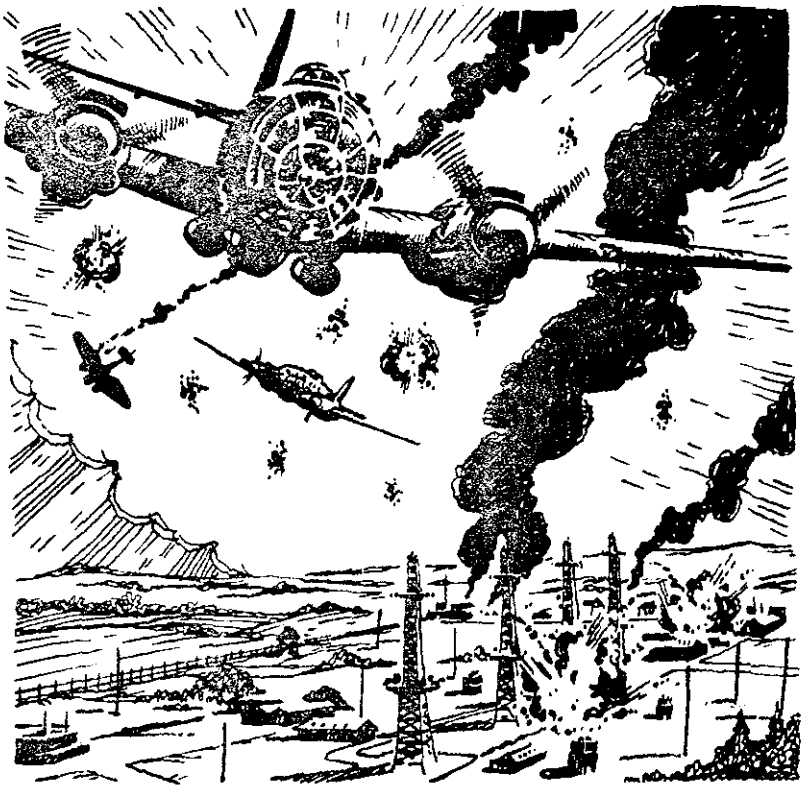
NAME	TYPE	ARMAMENT	SPEED
Messerschmitt I09E	Fighter	2 x 7.9mm mg 2 x 20mm cannon	357mph
Messerschmitt II0	Fighter	5 x 7.9mm mg 2 x 20mm cannon	349mph
Junkers 37	Dive bomber	I x I0I2 lb bomb 4 x II0 lb bombs	2I7mph
Junkers 88	Medium bomber	5,5I0 lbs bombs	292mph
Heinkel III	do.	do.	258mph
Dornier I7	do.	2,2I0 lbs bombs	270mph
Dornier 2I5	do.	2,2I5 lbs bombs	3IImph.



Attacks on convoys and fighter airfields near the coast such as Lympne and Hawkinge produced a great many spectacular dog fights over the Channel throughout June and July. Radio commentators on the coast followed these battles, and reported on them, much as they would a Football match. Spectators lined the cliffs at Dover and 'kept score' of the outcome of the engagements. The drawings show (top) a Dornier 17 and a Spitfire shot down in the sea. A German crew-dinghy and a British one-man dinghy are also shown. The aircraft shown (bottom left) is a Junkers 88 bomber. This was the best German bomber of the period although it, like the others, carried inadequate defensive armaments. Those units equipped with Ju-88s suffered lower attrition on operations than units employing Dorniers and Heinkel IIIs. In 1940 the German Air-Sea Rescue services were, generally, better prepared than those of the British. Throughout most of the Battle British fighter pilots had no dinghies and had to rely on their 'Mae West' life-preservers.

RADAR - Radio Direction Finding (RDF) or Radar was Britain's secret weapon. This invention bounced radio waves off incoming aircraft. The position of the aircraft was then displayed on an illuminated screen. The power of the bomber had been greatly feared after the First World War and this had given impetus to the development of counter measures. One such counter measure was Radar, invented by a team of British scientists after 1934. When the battle began, fifty one radar atations tracked the high level bombers and others tracked low flying aircraft. Aircraft were also spotted by the Observer Corps who, armed with binoculars manned a network of posts. Radar stations were connected by telephone to an operations room, to which they sent their estimates of position, speed, altitude and numbers of incoming bombers. This information was displayed on a huge map table in the centre of the 'ops room'. This system was of great value because British fighters could intercept the enemy with great accuracy.

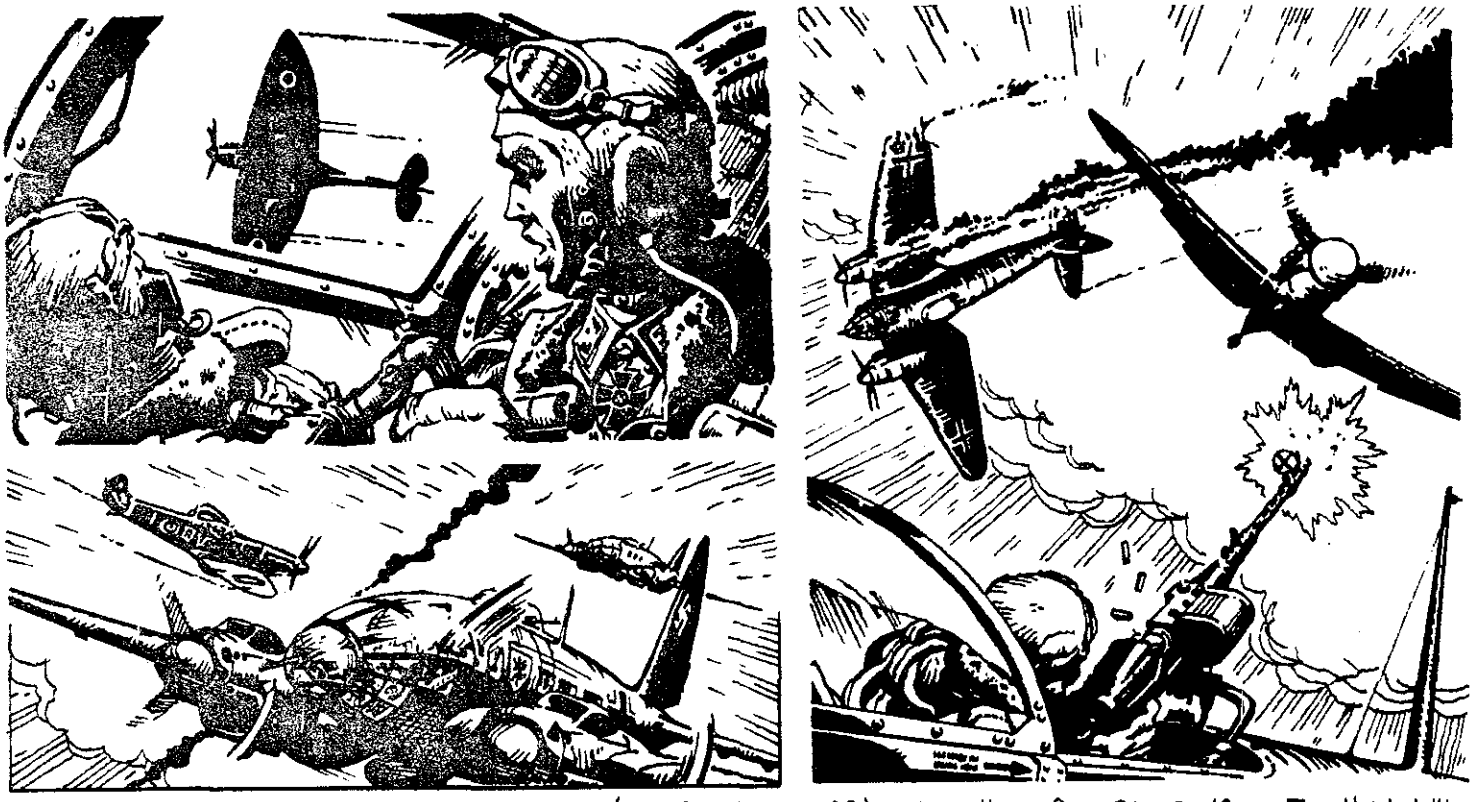
ATTACKS ON COASTAL SHIPPING - The battle had begun on July 10th when ships around the English coats were attacked by German fighters and bombers. The German's idea was to draw the R.A.F. into battles over the English Channel. This area was close



Before Hitler could launch 'Operation Sealion' - his invasion of Britain - he knew that he would first have to destroy the RAF and gain supremacy in the air. Göering had boasted that the Luftwaffe could, alone, force Britain to capitulate. On August 13th 1940 a concerted German effort comprising of strikes against British airfields and radar installations began. To the Germans that day was the day of 'Adlerangriff' - the attack of the eagles, and it was known as 'Adlertag' or Eagle Day. Radar stations at Ventnor, Pevensey and Swinggate had been bombed on August 12th and the main German objectives were airfields. Although the Germans knew where the RAFs fighter bases were they very often bombed the wrong ones. On Eagle Day, airfields at Eastchurch, Detling and Andover were heavily raided but not one was a fighter base in spite of the fact that the annhilation of Fighter Command was the primary aim of these 'Eagle Attacks'. The Luftwaffe flew 1,485 sorties on Eagle Day and struck successfully at nine RAF airfields. They lost 34 aircraft while the RAF lost 13 fighters. The policy of raiding RAF airfields was quite sound but one of Göering's failings was his inability to adopt, and stick to, decided policies. Events throughout the Battle of Britain bear this fact out and as a result of this particular failing the Luftwaffe needlessly lost both aircraft and crews. The drawings illustrate German raids on RAF Fighter airfields and strikes at radar stations.

to the German bases and their fighters could be in the air longer before refuelling. The R.A.F. lost 150 aircraft in the encounters to the Luftwaffes 286. The British losses were too high, the fighters would be needed to defend England itself. To prevent further losses of aircraft and shipping, the Channel convoys were stopped.

ADLER TAG - The first major assault began on August 10th. Goering called his attack 'Operation Eagle' and the first day of the assault was 'Eagle Day'. The plan was to destroy the R.A.F. in the skies and on the ground at its bases,(aerodromes). Bad weather prevented continuous German attacks for a couple of days but on the 12th August there were six major raids and several minor ones. Several hundred German aircraft came over and attacked Radar stattions, damaging five and 'knocking out' the one at Ventnor. Lympne, Manston and Hawkinge airfields were all damaged. Heavier attacks took place on the 13th August, the Germans flying 1,485 sorties and damaging three more airfields and some ships in the Thames estuary. On succeeding days railways were also attacked. Aircraft from Denmark and Norway also attacked



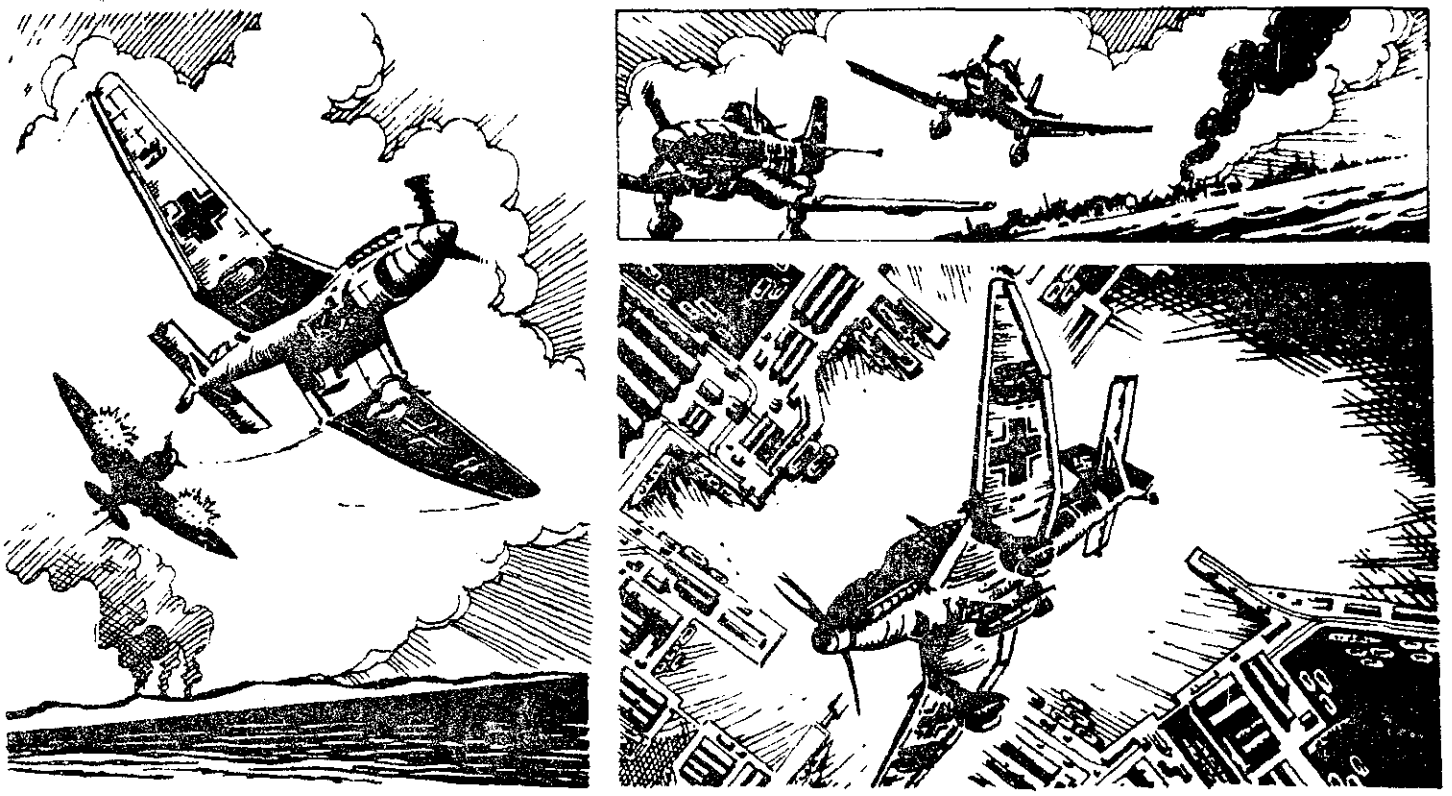
The drawings above show Heinkel III bombers of 'Kampfgeschwader 55' under attack from RAF Spitfires. The Heinkel III was already approaching obsolesence in 1940 and was the most vulnerable of the Luftwaffe's bombers. A daylight raid by unescorted Heinkels over the South Coast cost one Bomber 'Gruppe' all but 14 aircraft in losses. However, daylight raids continued in spite of almost insupportable attrition. In August, 183 bombers were destroyed and 48 were damaged. In the long run it was this unexpectedly, and disastrously, high rate of losses among bombers that forced the Germans to cease a lot of daylight operations. German fighter aircraft, on the other hand, managed to give as good as they got from the RAFs Fighter Command squadrons.

airfields in Northumberland. During August their were many 'dog fights' between British and German aircraft and many bombers were shot down. However the Germans had put out of action, the aerodromes at Middle Wallop, Martlesham, Driffield(Yorks) and Tangmere.

PHASE TWO - The Luftwaffe now thought that the R.A.F. was down to its last three hundred fighters, (both sides tended to overestimate the others losses), and so on August 24th the attack was switched from coastal airfields, to inland targets. The British were suffering losses - but mainly in trained pilots. New aircraft were pouring out of the factories.

Table Three - LOSSES AUGUST 8th - 18th.

R.A.F. fighters lost - in the air	181
- on the ground	30
Total	211
Pilots lost	154
(Replacement pilots 63 Replacement aircraft	170)
German aircraft lost	363



The Junkers Ju 87. This aircraft was known as the Stuka – from 'Sturzkampfflugzeug', a term descriptive of all German dive bombers. Use of the Stuka presupposed control of the air since it was extremely vulnerable to fighter attack. After emerging from the French and Polish campaigns with an almost legendary reputation the Ju 87 was first used in the Battle of Britain in July 1940. It suffered badly at the hands of RAF fighters and losses in the 'Stukigruppen' became unacceptable. At the end of August 1940 Stuka units were withdrawn from the Battle. As an aeroplane the Ju 87 was manoeuverable and light on the controls but, after 1940, this aircraft's dramatic career was eclipsed.

By switching inland, the Germans hoped to finish off R.A.F. Fighter Command altogethe

Table Four - THE LUFTWAFFE'S INLAND TARGETS (Refer to Map).

Airfields.....Tangmere (Sussex)
Kenley (Surrey)
Biggin Hill (Kent)
Hornchurch (Essex)
North Weald (Essex) .....All near London.

Further out from London were Debden and Northolt.

Headquarters.....No.II Fighter Group.....Uxbridge
Fighter Command.....Stanmore

Between August 24th - 26th many of the R.A.F's bases were hit and badly damaged. On September Ist, Biggin Hill was hit for the sixth time in three days and the next day it was bombed again ! During early September, the Vickers and Hawker factories

The Messerschmitt Bf 109. Undoubtedly one of the finest fighters of the period, the 109E enjoyed a higher maximum speed and superior rate of climb than the Spitfire which fulfilled the same basic concept. A direct injection fuel pump enabled it to go straight into a power dive but it could be out-turned by both the Spitfire and the Hurricane. 610 109Es were lost in the Battle of which 10% came down in the Channel after exhausting their fuel since the type suffered from a lack of range and the non-availability of suitable drop-tanks. The drawings show (bottom left) a 109E of 'Jagdgeschwader 3' "Udet", and (right) a 109E of 'Jagdgeschwader 2' "Richthofen" which was based at Le Havre in August 1940. The 109 accounted for most of the 1,172 Fighter Command aircraft lost during the Battle. Variants of the 109 remained in Luftwaffe service until 1945.

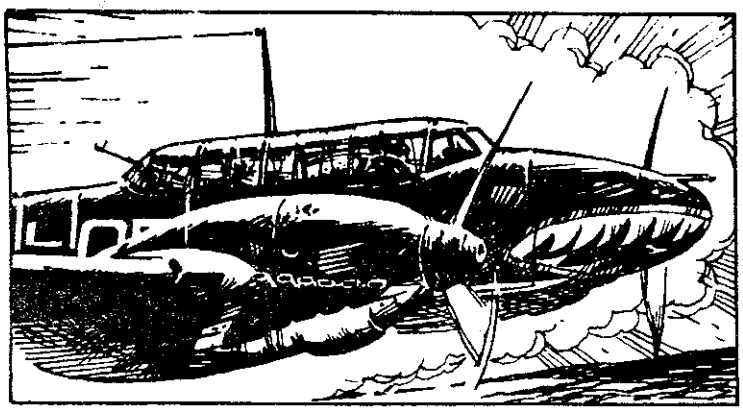
near Weybridge were hit and production of fighter aircraft was interrupted. The Germans had begun to realise that the secret of the R.A.F.'s success in intercepting their attacking aircraft was the existence of a first rate communications system.

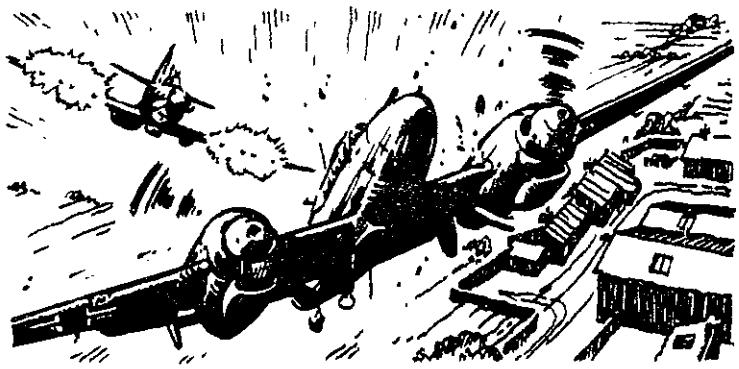
> "We realised that the R.A.F. fighter squadrons must be controlled from the ground by some new procedure because we heard commands skillfully and accurately directing Spitfires and Hurricanes on to German formations. . . . . For us this radar and fighter control was a surprise and a very bitter one." - Adolf Galland, a Second World War German Fighter 'Ace'.

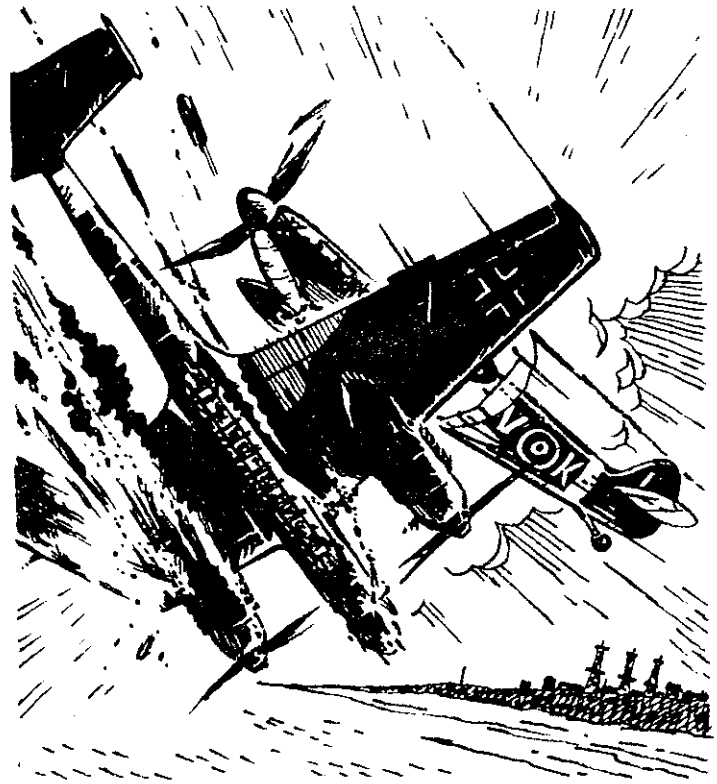
By this time German losses were approaching almost I,000 aircraft while Great Britain's were 550. Most of the British losses were in fighters, which because of bomb damage to the factories could not be immediately replaced. Much more serious was the loss of trained fighter pilots, which by the end of August had become a grave worry. 25% of the pilots available had been killed or seriously wounded.

> "The scales had tilted against fighter command....there was much anxiety." - Winston Churchill.

At this point, Goering made a crucial error - he stopped the attacks on Radar Stations. Probably Goering underrated the importance of these stations and did not



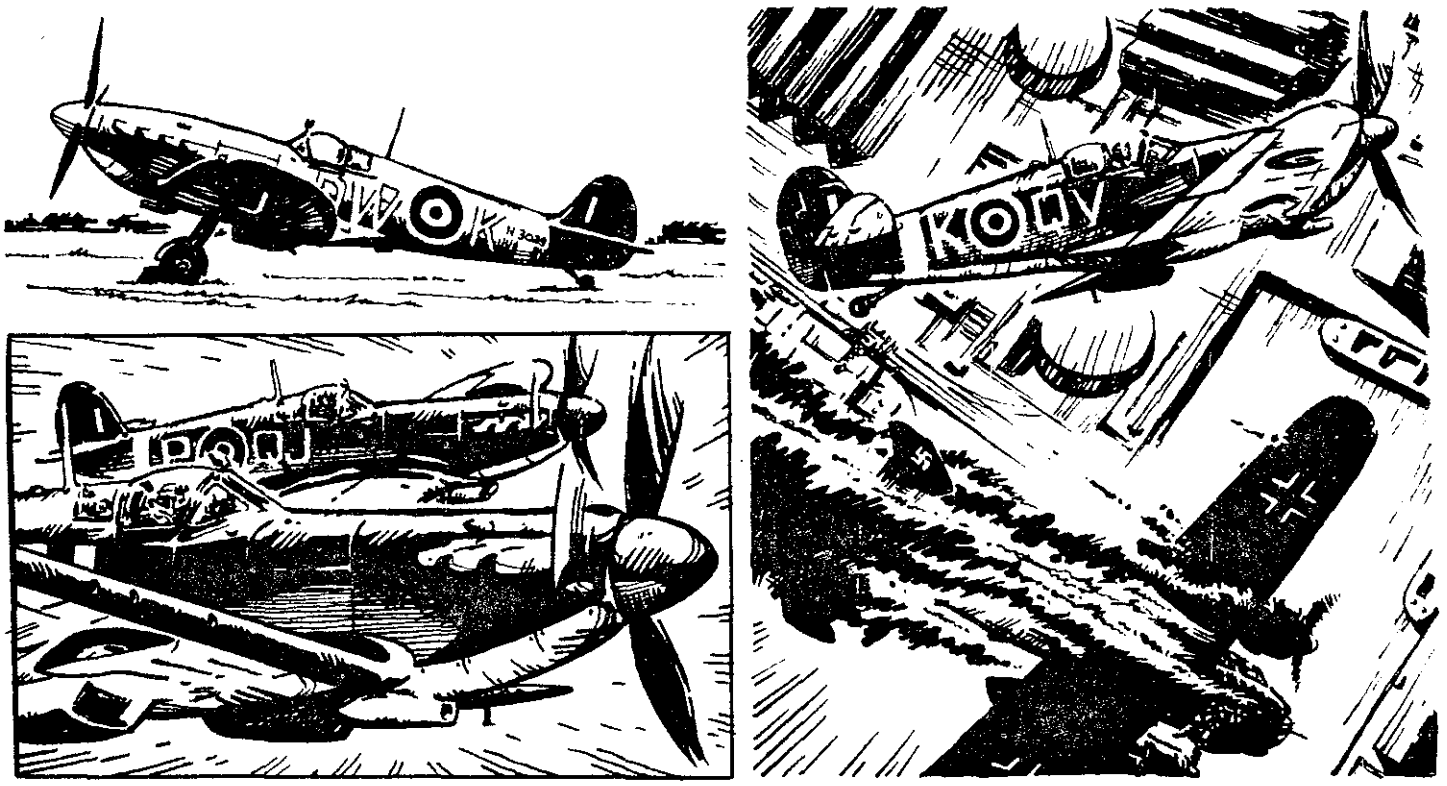




The Messerschmitt Bf 110. Like the 'Stuka' this fighter entered the Battle with a false aura of invincibility. It took its name, 'Zerstörer' - destroyer, from Naval parlance and it was intended for use as a long-range fighter to escort, and clear the way for, bombers. Zerstörer units represented Göering's prized élite corps. In fact the 'Zerstörergruppen' received a severe mauling from RAF fighters because the 110 lacked manoeuverability and speed. The farcical situation of Me 109 fighters escorting 110's arose and, on attack from RAF fighters, the 110's flew in defensive circles. This became known as 'The defensive circle' and a petulant and very disenchanted Göering demanded that this should be called 'The offensive circle'. The 110, once its obvious shortcomings were realised, later proved to be an effective warplane. Its failure in the Battle, however, angered and embarrassed Göering who had little grasp of the realities of the situation. The drawing (top right) shows a 110 C-3 of 'Zerstörergeschwader 76' "Haifisch" operating from Le Mans in September 1940. Later in the war the 110 was more usefully employed as a radar-equipped night fighter and fighter bomber.

realise that they could easily be damaged. Ventnor Radar Station had to be closed because of delayed action bombs lying on the site, but this too went undetected by the Germans. So throughout the battle, the British radar screen continued to function.

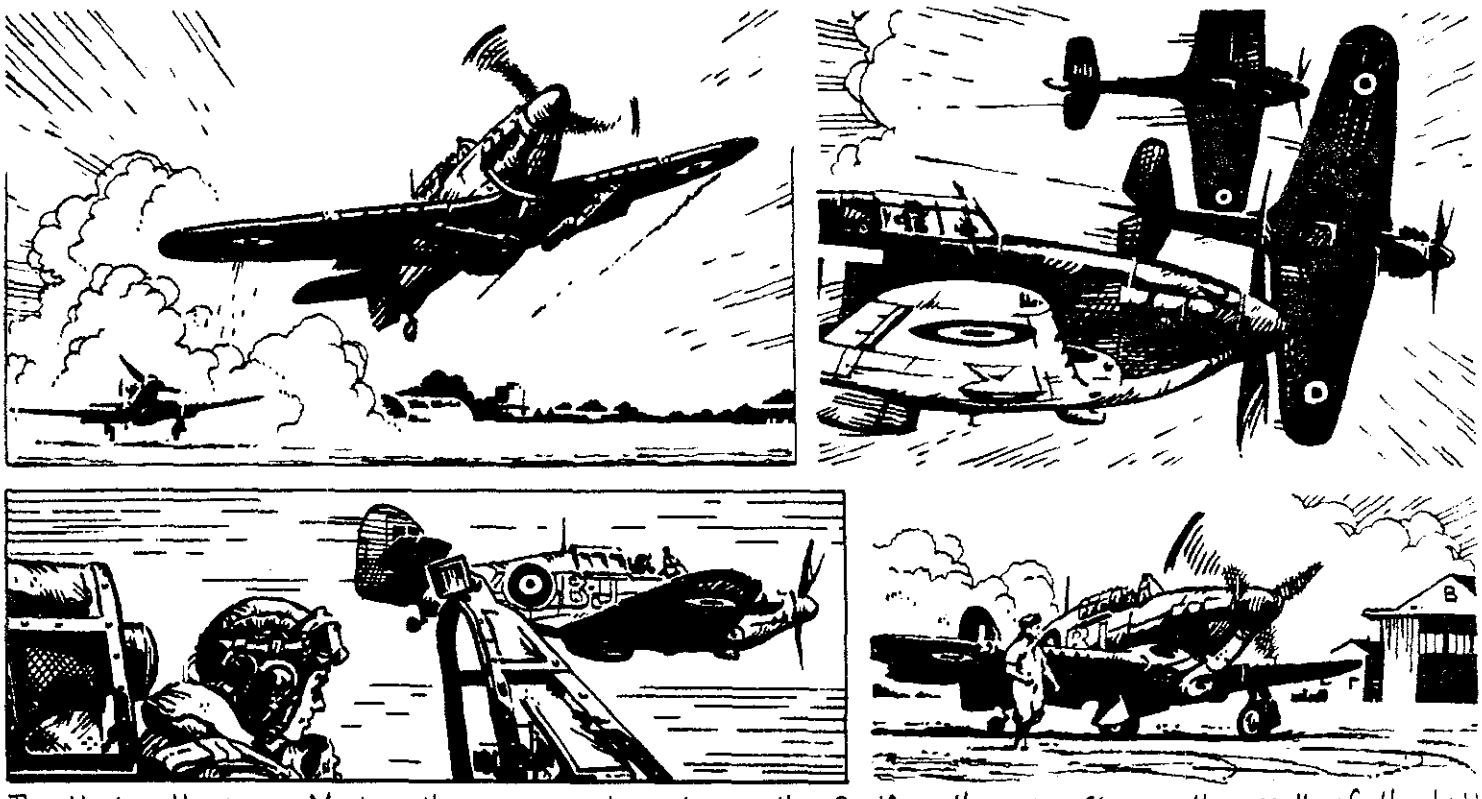
THE BLITZ ON LONDON - The greatest error of all was the abandonement of the attacks on the R.A.F. and its bases. Instead the Luftwaffe began to bomb London. On the night of 23rd August, about a dozen German bombers had got off course. They had been sent to bomb oil tanks outside London, but instead they dropped their bombs by mistake in the centre of the city, doing a little damage and causing a fe casualties. The British thought that this was deliberate and they decided to raid Berlin the next night. Eight-one bombers were sent. Only half of them found their target because of dense cloud over Berlin and not much damage was caused. The Berliners were very shocked, for Goering had always said that no enemy plane would ever reach the German capital. An American newspaper man, William Shirer



The Vickers-Supermarine Spitfire I. The drawings show (top left) a Spitfire of 610 Squadron and (bottom left) Spitfires of 92 Squadron. Both these squadrons operated from Biggin Hill in 1940. The drawing on the right shows a Spitfire of 19 Squadron, operating from Duxford in August 1940, shooting down a Dornier 17. The famous Spitfire became a material symbol of victory to the British, although with Fighter Command possessing only 19 Spitfire squadrons in July 1940, twice the number of Hurricanes took part in the Battle. Descended from the record-breaking S6B seaplane the Spitfire was the inspired design of RJ Mitchell. It was the equal of the German 109 fighter and was more manoeuverable. It was well loved by its pilots and was used throughout the war in a variety of Marks. Probably remembered as the most famous aeroplane ever the Spitfire, in its Battle of Britain form, was powered by the equally famous Rolls Royce Merlin engine.

was in Berlin at the time and he wrote in his diary, " The Berliners are stunned. They did not think it could ever happen. When this war began, Goering assured them it couldn't.....,they believed him. Their disillusionment today therefore is all the greater. You have to see their faces to measure it. "

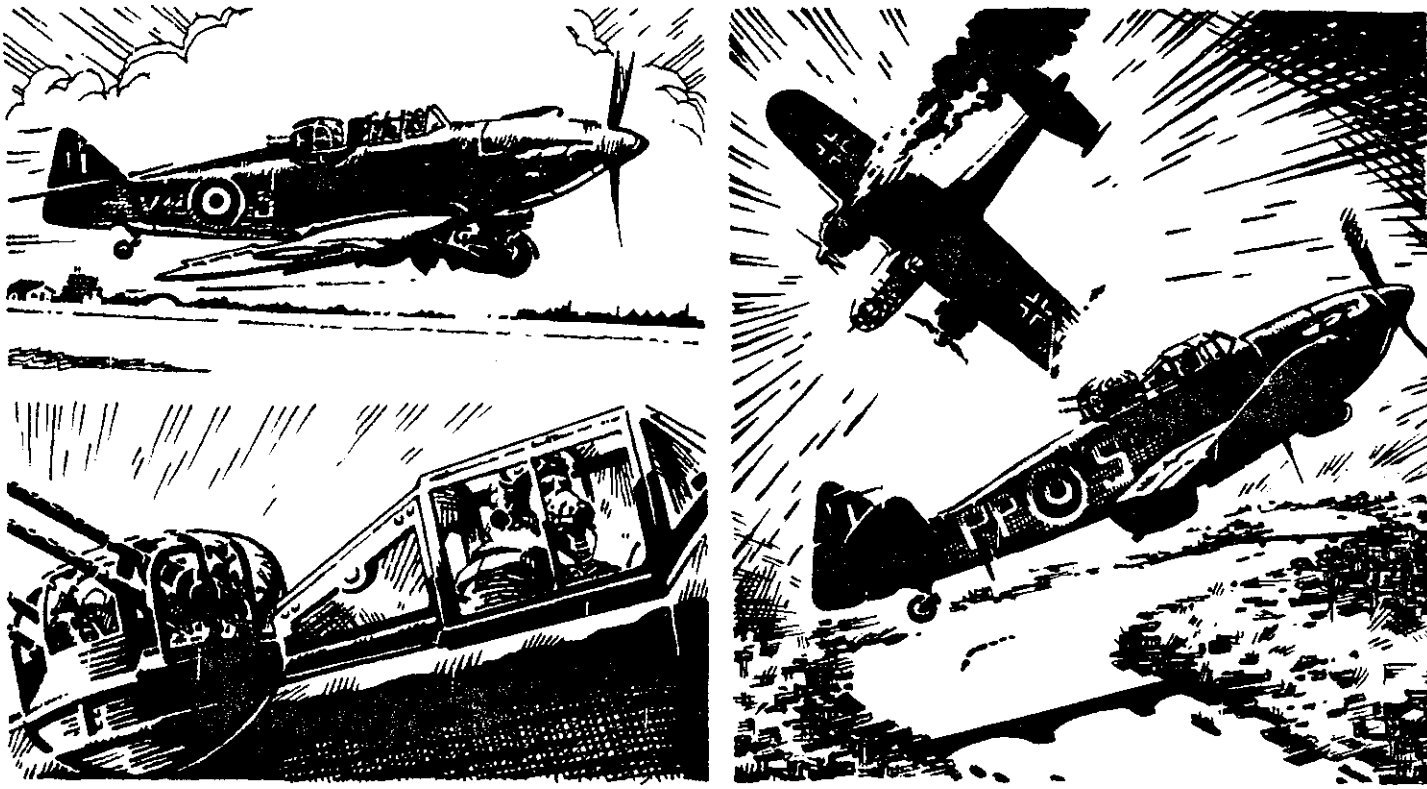
On September 4th, Hitler made a speech to an audience of mainly female nurses and social workers, in which he denounced the British raids and promised this revenge, "When they declare that they will increase their attacks on our cities then we will raze their cities to the ground.". Perhaps Hitler wanted to reassure the Germans, but perhaps also he had decided to use 'terror bombing' to make Britain surrender. On September 7th over six hundred German bombers attacked London. Vast fires were st arted as bombs rained down on power stations, gas works, warehouses and docks. The following night the bombers returned. In these two raids 842 people were killed and 2,347 wounded. The night raids were to continue for another fifty five nights. What were these raids like for ordinary Londoners in the East End ?



The Hawker Hurricane. Meeting the same requirements as the Spitfire this aircraft was the result of the highly studied application of experience and was the logical outcome of a long line of fighting aircraft. Its prototype trials began in 1935 and, during the Battle, over 30 squadrons were equipped with the type. The Hurricane was the main RAF fighter of 1940 and was numerically superior to the Spitfire. It was inferior to the 109E in most performance respects but it was both rugged and, at low altitude, very nimble. Like the Spitfire it was powered by a Merlin engine. From the beginning of August to September 30th the RAF lost 448 Hurricanes, this aeroplane having borne the major burden of Britain's air defence. The drawings here show Hurricanes of 17 Squadron, RAF, stationed at Debden in August 1940. The Hurricane also equipped Polish, Czech and Canadian squadrons during 1940. Hurricanes of various marks served operationally with the RAF until 1945.

One Londoner recalled that the bombs came down, " with a tearing sound as well as a whistle; they did not fall, they rushed at enormous velocity as though they were attracted to the earth by some supernaturally gigantic magnet."
A naval officer travelled up the Thames and described what he saw, " a stupendous spectacle. Half a mile or more of the Surrey shore was burning....The wind was westerly, and the accumulated smoke and sparks of all the fires swept in a high wall across the river" inside this wall of smoke "the scene was like a lake in Hell. Burning barges were drifting everywhere....We could hear the hiss and roar of the conflagration, a formidable noise, but we could not see it, so dense was the smoke. Nor could we see the Eastern shore. "

In peacetime, a fire that needed thirty pumps to get it under control had been a very big one indeed. Shortly after midnight on September 8th there were nine huge fires each needing 100 pumps each. Besides these there were 19 fires needing 30 pumps, 40 ten pump fires and about a thousand smaller blazes. In the Surrey Docks, two hundred and fifty acres of timber were set on fire. To some it seemed as if the whole world was on fire. Elsewhere that night "There were pepper fires, loading the surrounding air heavily with stinging particles so that when the firemen took a deep breath it was like breathing

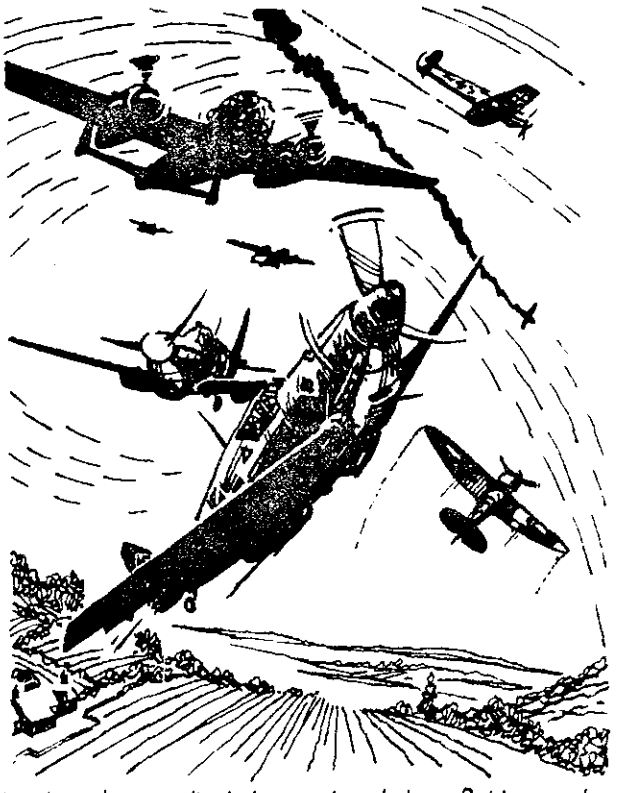


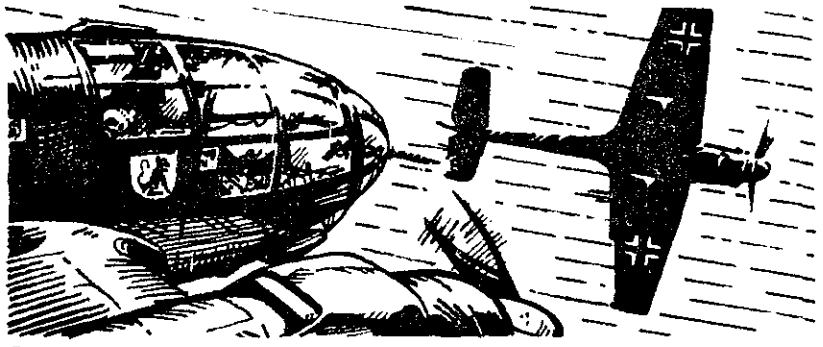
The Boulton Paul Defiant fighter, armed solely with a turret, was the fulfillment of a concept that crystallised at a time when the quality of conventional fighters had yet to be proven. At first it enjoyed limited success because it superficially resembled a Hurricane and, when attacked from the rear, the gunner could return effective fire. The Germans soon realised this and the concept of the turret-armed fighter proved to be a dismal failure, insofar as daylight operations were concerned. On July 19th 1940, 141 squadron, equipped with Defiants, was almost wiped out by Me 109s. The Defiant was subsequently withdrawn from daylight operations and was used as a Night Fighter. The drawings show Defiants of 264 squadron. At first based at Kirton-in-Lindsey in Lincolnshire this was a Day fighter unit. The drawing on the right shows a Defiant of this squadron after its removal to Rochford, near Southend, in September 1940 destroying a Dornier 17 over London. By this time 264 squadron was a Night fighter squadron and its aircraft were camouflaged entirely in a coat of Matt black paint.

fire itself. There were rum fires, with torrents of blazing liquid pouring from the warehouse doors, and barrels exploding like bombs themselves. There was a paint fire, another cascade of white hot flame, coating the pumps with a varnis that could not be cleaned for weeks. A rubber fire gave forth black clouds of smoke so asphyxiating that it could only be fought at a distance, and was always threatening to choke the attackers."

Firemen were cut off and perished in the acres of flame. Others tried to get close to the cold air surrounding the water jets. Others ached trying to direct the powerful jets onto the flames. Many worked for days, soaked to the skin and going without sleep to fight the fires.

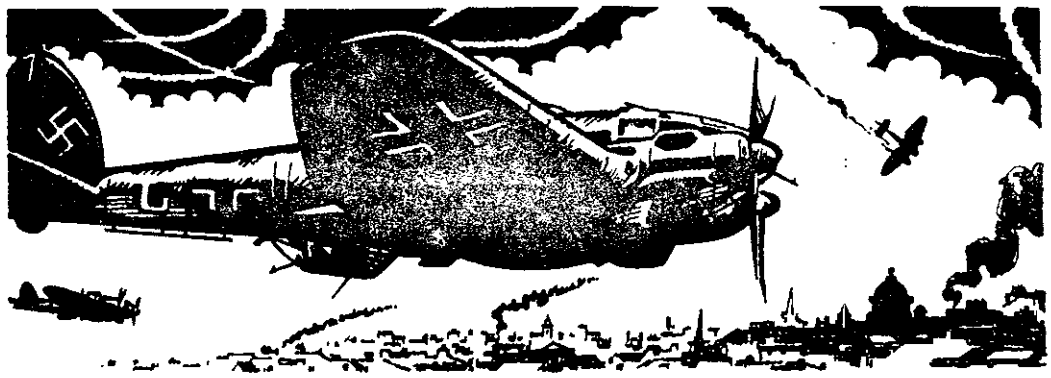
An invasion alert was sent out because many thought that the bombing was the prelude to Operation Sealion. The R.A.F. was still recovering from the attacks on its bases and the German bombers encountered very little resistance. The Germans were now so confident that they thought that one more big raid woul bring the British to their knees.



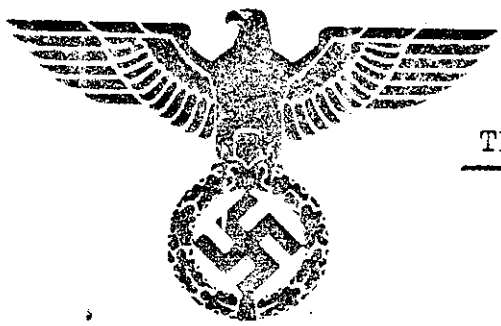


By mid-August 1940 Göering had become so alarmed at his high bomber losses that he ordered his fighter units to maintain close stations to the bombers when they were being escorted. Göering accused his fighter pilots of lack of aggression when in fact the 110 had already been proved a failure and the 109 was available in only relatively small numbers and lacked range. Göering's order served only to hamper his fighters' freedom of movement and offer the RAF's fighters some advantage over them. Göering had few qualifications as either a commander or strategist. His understanding of technical subjects was non existent and he badly mishandled the Luftwaffe which possessed no strategic bombers and was devised largely as a tool to support 'Blitzkrieg' land operations. The drawing (bottom left) shows a Heinkel 111 of KG 26 and its Me 109 escort. The drawing on the right shows Me 109s of JG 53 attempting to protect Dornier 17 bombers from attacks made by RAF Spitfires.

SEPTEMBER 15th, THE GREATEST BATTLE - Goering ordered a massive daylight raid on September 15th. The sky that morning was cloudless, but after midday thin veils of cloud began to develop. At about 11.30 a.m. great hordes of bombers began crossing the coast, heading for London. The first battles began over Canterbury. The main R.A.F. fighter force under the command of Leigh-Mallory was able to engage the Germans as they reached London. The flights of German aircraft were broken up and fled back to the coast in confusion. Over fifty German aircraft were destroyed. The R.A.F. lost only 26 planes and 13 pilots. The Germans attacked again in the afternoon with similar results. By 6 p.m. the last attacks had been repelled. It was now clear to Hitler that Britain could still defend itself and he called off the planned invasion. When Hitler attacked Russia in June 1941, he still had an enemy in his rear. This enemy was hard pressed but not beaten.



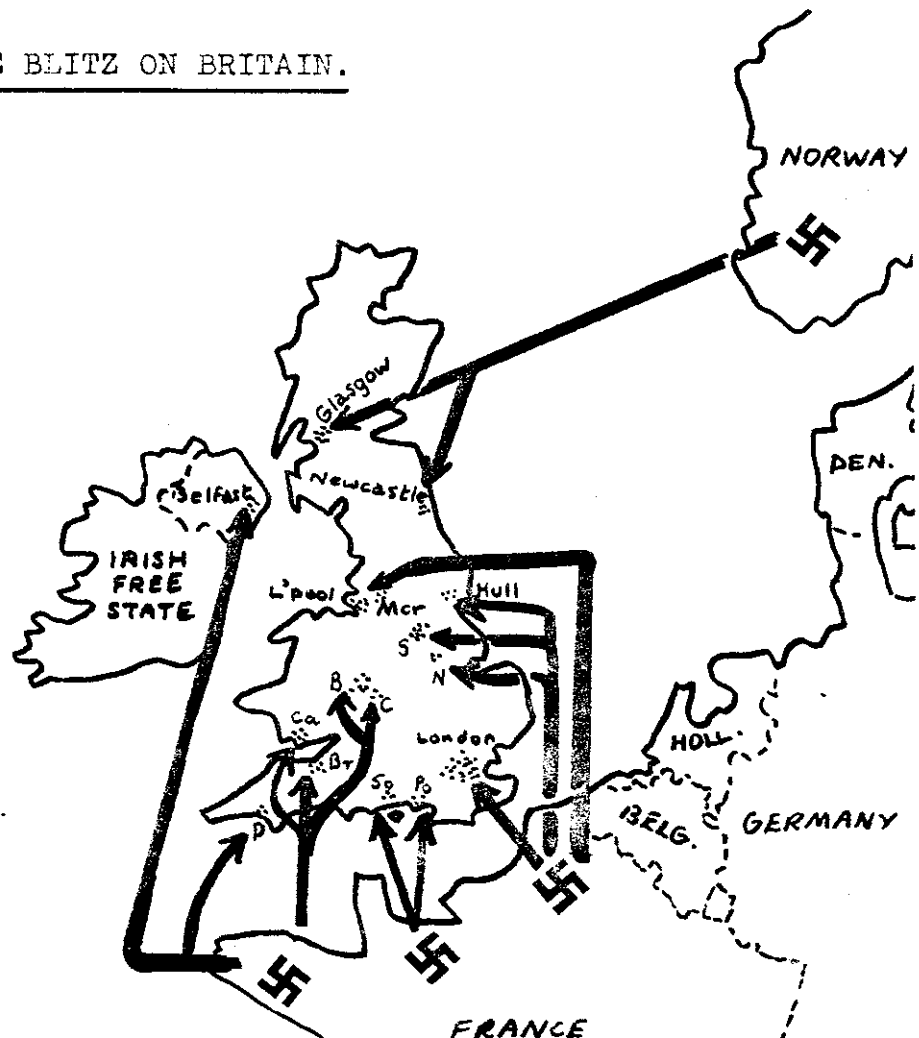
On the night of August 24th 1940 German bombers heading for Thameshaven's oil refineries bombed the East End of London. This was an error and was largely due to poor navigation. This event, however, began a chain reaction when RAF bombers hit Berlin in reprisal raids and the Germans, in their turn, began their 'Blitz' on British cities. The drawings above show a daylight raid on London carried out by Heinkel III's. The characteristic 'contrails', in the drawing on the left, were frequently all that a spectator on the ground could see of the battles over London.

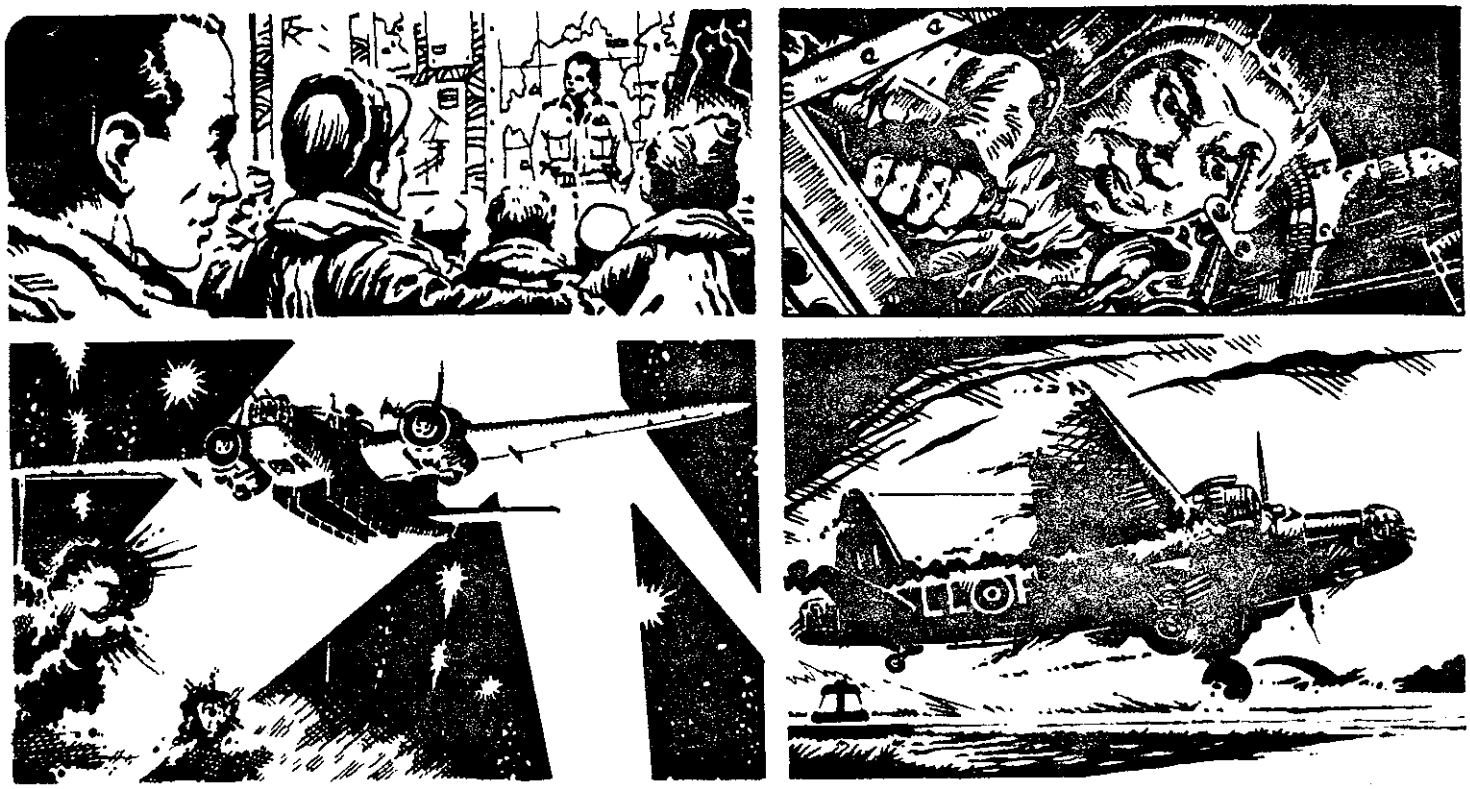


THE BLITZ ON BRITAIN.

KEY.

L'pool	+ Liverpool
Mcr	+ Manchester
S	+ Sheffield
N	+ Nottingham
B	+ Birmingham
C	+ Coventry
Ca	+ Cardiff
Br	+ Bristol
P	+ Plymouth
So	+ Southampton
Po	+ Portsmouth



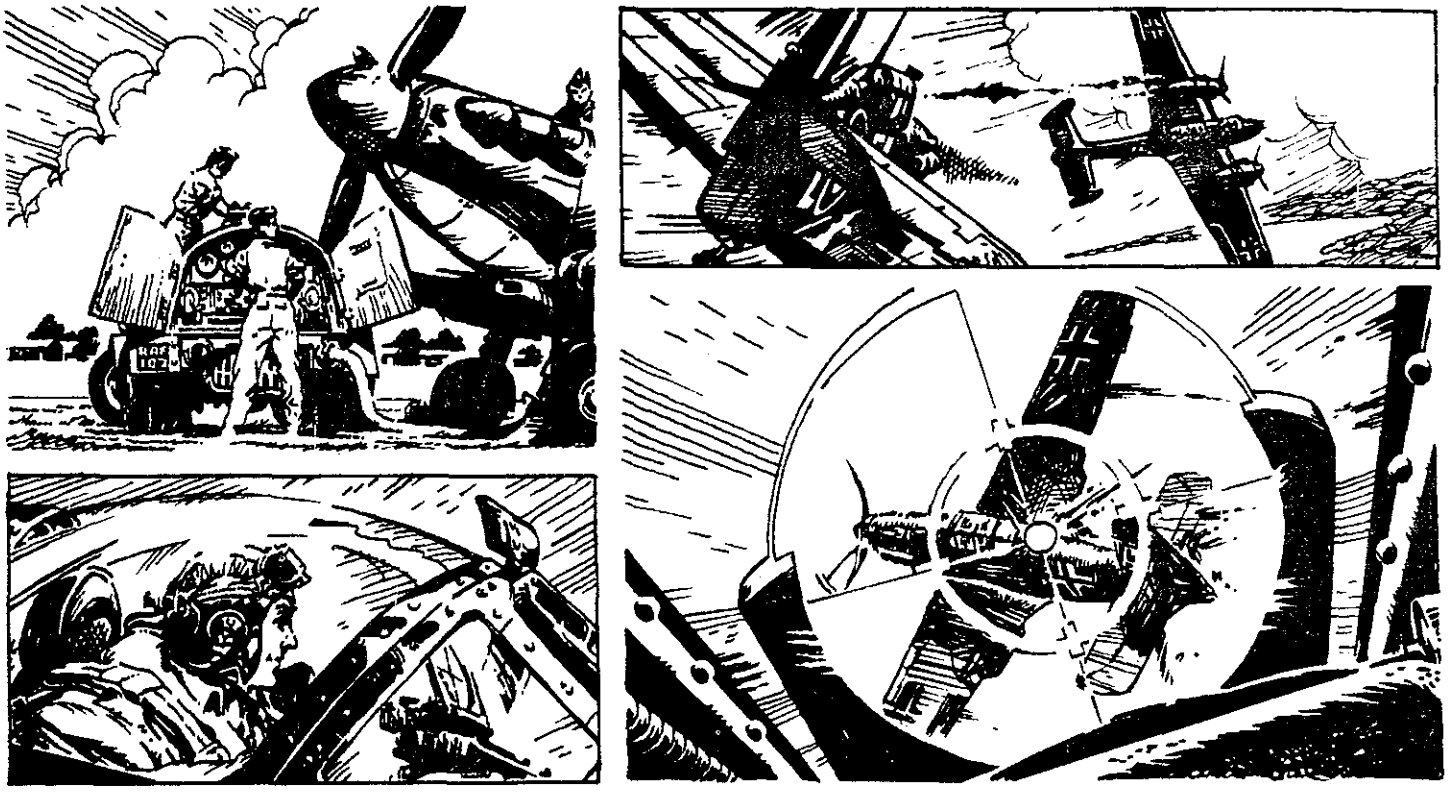


Although the Battle of Britain was, for the RAF, a fighter's arena Britain's comparatively small bomber force was also active. On 25th August 1940, 81 Whitleys, Hampdens and Wellingtons (shown above) attempted to raid Berlin. This was largely urged by Churchill in reprisals for the bombing of London. In fact less than 10 bombers found the target but they tried again 4 times in the next 10 days. This gesture did, however, put paid to Goering's boast that the RAF would never fly over Berlin. Unlike German raiders striking at London from France the RAF bombers had to cross large areas of enemy-occupied territory to strike at targets in the Reich. The drawing, bottom right, shows a Wellington of 37 Squadron, Bomber Command RAF, based in East Anglia in 1940. In December 1940 this squadron was badly mauled by enemy fighters in an attempted raid on German naval installations in the Schillig Roads and at Wilhelmshaven. In 1940 Poor Navigational aids and general inexperience hampered the efforts of Bomber Command.

The battle was over by the time the Italians arrived to help the Luftwaffe and the Germans turned their attention to the night bombing of other cities as well as London. The Germans were now using radio beams to pilot their bombers onto their targets. The first group of bombers would be 'pathfinders' who would drop INCENDIARY bombs onto a city centre. The resulting fires would guide the rest of the attacking bombers on to the target. The first British city to be attacked using this method was Coventry on November 14th.

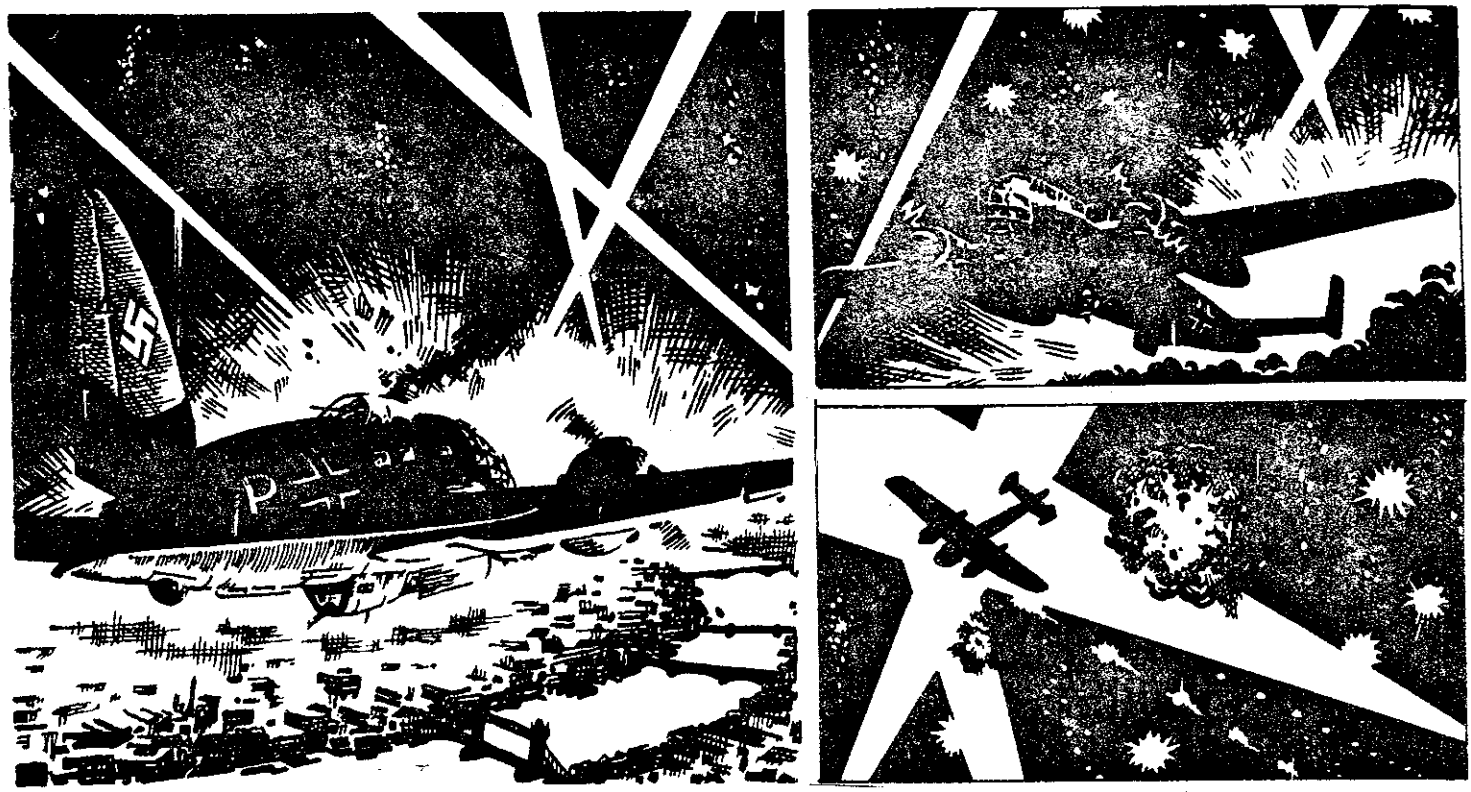
COVENTRATION - The raiders dropped incendiary bombs on the mediaeval centre of Coventry. Many buildings, including the beautiful cathedral went up in flames. Then bombs were poured into the city for ten hours. Almost one third of the city's houses were made uninhabitable, over half its buses were smashed up and six out of every seven telephone lines were put out of action. Railway lines in the city were broken and blocked. A hundred acres of the city centre were flattened. 554 people were killed and 865 were wounded.

A journalist describes what she saw the day after the raid, "Five miles outside the town we had picked up the first thin smells of smoke, but as we went



September 15th 1940 heralded a last effort by the Luftwaffe to force the RAF into a fight to extinction. It was a day of intense activity during which the Germans lost 56 aircraft. RAF losses totalled 26 aircraft and 13 pilots. For the Germans, air supremacy was no longer geared to 'Operation Sealion' since this was in the process of being postponed. September 15th is regarded by some as being the day on which the Battle of Britain ended and it is celebrated in England now as 'Battle of Britain Day.' Some German historians suggest that the Battle continued until 1941. Certainly, however, September 15th marks the close of 6 weeks fighting when the struggle for supremacy in the air was most closely linked to preparations for the invasion of Britain. The drawings illustrate various aspects of the air war; (top left) a Spitfire being refuelled, (bottom left) a Spitfire pilot, (top right) a Hurricane attacking an Me 110 and (bottom right) an Me 109 seen through the gunsight of an RAF fighter. By September 15th attrition among Fighter Squadrons had left Dowding 170 pilots under strength and every aircraft available was very precious indeed. Fortunately the Germans did not realise that no reserves were left to Fighter Command by that time.

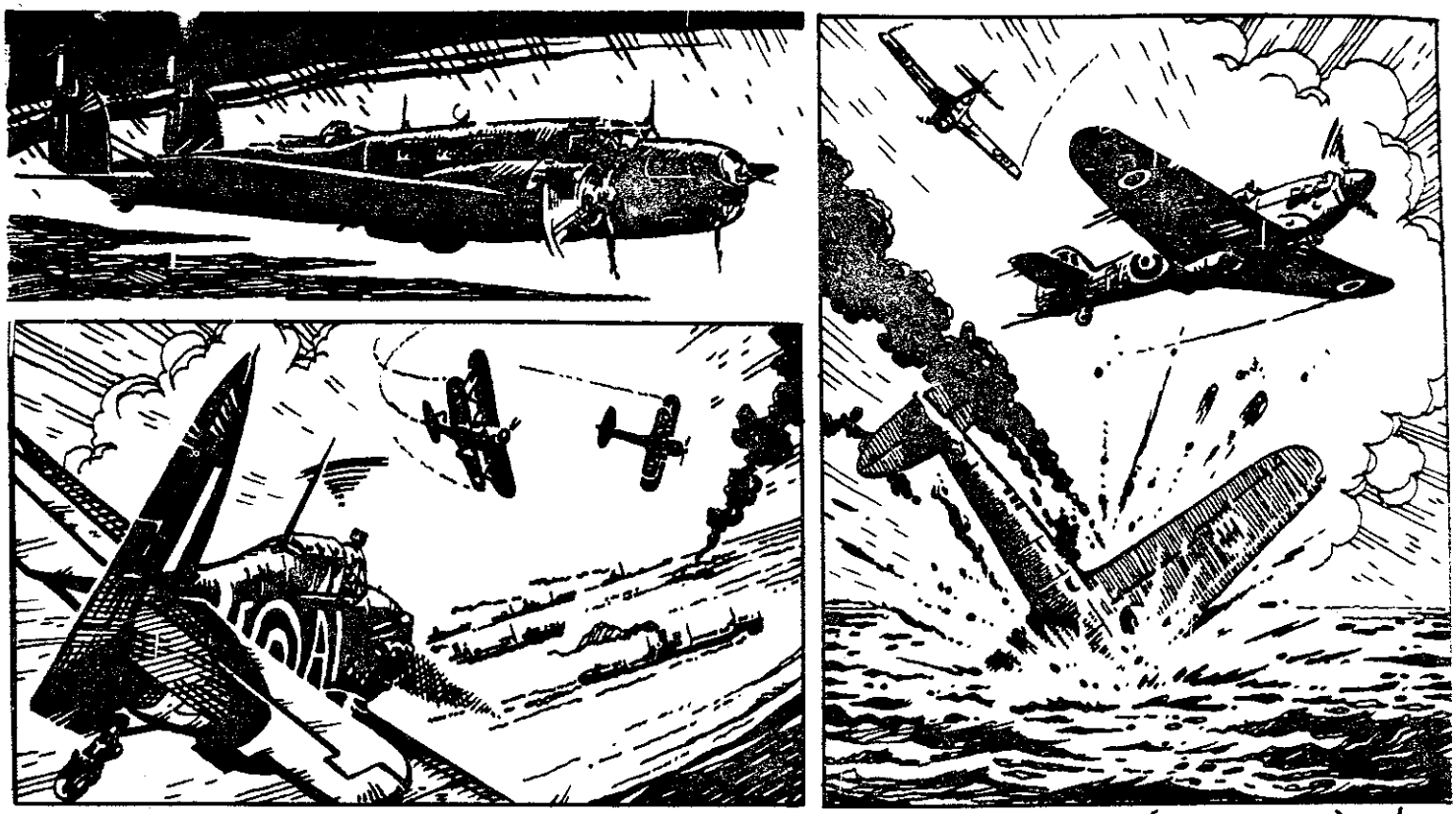
nearer the air thickened and carried charred bits of wood in through the car window. It was a heavy,stifling smell that bit into your throat and lungs. Then suddenly, as we came to the edge of the city, the air became as warm as a spring day. Though it was noon, the city was darkened by the black fog that clouded the sky and the thick banks of soot that were suspended over the streets. The people who walked the streets had grimy faces and their eyes were reddened with the heat and the smoke. They dithered and reacted slowly to the car's horn." In a small city like Coventry, the raid had effected everyone. Many people rushed to get out into the countryside. Some people showed signs of panic amd hysteria. About five hundred shops had been destroyed and many people had lost their ration books. Rationing was suspended and 100,000 loaves were rushed from neighbouring cities in a single day. The WVS brought in mobile canteens and cooked stew in the ruined streets. Drinking water had to be boiled The Germans did not repeat the attack and those factories that had been damaged were soon back in production, for although roofs might be blasted off, machiner usually survived the bombing. The Germans called this kind of concentrated atta



In early September 1940 German policy changed. Raids on airfields, radar installations and sector stations had not achieved air supremacy. It was hoped that unremitting attacks against London would both draw British fighters to the area and destroy civilian morale as it had done at Warsaw and Rotterdam. Neither aim was achieved and continually escalating bomber losses obliged the major offensive against the Capital to be undertaken at night and not in daylight. The drawings show a Heinkel 111 (left), and Dornier 17 (right) bombers, over London at night.

'Coventration'. It was to set a pattern for the terror bombing of Dresden and Hiroshima later in the war. These attacks on the smaller provincial centres caused total collapse of services and sometimes morale. This was because, unlike London and the big cities like Birmingham and Glasgow, the smaller towns only had one shopping centre, one local government centre and so on. When these were destroyed, there was chaos. If the clothes shops in one London borough were hit, there were others in the next borough, usually within walking distance.

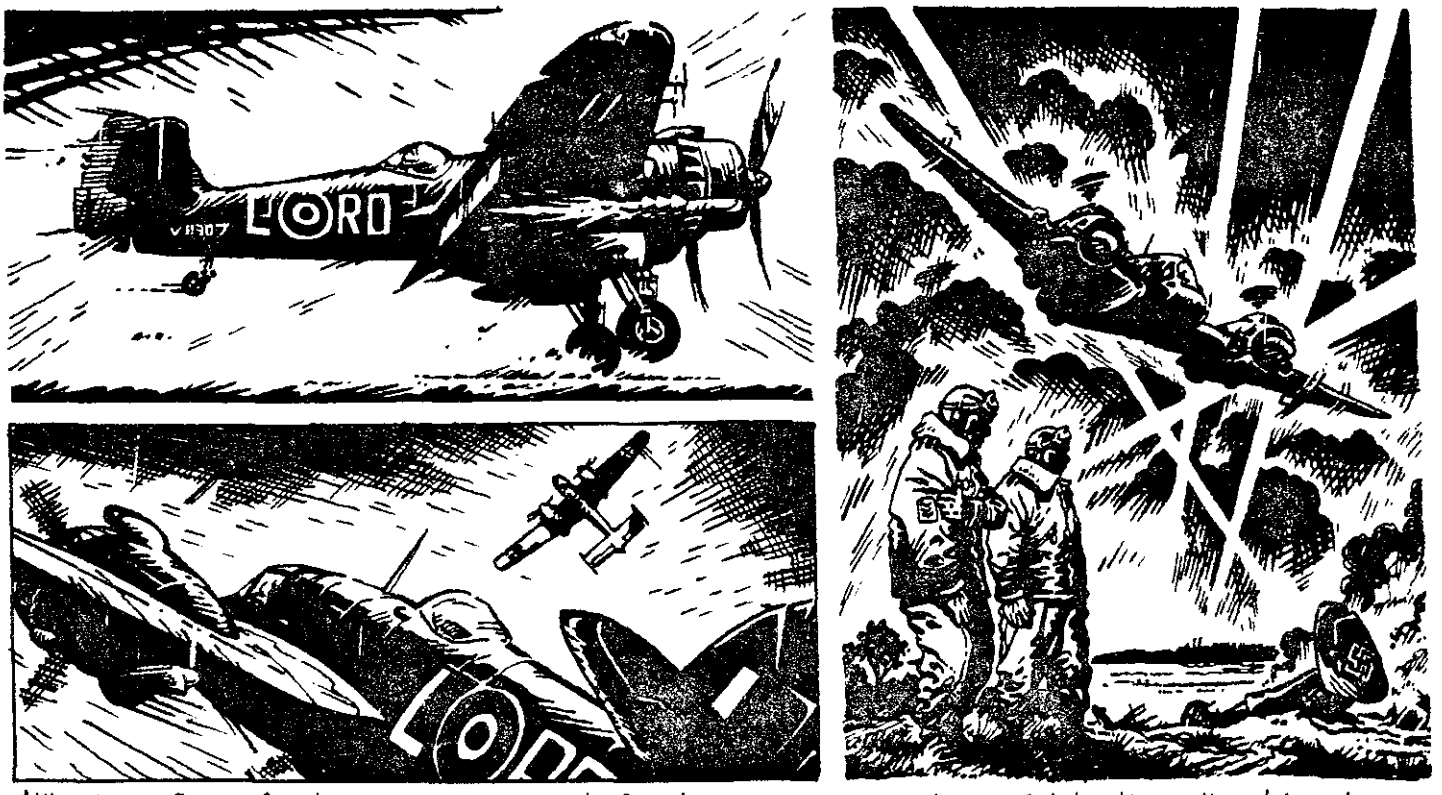
Before the end of November, Bristol, Birmingham and Southampton had al been hit. For fifteen nights in December bad weather kept the Luftwaffe away, but at the end of the month they returned to the attack. London suffered thre big raids and twelve smaller ones. Liverpool, Manchester, Birmingham, Sheffie Portsmouth and Leicester also suffered. On December 29th hundreds of incendia bombs were dropped on the city of London, around St.Paul's Cathedral. The are around St Paul's has few people living there, it was mainly shops, offices a warehouses. Fires got going before anyone could raise the alarm. The German attack lasted two hours and started I,500 fires. By a miracle, St.Paul's was untouched. Air Marshall 'Bomber' Harris witnessed the scene. He knew that



In October 1940 the Italian 'Regia Aeronautica' sent a total of 80 Fiat BR 20 bombers (drawing, top left) and a number of fighters to Belgium. Hitler had already refused Mussolini's offer of troops to assist in the invasion of England and the Regia Aeronautica's participation in the Battle of Britain proved something of an embarrasment to the Luftwaffe. The drawings show (bottom left) Fiat CR42 fighters and (right) Fiat G50 fighters engaged in combat with RAF Hurricanes. A day attack on Harwich on November 11th was hotly resisted by four squadrons of Hurricanes and 5 of the 10 BR 20 bombers sent, and several Italian fighters, were shot down. An earlier night attack on Harwich saw two of the sixteen bombers getting lost on the return trip and one crashed on take off. Day raids on Ramsgate and night raids on Ipswich were also made but it was obvious that the Italians, who flew wearing steel helmets and carrying bayonets, were ill-trained with regards to navigation and night flying and their aircraft were scantily equipped for such operations. Some crews were sent to instrument flying schools but the German air offensive on Britain was beginning to run down and, in January 1941, the Italians went home having lost about 20 bombers during their short and ineffectual campaign. Italian fighters were outclassed by RAF machines and, on October 29th 1940, three CR42 fighters were shot down escorting a raid on Ramsgate. The CR42 and G50 were manoeuvrable but lacked firepower and were rather slow.

new heavy bombers were being built for the R.A.F. and he remarked, "Well, they are sowing the wind". One hundred and sixty three people perished in the raid. Perhaps 135,000 people died in Dresden's firestorm in 1945. Germany had indeed reaped the whirlwind.

January and February saw some bombing attacks, one on Clydebank being particularly fierce - 35,000 out of a total population of 47,000 were made homeless. Between February 19th and May 12th there were over 61 raids involving over 50 German bombers. Plymouth and Liverpool were heavily pounded during this period. Belfast, Hull and Nottingham were also visited by the Germans during this period. In 1940 and 1941, approximately 43,000 people were killed in German bombing raids and about 90,000 were seriously injured. Over 150,000 were slightly injured. Many cities were badly damaged. The Luftwaffe failed to destroy the R.A.F. during the battle of Britain and they failed to defeat Britain in the bombing offensive that followed. What were the reasons behind the defeat of the Germans in this bat-



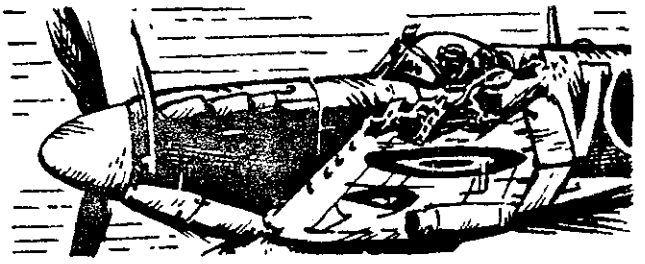
Although the Battle of Britain was, by the onset of winter, over, London and other British cities still had to endure the night 'Blitz'. Defiant and Blenheim night fighters continued to intercept nocturnal raiders and the Blenheims had also played a small part in the day battles earlier on in the summer. At the height of the Battle several squadrons had begun to receive the Bristol Beaufighter which was to play an important part in Britain's defence in late 1940 and well into 1941. In late 1940 some of these aircraft were equipped with A.I. Mk IV radar giving them "eyes" for night interceptions and, in January 1941, the even more efficient GCI radar sets supersed these sets. The first operational night patrol was made by such an aircraft on 17th September 1940 and, on the 25th October, the first victim - a Dornier 17- was claimed. During the night of 19th May 1941, 24 raiders were shot down by night fighters. Only two were claimed by Anti-Aircraft fire. Earlier, in March 1941, 22 raiders were brought down and half of these were claimed by Beaufighters. Armed with four cannon and six machine guns the nocturnal Beaufighter possessed a devastating concentration of firepower and took a heavy toll of Luftwaffe raiders. The losses, even at night, became too heavy for the Germans to sustain and defeat, as by day, also overtook them at night. The illustrations show a Beaufighter IF of 29 Squadron based at West Malling, in Kent, destroying a German Messerschmitt 110 fighter bomber. The Me 110 was, by winter 1940, often employed as a night 'sneak-raider.'

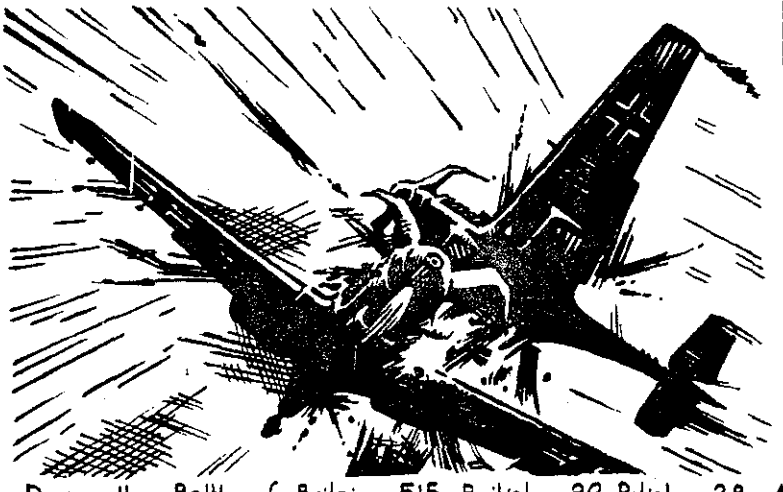
There are various reasons for the defeat of the Luftwaffe in 1940. Although the Luftwaffe had been triumphant in victories against Poland, Norway and France it had never faced an enemy air force as well equipped and led as the R.A.F. before. Goering, the Luftwaffe's commander shifted his aircraft from one strategy to another, from one set of targets to another. This was a bad mistake when it is realised that the attacks on the R.A.F.'s aerodromes came close to winning the battle for the Germans. Only the switch to bombing London enabled the R.A.F. to recover. To some extent, this decision was made because the Germans did not really know how many British fighters they had destroyed. The figures below show how both sides tended to overestimate the losses of the other;

R.A.F. - 650 aircraft lost (German estimate 3,058.)

Luftwaffe - 1,100 aircraft lost (British estimate 2,698).

The Germans altered their strategy because they thought the R.A.F. was finishe





During the Battle of Britain 515 British, 29 Polish, 28 Australian and New Zealander, and 20 Canadian pilots were killed. Airmen from South Africa, Southern Rhodesia, Czechoslovakia, from the occupied countries of Western Europe, volunteers from America, and even one Palestinian pilot contributed to Britain's defence. The overall losses of aircrew flying operationally from RAF Fighter Command bases from July 10th 1940 to October 31st 1940, including wounded, numbered just over a thousand. German bomber crew casualties were never totalled up but figures available show that, from July to December 1940, 261 German fighter pilots were killed or reported missing. From July to October 1940, however, 1,733 German aircraft were destroyed. The strain of the prolonged battle alone took its toll of men and aircraft. Fatigue induced accidents and errors of judgement such as (drawing, top left) pressing home attacks to the point of collision, collisions between friendly aircraft in combat (bottom left), while some pilots simply fell asleep at the controls or suddenly lost their nerve. The drawings on the right show a Spitfire (top) bearing minor battle damage and (below) a Hurricane pilot. Exact battle losses, however, remain a vexed question among experts.

There were two other reasons why the Luftwaffe lost. The first was that it did not have enough fighters. I,050 fighters were stationed in France during the battle, of these 800 were Me.I09s, superb fighters, but not really suitable for escorting bombers nor numerous enought to protect bombers on daylight raids. The Me.II0 proved to be too unmanoeuvrable to be much of a match for the R.A.F.

The second reason for the German defeat was the efficiency of British Fighter Command. Its pilots had fighting spirit, its aircraft were excellent, supply factories worked flat out to replace losses, the repair services put damaged aircraft back into the air in the shortest possible time and finally Dowding and Park, the R.A.F. Fighter Command's leaders handled their force brilliantly. Despite his failure to defeat Britain, Hitler attacked Russia as well in June I94I and thereby sealed the doom of the Third Reich.
THE BATTLE OF BRITAIN WAS THEREFORE ONE OF THE DECISIVE EVENTS OF THE WAR.

Many Battle of Britain units, notably German ones, employed distinctive insignia and displayed them on their aircraft. German units were deployed as 'Geschwaders' which contained 'Gruppes' composed of up to three or four 'Staffel' of between ten and sixteen aircraft. Geschwaders, Gruppes and Staffeln often had their own identifying insignia while RAF Squadrons tended, in 1940, not to display such devices on their aircraft to any great extent. Almost all Italian units employed identifying insignia. Below are depicted fifteen typical unit emblems displayed by various formations during 1940.

i ii iii iv v

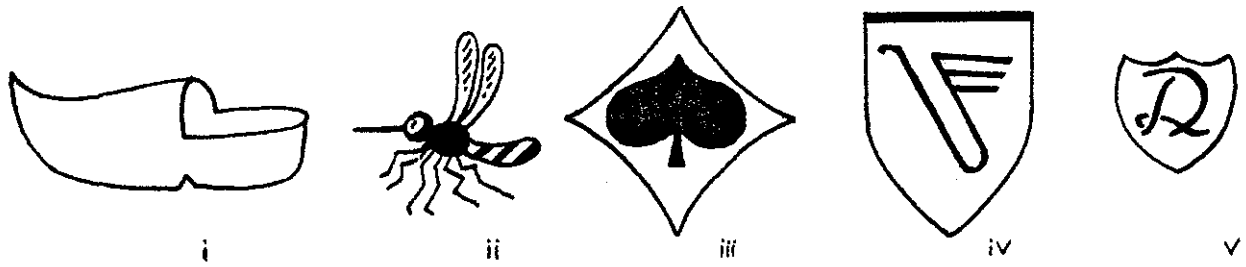
i Emblem of KampfGeschwader 55 Bomber Wing (Heinkel IIIs), France. 1940.

ii Emblem of KampfGeschwader 54 Bomber Wing (Junkers 88s), France. 1940.

iii Emblem of 3rd Gruppe, KampfGeschwader 26 Bomber Wing (Heinkel IIIs), France. 1940.

iv Emblem of 4th Staffel, StukaGeschwader 77 Dive Bomber Wing (Junkers 87s), France. 1940.

v Emblem of 3rd Staffel, StukaGeschwader 1 Dive Bomber Wing (Junkers 87s), France. 1940.



i ii iii iv v

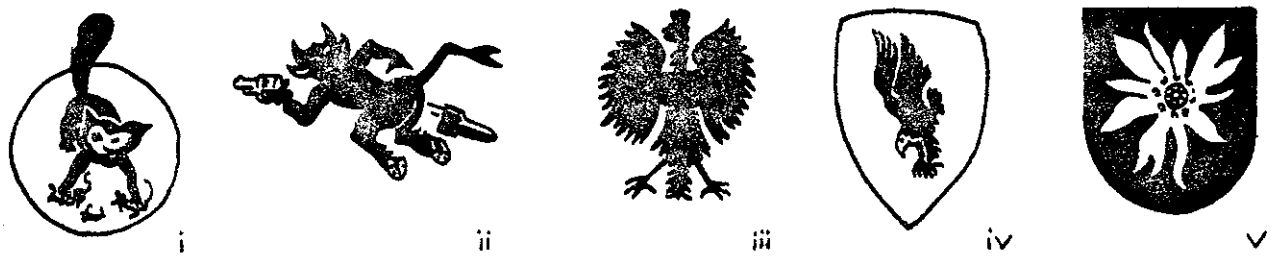
i Emblem of 2nd Gruppe, ZerstörerGeschwader 26 Fighter Wing (Me 110s), Crecy-en-Ponthieu, France. 1940.

ii Emblem of 9th Staffel, JagdGeschwader 2 Fighter Wing (Me 109s), Le Havre, France. 1940.

iii Emblem of JagdGeschwader 53 Fighter Wing (Me 109s), France. 1940.

iv Emblem of JagdGeschwader 3 Fighter Wing (Me 109s), France. 1940.

v Emblem of JagdGeschwader 2 Fighter Wing (Me 109s), France. 1940.



i ii iii iv v

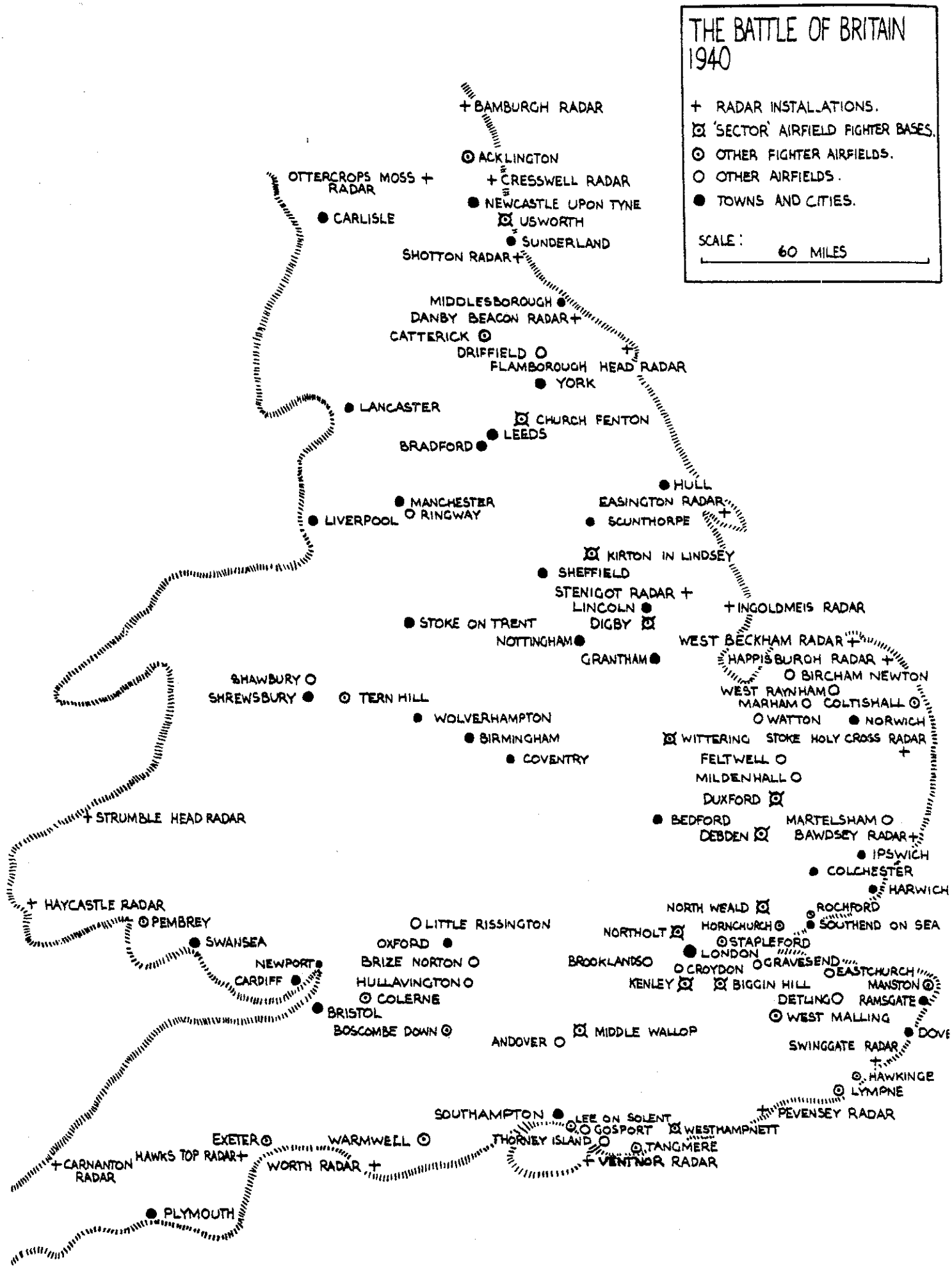
i Emblem of 56 Stormo CT Fighter Unit, Italian Regia Aeronautica (Fiat G.50s), Ursel, Belgium. 1940

ii Emblem of 1st Staffel, KampfGeschwader 76 Bomber Wing (Dornier 17s), Beauvais-Tille, France. 1940.

iii Emblem of Polish Air Force used by Polish squadrons of RAF Fighter Command, 1940.

iv Emblem of 3rd Gruppe, KampfGeschwader 30 Bomber Wing (Junkers 88s), France. 1940.

v Emblem of KampfGeschwader 51 Bomber Wing (Junkers 88s), France. 1940.


THE BATTLE OF BRITAIN
1940
+ RADAR INSTALLATIONS.
'SECTOR' AIRFIELD FIGHTER BASES.
OTHER FIGHTER AIRFIELDS.
OTHER AIRFIELDS.
TOWNS AND CITIES.
SCALE :
60 MILES
BAMBURGH RADAR
ACKLINGTON
OTTERCROPS MOSS RADAR
CRESSWELL RADAR
NEWCASTLE UPON TYNE
CARLISLE
USWORTH
SUNDERLAND
SHOTTON RADAR
MIDDLESBOROUGH
DANBY BEACON RADAR
CATTERICK
DRIFFIELD
FLAMBOROUGH HEAD RADAR
YORK
LANCASTER
CHURCH FENTON
LEEDS
BRADFORD
HULL
EASINGTON RADAR
MANCHESTER
RINGWAY
LIVERPOOL
SCUNTHORPE
KIRTON IN LINDSEY
SHEFFIELD
STENIGOT RADAR
LINCOLN
INGOLDMEIS RADAR
STOKE ON TRENT
DIGBY
NOTTINGHAM
WEST BECKHAM RADAR
GRANTHAM
HAPPISBURGH RADAR
BIRCHAM NEWTON
SHAWBURY
WEST RAYNHAM
SHREWSBURY
TERN HILL
MARHAM
COLTISHALL
WATTON
NORWICH
WOLVERHAMPTON
WITTERING
STOKE HOLY CROSS RADAR
BIRMINGHAM
FELTWELL
COVENTRY
MILDENHALL
DUXFORD
STRUMBLE HEAD RADAR
BEDFORD
MARTELSHAM
DEBDEN
BAWDSEY RADAR
IPSWICH
COLCHESTER
HARWICH
HAYCASTLE RADAR
NORTH WEALD
ROCHFORD
PEMBREY
LITTLE RISSINGTON
NORTHOLT
HORNCHURCH
SOUTHEND ON SEA
SWANSEA
OXFORD
STAPLEFORD
LONDON
NEWPORT
BRIZE NORTON
BROOKLANDS
CROYDON
GRAVESEND
CARDIFF
HULLAVINGTON
KENLEY
BIGGIN HILL
EASTCHURCH
MANSTON
COLERNE
DETLING
RAMSGATE
BRISTOL
WEST MALLING
BOSCOMBE DOWN
ANDOVER
MIDDLE WALLOP
DOVER
SWINGGATE RADAR
HAWKINGE
LYMPNE
SOUTHAMPTON
LEE ON SOLENT
PEVENSEY RADAR
GOSPORT
WESTHAMPNETT
EXETER
WARMWELL
THORNEY ISLAND
TANGMERE
CARNANTON RADAR
HAWKS TOP RADAR
WORTH RADAR
VENTNOR RADAR
PLYMOUTH