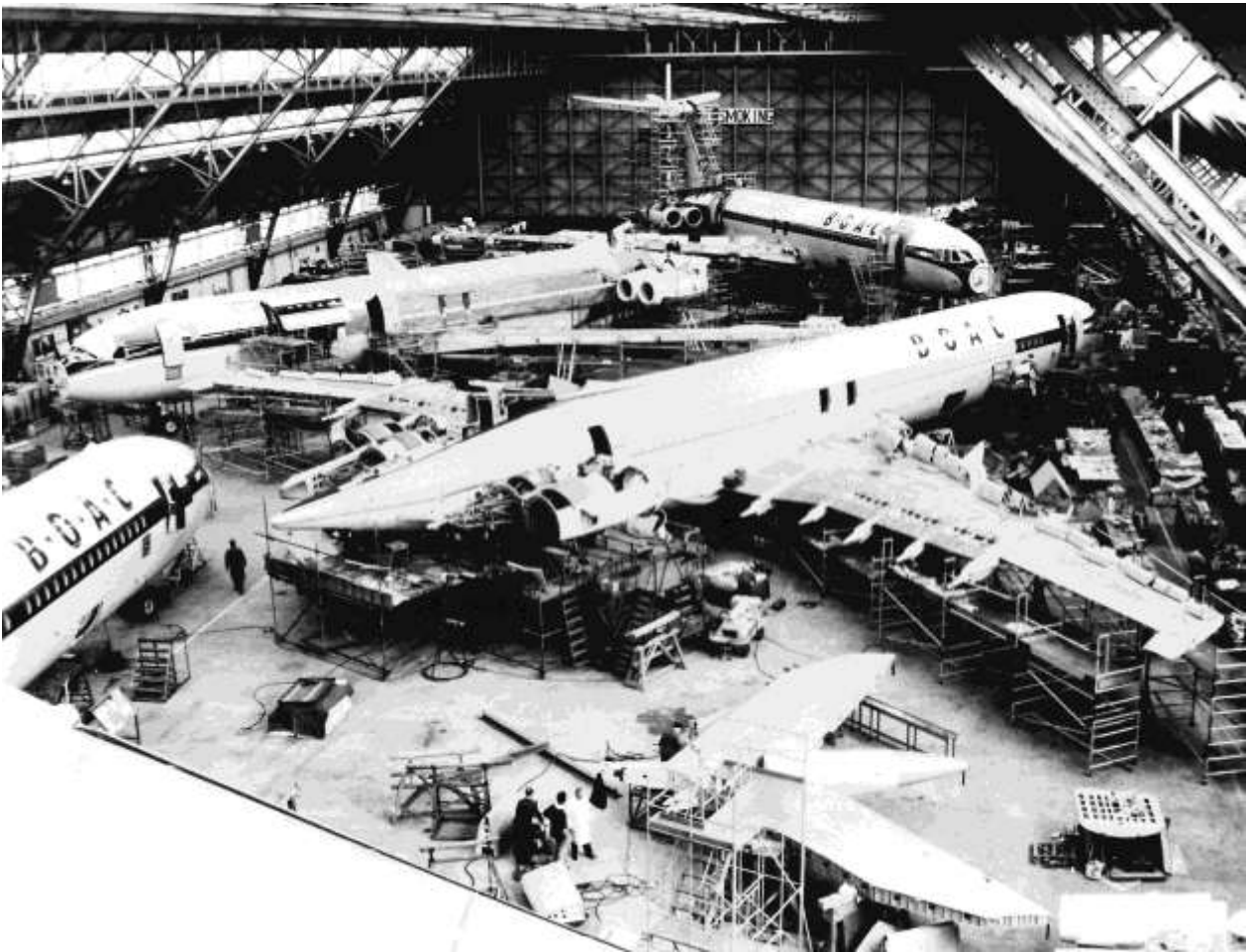


Chapter 8

ENGINEERING



BAC VC 10s and Super VC 10s in production at Weybridge for BOAC and BUA in 1964. *Brooklands Museum.*

In parallel with the development of air transport, Surrey has had a long and important involvement in the aircraft industry which still continues today, albeit in a much reduced form. With its proximity to London, the county was also prominent in the pioneering stage of motoring and the design of early cars. Motor vehicle manufacturing has remained an important industry among a wide range of specialised engineering works, many of which have manufactured parts for aircraft and vehicles. Other industries include the manufacture of dry-cleaning machinery at Leatherhead; industrial knitting machinery at the Gillett Works, Bookham; machine tools at the Dorking Foundry; vacuum cleaners at the Goblin Works, Ashted; Drummond lathes and Webber stationary engines at Guildford; and printers' compositing machines at the Monotype Corporation's works at Salfords near Redhill.

Village smithies and forges and foundries in several towns, such as Filmer and Mason's in Guildford and the Chertsey and Dorking Foundries, continued to

supply local needs well into the twentieth century. Of special note among foundries was Burton's at Thames Ditton, which sent monumental statuary all over the Empire, while Rowhurst Forge, Leatherhead, established in the 1930s, has been influential in reviving the art of the blacksmith.

Aircraft manufacture

The Brooklands site at Weybridge had a major involvement in aircraft construction from the early days. Vickers, who took over and extended the Itala motor works in 1915, Martin and Handasyde, Avro, Sopwith, Blériot and the British and Colonial aircraft company, all operated there during the First World War. Some 20,000 aircraft were flown out during that war, including Sopwith aircraft, the Vickers Gunbus, and over 1600 S.E.5s, built by Vickers and other makers at Brooklands under contract from the Royal Aircraft Factory at Farnborough. Martinsyde (the renamed Martin and Handasyde), had opened up

a new factory on the site of the Oriental Institute in Woking and Louis Blériot set up a factory at Addlestone to build French Spad fighters. Both of these firms, like Sopwith, sent their aircraft to Brooklands for flight testing as they had no airfield of their own.

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Vickers began to specialise in building large military aircraft. The Vimy bomber came just too late to fly offensively in the First World War but made historic flights across the Atlantic with Alcock and Brown in June 1919 and to Australia with Ross and Keith Smith in December of the same year.

During the 1920s and 1930s, Vickers produced the Virginia and Victoria biplane bombers and transports, the Vildebeest torpedo bomber and then the Wellesley long-distance aircraft, using Barnes Wallis's geodetic construction, and just before the Second World War the Wellington, of which 11,461 were ultimately built. Not a single flying example remains but a static model is being completed from the wreck salvaged from Loch Ness, fittingly at the Brooklands Museum.

After the war, Vickers built the Viking, Vanguard, Viscount and VC 10 airliners and the first of the V-bombers, the Valiant. The Viscount, the world's first prop jet airliner, outsold any other of its type. It was operated by over 60 different civil and government organisations in 40 countries and many remain in service today. After the company became part of the British Aircraft Corporation, and then British Aerospace, it produced parts for the BAC111 jet liner and Concorde and built the ill-fated supersonic TSR2 strike aircraft. Although aircraft made their first flight from the new concrete runway at Brooklands, it was only a short 'hop' to Wisley where all the post-war development flying for the Viking, Viscount, Vanguard, VC 10 and most of that for the BAC111 took place. The factory was closed in the 1980s and the site redeveloped, though some of the original buildings have been retained as part of the Brooklands flying and motor-racing museum.

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Tom Sopwith took over the skating rink in Canbury Park Road, Kingston upon Thames, in 1912 and started building the first of a long line of successful military aircraft, including the Tabloid, Pup, Strutter and Camel. All had to be taken by road to Brooklands for final assembly and flight testing. A seaplane version of the Tabloid won the Schneider Trophy for Britain in 1914 at Monaco. In 1917 the government, concerned with the increasing need for aircraft to pursue the war in the air, announced plans to build a number of national aircraft factories, financed by the government but managed by the aircraft manufacturers.

One of these was built at Richmond Road, Ham. Sopwith had misgivings about the viability of the scheme, so was instead offered a lease on the site which he took up. On the two Kingston sites, with the help of a number of sub-contractors, over 16,000 Sopwith aircraft were built during the First World War. The two factories employed 3500 people, including 1000 women, by the end of the war.

In 1920 the Sopwith Company was forced into liquidation by an enormous claim by the government for excess war profits. A new diversified company was immediately created, the Hawker Engineering Company. Harry Hawker, who had joined Sopwith in 1912, was tragically killed in a flying accident the next year but the company bearing his name went on to build fine military aircraft, first under W G Carter as chief designer and then the legendary Sydney Camm. Planes such as the Horsley, Hart, Fury, Nimrod, Osprey, Demon and Audax led up to the RAF's first monoplane fighter, the Hurricane, which made its maiden flight from Brooklands in November 1935. A total of 9,997 Hurricanes were built by Hawkers, and a further 4,129 by other companies.

After the Hurricane came the Typhoon and Tempest, followed at the end of the Second World War by the Sea Fury, the fastest piston-engined fighter built anywhere in the world. The jet age came in 1949 with the P1040 and the Sea Hawk, followed by the P1052, the Hunter, the Harrier in 1971 and then another Hawk. The last two are still in service in the 1990s in many parts of the world, the Harrier being famous as the world's first vertical short take-off and landing aircraft and the Hawk as the Red Arrows' display team machine. In 1950 Dunsfold airfield was leased to provide final assembly and flight test facilities to replace those at Langley, Buckinghamshire, and Farnborough. In 1963 the company became part of the Hawker-Siddeley Group and more recently of British Aerospace.

The Kingston factory was closed and the site cleared by February 1994, leaving Dunsfold as the sole remaining aircraft assembly and flight testing site in Surrey.¹ Harriers and Hawks are completed there from assemblies made largely at Blackburn Aircraft at Beverley in Yorkshire.

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The National Aircraft factory No 1 was built at Waddon to construct de Havilland designs. Completed in June 1918, it came too late to have any serious effect on the outcome of the First World War, but contracts placed were fulfilled and when 1,500 employees were dismissed in January 1919 there was severe industrial unrest. In 1920 the business was taken over by the Aircraft Disposal Company and the site became a



John Henry Knight's 'steamer' outside the gates of Weybourne House, Farnham.
John Henry Knight Collection, Museum of Farnham.

huge sale depot where parts, engines and complete planes were available at knock-down prices. When Croydon airport was opened many of the factory hangers on the north side continued to produce light aircraft, first by Marcel Desoutter, who subsequently became associated with the development of Gatwick airport, then by the Redwing Company, and later by the General Aircraft Company.

A number of component factories developed, particularly around Brooklands; the propeller factory of Langs and the Clerget engine factory of Gordon Watney & Company, both at Addlestone, are typical. Engine manufacture, except by sub-contractors during the war years, was limited to Blackburnes of Bookham, who produced a number of designs for light aircraft in the 1920s and 1930s.

Motor vehicle manufacture

The genesis of the motor vehicle in Surrey lies in the 1868 road steam vehicle of John Henry Knight of Farnham. Knight was well-to-do, trained as an engineer and was an enthusiast for harnessing the power of steam to road-going transport. Though his vehicle was clumsy and disaster prone, it seemed to prove that road vehicles not powered by horses or pedal

power were a possibility despite the restrictions of the law. However, Knight's next vehicle, his most important one, resulted from his dabbling with a gas engine, his *Trusty*. The result was initially a three-wheeler with tiller steering and powered by the *Trusty* engine. It was probably the fourth native British car made and it is still preserved in the National Motor Museum at Beaulieu. It may be that Knight's real importance subsequently was as a catalyst, acting upon his friend, Sir David Salmons (of Tunbridge Wells) in agitating for a greater acceptability of the motor car by the aristocracy and the legal bureaucracy. With his own leanings towards the privileged classes, Knight could not possibly envisage the coming days of motoring for the masses.

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Surrey had acquired a bad reputation for its persecution of the motorist — as the early motorist saw it — after the appointment of Captain H M Sant as Chief Constable in September 1898. The first skirmishes involved motorists against the police for their oppressive tactics against speedsters, and the Self Propelled Traffic Association was formed in December 1895 to repeal the Locomotives on Highways Act which restricted vehicle speeds to 4 mph in the country and 2 mph in towns. In 1896 Parliament duly passed the

'Emancipation Act', liberating motorists from the demands of that earlier Act. In 1898 the SPTA was swallowed up in the Automobile Club of Great Britain and Ireland which eventually turned into the RAC. However the speed limit was only 20 mph in 1905 when the Automobile Association was born from the need to warn motorists of police speed traps. Needing little encouragement to pursue the well-to-do, Sant's policemen set up road traps which made Cobham, Wisley and Godalming notorious amongst car and motorcycle owners. *The Diary of the Bow-Wows Motor Cycle Club, 1914*, relates how the motorists 'proceeded quietly to Godalming where a halt was called to see everyone safely through the trap which was observed to be working with its usual weekend vigour ... The ride from Guildford to the 'Hut' [The Wisley Hut Hotel, demolished during widening of the A3] was remarkable for the feeling of 'trap-funk' which existed'.

The Government reluctantly allowed the motors to flourish, the better to tax the owners and thus improve the state of the roads, but the greatest impetus for change in Surrey, and the event which had the most far-reaching consequences for the County, was the coming of Brooklands Race Track in 1907.

Financed by Hugh Locke-King and sited on his own land near Weybridge, the track was inspired by his exasperation at the failures of British racing cars to win road races on the continent. Brooklands offered a safe haven where cars and public were in little danger from each other, but it spearheaded the thrust of the car and of car racing into what was then the countryside. Car manufacture, pushed outwards in a south-westerly direction from the London suburbs, encouraged the entrepreneurs to produce more vehicles in obscure places, for example Blackburne motorcycle engines at Tongham near Farnham. Component factories have flourished along country lanes — crankshafts at Elstead; gauges at Bramley; special van bodies in Godalming; bespoke car and coach bodies at Wrecclesham.



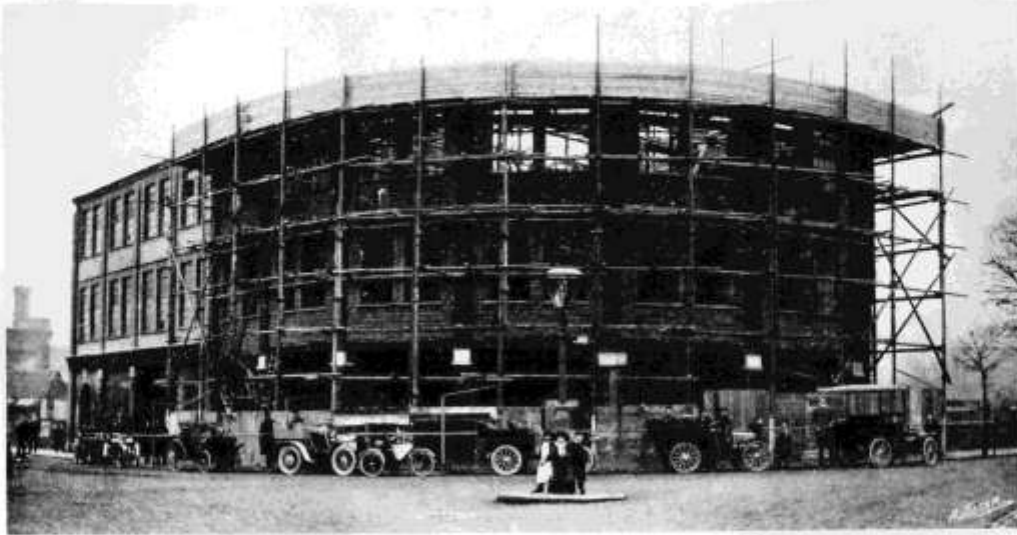
A mechanic at work in Thomson and Taylor's premises at Brooklands race track. *Brooklands Museum*.

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Everywhere wayside garages sprang up, offering petrol and accessories and specialised servicing to the motorist. An interesting example might be Puttocks who originally came to Guildford in 1814 to set up a livery stable but turned over their business to the motor vehicle industry in 1903. Since then they claim to have offered the first motor car for hire (1905), the first taxi (1908), the first charabanc (1910), and the first Mercedes car dealership in Surrey. In 1911 Puttocks built a new garage in Guildford High Street and had the first pump in Guildford maintaining a virtual 24 hour service. Often such garages were sited on the more important roads into and out of towns, such as RKG on the Epsom Road out of Guildford, Martin's on the A281 from Guildford to Horsham, and also

DENNIS BROTHERS, Limited.

A new additional Factory now being erected which, when completed, will be employing upwards of four hundred workpeople.



To enable us to cope with the increasing demand for DENNIS MOTORS.

Factory : Guildford.

Head Offices : Guildford.

Dennis Brothers' purpose-built car factory in Onslow Street, Guildford, nearing completion in 1901.
Surrey History Centre.

Warn's of Shalford (1908) further along on the same road. Many of them have been selling cars for a long time, for example Grays of Guildford since 1904. Some of them, for example Thomson and Taylor of Cobham — used by Malcolm Campbell for his Bluebird cars and boats from 1930 — or Jarvis of Wimbledon, who built the Jappic car in 1925 for record breaking, became heavily involved in attempts on the land speed record. A further 'spin-off' was the number of famous drivers and mechanics who came to live in Surrey, such as Malcolm Campbell and his son Donald, Leo Villa their mechanic, and famous Brooklands divers Parry Thomas and Sammy Davis.

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The oldest motor vehicle manufacturer in the county, one which is still making vehicles today, is Dennis Specialist Vehicles, originally Dennis Bros of Guildford. After making bicycles, motorised tricycles and cars, this firm progressed to fire engines, lawn mowers, rubbish collectors, aeroplane towing trucks, buses and coaches. Dennis Bros, bought up White and

Poppe of Coventry to acquire their expertise in making engines and encouraged their workers to move to Guildford. Consequently they needed housing, so the firm founded Dennisville to build its own housing, thus adding to the spreading Guildford environment. One of the earliest Dennis production factory buildings, known as Rodboro Buildings in Guildford, is one of the oldest purpose-built car factories in the world, and is said to be the oldest multi-storey one. Plans to demolish the building to improve the traffic flow in the town were not carried out and it has been adapted for recreational use as a spacious and interesting public house.

Another specialist product from the early years of the motor car era was made by the firm of F G Barnes of Godalming, one of the pioneers in attempting to solve the problems of road maintenance created by the new traffic. They were probably the first after the turn of the century to produce a tar-spraying machine for roads.

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As the twentieth century progressed, an economy based on the living horse gave way to one based on mechanical horsepower. The result was that thousands of people had to learn new skills and find re-employment. Car manufacture boomed. The largest employers have probably been Dennis Bros at Guildford and Lagonda at Staines but many different makes of cars and motorcycles have been attempted. Some of them have become famous, such as the Trojan of Croydon, AC and Panther of Thames Ditton, and Invicta of Virginia Water and Cobham, but many have remained obscure, such as the delightfully named Humming Bird of Dorking, the Carlette of Weybridge and the Zendik of Kingston upon Thames. Over 130 makes of car and over 40 makes of motorcycles have been produced, some of them perhaps in small numbers. One of the most consistently produced types of vehicle was the cycle car, whose openness to the skies and cheapness of production appealed to the mechanically minded from 1913 onwards, when the first race for them was held at Brooklands. Each of the World Wars brought promising productions to a halt but so too did such threats to commercial prosperity as the coming of quality mass motoring production (via Ford, Morris and Austin) and the Great Depression of the 1930s.

The post-war flooding of the British market by the Pacific Rim countries, notably Japan, has hit the whole of British car production, yet has hardly touched an astoundingly successful aspect of Surrey's motor activity — the production of very fast cars either for road use: the Cooper, Panther, AC, Caterham 7 — or for specialised track racing, such as McLaren at Woking and Tyrrell at Ockham.

The Ken Tyrrell Racing Team successfully took part in F2, F3 and saloon car racing and moved into Formula One racing in 1968, with engines supplied by Cosworth. The team became famous with the emergence of Jacky Stewart, who won the World Championship three times with cars of his own design. Other famous drivers in the Tyrrell team have included Jody Scheckter, Ronnie Peterson and Jean Alesi. In 1996 Salo, Katayama and Dr Harvey Postlethwaite were designing cars for the team.

Notes

1. As this book went to press it was announced that Dunsfold was to close as an airfield and manufacturing site.