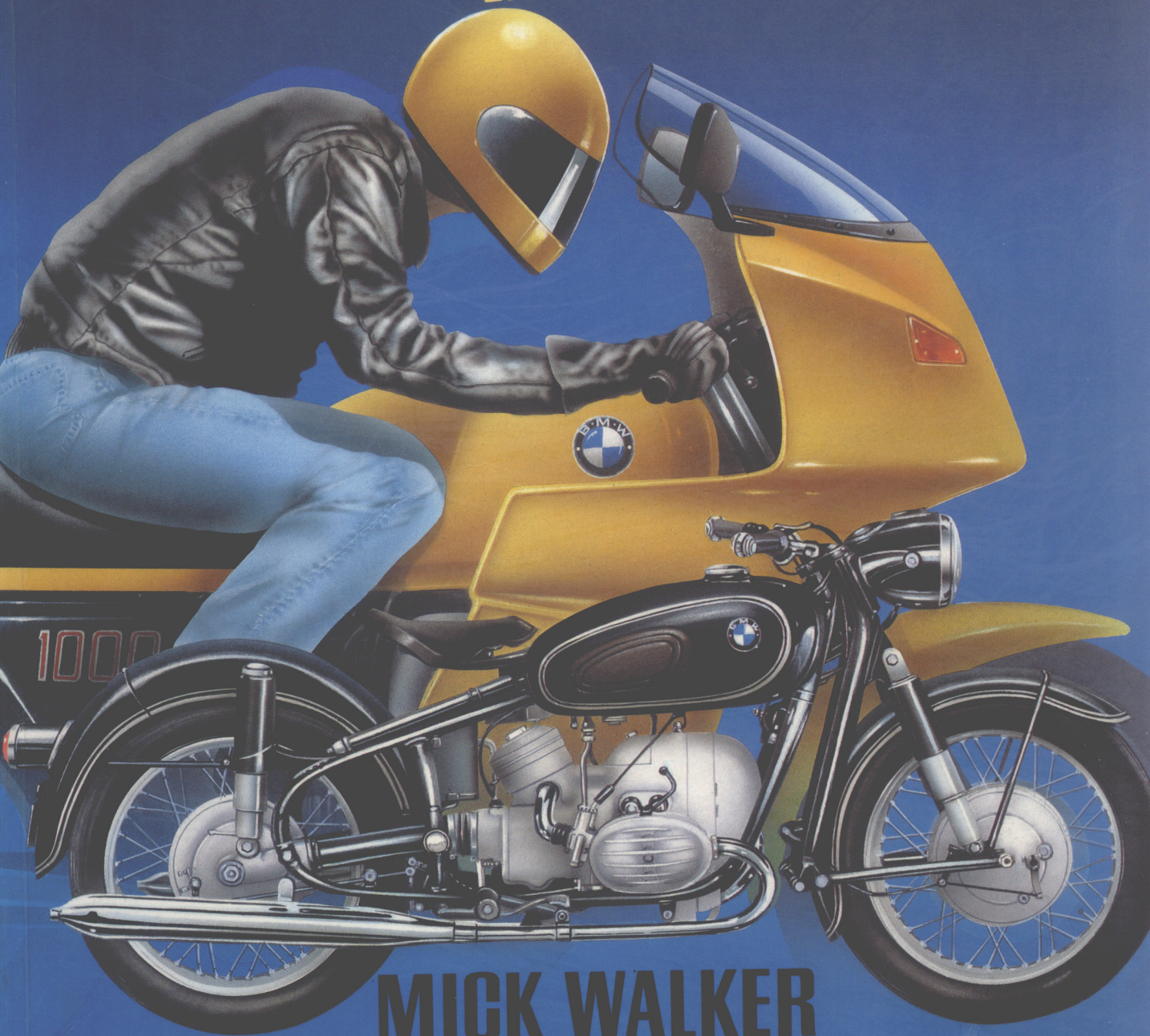


BMW TWINS

ALL BMW FLAT TWINS, 1955–1985

RESTORATION

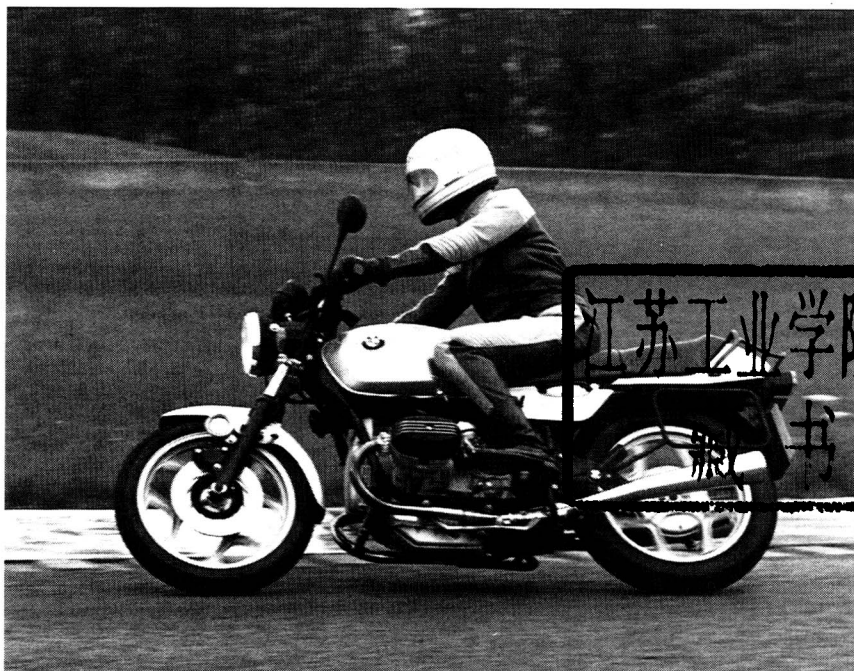


MICK WALKER

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江苏工业学院图书馆
藏书章

BMW TWINS

ALL BMW FLAT TWINS, 1955–1985

RESTORATION

The essential guide to the
renovation, restoration and
development history of all BMW
flat twins 1955–1985

MICK WALKER

OSPREY
AUTOMOTIVE

HALF TITLE *The author testing one of the 1987 R80 monoshock models at Donington Park, in June that year*

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Contents

| | | | |
|--|-----|-------------------------------------|-----|
| Acknowledgements | 7 | Appendices | |
| 1 Background | 9 | 1 General specifications | 220 |
| 2 Where to start | 25 | 2 Model alterations | 223 |
| 3 Preparation | 30 | 3 Engine and frame numbers | 225 |
| 4 Engine | 35 | 4 Model chart | 228 |
| 5 Transmission | 76 | 5 Colour schemes | 229 |
| 6 Carburettor and exhaust | 92 | 6 Plugs, points and tank capacities | 231 |
| 7 Lubrication | 106 | 7 Nut and bolt sizes /5 onwards | 233 |
| 8 Frame | 112 | 8 Lubrication | 234 |
| 9 Suspension | 119 | 9 Conversion tables | 235 |
| 10 Wheels, brakes and tyres | 130 | Index | 237 |
| 11 Electrics | 139 | | |
| 12 Cables, controls and instruments | 153 | | |
| 13 Seating | 162 | | |
| 14 Painted parts and plated details | 169 | | |
| 15 Finishing techniques | 184 | | |
| 16 Accessories: fairings, luggage and sidecars | 190 | | |
| 17 Getting back on the road | 215 | | |



Acknowledgements

The horizontally opposed twin cylinder BMW engine with its semi-unit construction layout and shaft drive has proved to be one of the very longest-lived concepts in the motorcycling world. As events have proved, even the introduction in 1983 of the four-cylinder K100, followed soon after by the three-cylinder K75, couldn't banish the classical flat twin from BMW's production list.

My own particular interest in this famous line of motorcycles first came in the early 1960s, when the machine I aspired to own, but never did, was the Earles fork R69S. In those days my resources never matched BMW's asking price, so I settled for Italian and British bikes instead.

Subsequently, over the last twenty years or so, I've been fortunate enough to have sampled the majority of the models covered in this book; thanks to the good fortune of being both a dealer and journalist.

Even so, the amount of research needed for *BMW Twins Restoration* was extensive, and was carried out over a two year period . . . and that was before I even started putting pen to paper! This is because although the *basic* concept has remained, BMW have carried out a myriad engineering redesigns, technical modifications and cosmetic restyling exercises during the thirty-year span covered in *BMW Twins Restoration*.

The further I became involved with the subject, the more I began to realise just how complex the task was; and I must say a big thank you to the many people who assisted with the book's preparation.

Right at the very top of the list must be my old friend Andrew Kemp, who has been a provider of help ever since my first title, which I wrote back in 1984.

Andrew has been a BMW owner and enthusiast for many years, with his personal knowledge extending right back to the first models covered here. It would be true to say that without Andrew's help this book would have proved an almost impossible task.

Other good people who deserve a vote of thanks are: Chris Hooper and Ron Slater of Hughenden M40, Peter Watson, Fred Secker, Mike Cooke, Andy Sexton, Bob Porecha, John Lawes, Gerry Daubney of M R Holland Ltd and the many members of the BMW Owners Club who shared their experiences gathered over many years. Also the British Dell'Orto carburettor distributors, Contact Developments of Reading, Berkshire.

Much of the photographic material on which the book is based came from the personal albums of several BMW enthusiasts; the German company's Press and Public Relations Department also came to my assistance on numerous occasions. The remainder of the illustrations came from the archives of Doug Jackson and EMAP as well as from my own collection.

Both my secretary Kim White, who typed the manuscript, and my wife Susan, who provides such valuable support and encouragement, deserve a special thank you.

Finally, my thanks also to the excellent Osprey editorial team headed by editorial manager, Nicholas Collins. Once more they have succeeded in their usual professional transformation of the original manuscript into the finished product that you have before you now.

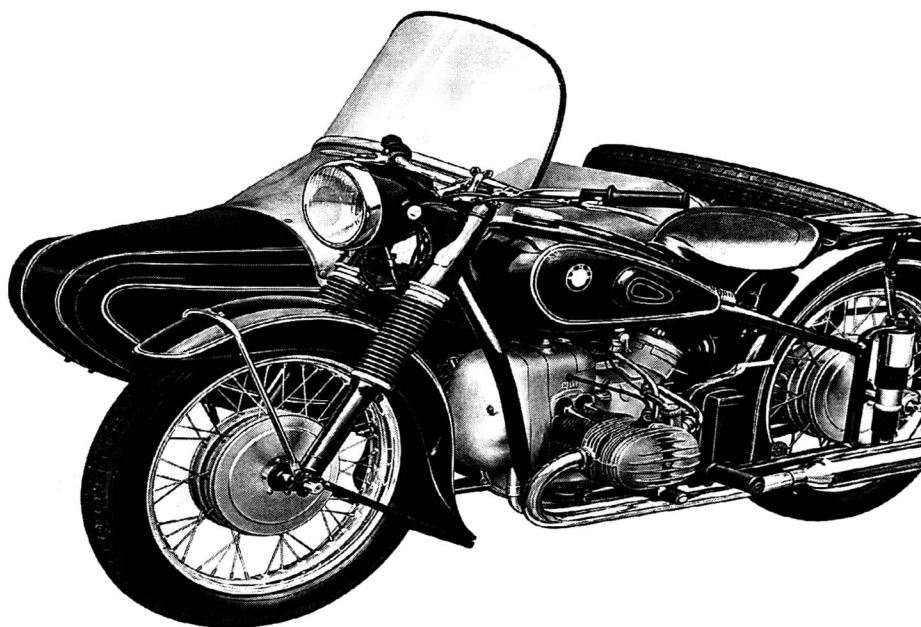
Mick Walker

WISBECH, CAMBRIDGESHIRE



ABOVE *BMW works rider Franz Bieber competing in 1924 on an R32 flat-twin*

RIGHT *One of the very last BMW flat twins before the introduction of the Earles fork models; the 1954 R67/2. It was used both for sidecar and solo work*



1 Background

Although BMW (*Bayerische Motoren Werke*) can trace its history back to the 19th century, the first BMW motorcycle did not make an appearance until after the end of the First World War.

Strictly speaking, this began in 1920 with development work on a machine using a proprietary Kurier 148cc two-stroke single designed by Curt Hanfland. Named the Flink, it was not a commercial success. Next, in 1921, came the introduction of an engine which was to shape BMW's two-wheel future. Designed by Martin Stolle and designated the M2B15, it was a 493cc flat-twin side valve with square bore and stroke dimensions of 68 × 68mm. The M2B15 was supplied to Victoria, Bison, SMW and SBD and other smaller companies. It was also used by BMW themselves to power the Helios motorcycle in which the M2B15 was mounted fore-and-aft like a contemporary Douglas, driving the rear wheel by chain. The Helios was not a BMW design, although the complete machine was constructed at the Munich plant. And nor was it a very good motorcycle – partly, one suspects, because BMW's heart at that time was in aviation rather than in the far more humble powered two-wheeler.

The twins are born

However, even though the company didn't have the same interest in bikes as it had in aircraft, its chief designer Dipl. Ing. Max Friz was a realist – he knew that at least for the present there was no possibility of returning to aircraft manufacture. Although he was the first to admit that he actually *hated* motorcycles. Friz set about creating a machine which could carry the blue and white BMW emblem with pride.

When the results of his labours were unveiled, at the Paris Salon in 1923, they created a sensation. The R32, as the newcomer was known, employed what was virtually a direct descendant of the M2B15 engine. But it was now mounted transversely in unit with a three-speed gearbox with shaft drive to the rear wheel. The frame was a full twin triangle affair and the front fork was sprung by a quarter-elliptic leaf spring. It was the beginning of a design format which was

modern enough to last until the present day. Although the R32 was not as powerful as some of its contemporaries, the Friz inspired design was superior in several important areas and offered a truly modern concept in a world still dominated by unreliable engines, flimsy frames and temperamental transmissions. During the next three years over 3,000 examples were produced.

Although Max Friz returned to aircraft design in 1924, he had been instrumental in setting BMW on the road to success on two wheels. That year Rodolf Schleicher developed the R37 with an ohv engine which offered nearly double the 8.5bhp power output of the R32, with 16bhp at 4,000rpm. By 1927, BMW had manufactured its 25,000th motorcycle, and shortly after this launched its first 750 class machine, the side valve R62. In 1928 on ohv version of the 750 flat-twin called the R63 was introduced.

Like their great rivals NSU, BMW had grown rapidly by the late 1920s and were left in a very vulnerable position when the Great Depression came. But they just held on, with a combination of diversification and skilled financial management keeping BMW from succumbing to the economic catastrophe that had seen some 17,000 German companies declared bankrupt in 1931 alone.

In the early 1930s BMW introduced pressed steel frames for the first time anywhere in the world. These were used on the 740cc R11. But it was the little 198cc ohv single cylinder commuter lightweight (code-named R2), together with a larger one lunger, the 398cc R4, which really secured BMW motorcycle recovery in the first half of the decade. From 1932 onwards, the R4 was delivered to the German Army in sizable numbers, and the abolition of vehicle licence tax in the same year helped its chances with the civilian population. By 1933, the year when Adolf Hitler became Chancellor, BMW had virtually recovered from the crisis. The company boasted record production and had a total workforce of over 4,700.

Its turnover in 1934 of 82 million RM (Reich Marks), compared with the 19 million RM of 1932, was remarkable. But even more startling figures were to emerge in 1935 with a staggering total of 128 million



LEFT BMW engineer Rodolf Schleicher (left), designer of the first sports flat-twin from the German company to feature overhead valves and a successful off-road rider, congratulates Ernst Henne after the latter had set one of several world speed records in the 1930s

RIGHT The 24 bhp R5 with revised ohv sports engine. This 494cc machine first appeared in 1936 and was the first BMW with a foot-operated four-speed gearbox

BELOW RIGHT In 1938 the R51 sports model, together with its R61 touring counterpart, was the first series production BMW with telescopic shock absorbers on the rear wheel

RM and over 11,000 employees. This was the year of the introduction of the 754cc R12 flat twin, which was destined to prove the company's most successful model of the inter-war years. It had one outstanding feature – not the first-ever telescopic forks, but the first to incorporate hydraulic damping on a production machine. The R12 also had a four-speed gearbox whereas earlier BMWs had only three ratios.

Between 1935 and 1938 36,000 R12s were sold. But 1935 also saw the introduction of a machine whose total production would be no more than 450 in the next two years. This was the prestigious R17, a super-sporting mount with a twin-carb 730cc flat-twin engine giving 33bhp at 4,300rpm. It was the most powerful production roadster built by BMW until the appearance of the much later post-war R68 model in 1952.

In 1938 (the year that the 100,000th BMW motorcycle rolled off the production line) both the R51 and R61 models appeared, equipped with spring frames and telescopic forks. The same year also saw the first BMW motorcycles imported and sold on a commercial basis in the USA. In 1939 the BMW empire (which also encompassed automobiles and aircraft engines) was still putting on weight with a workforce now standing at almost 27,000.

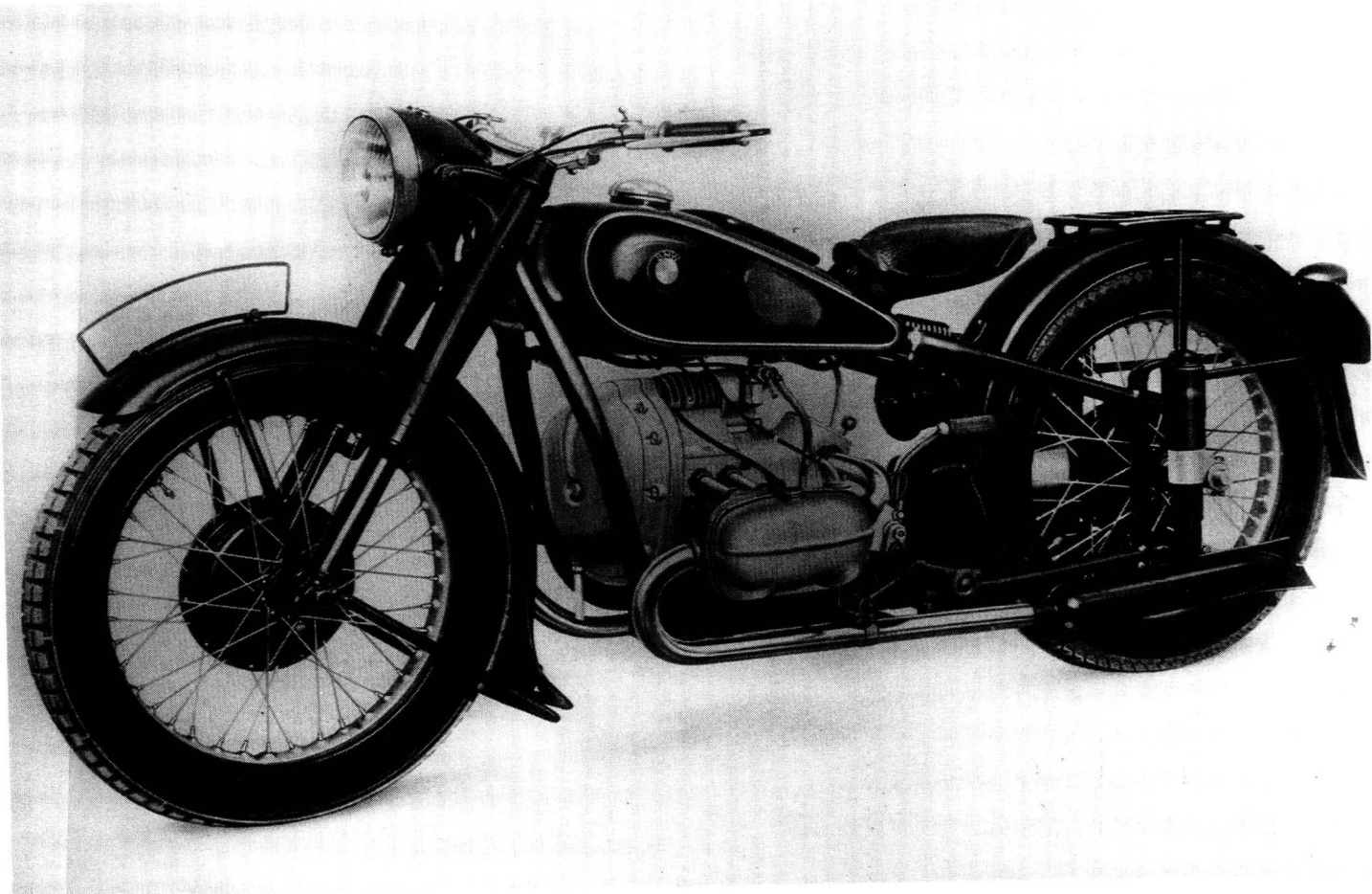
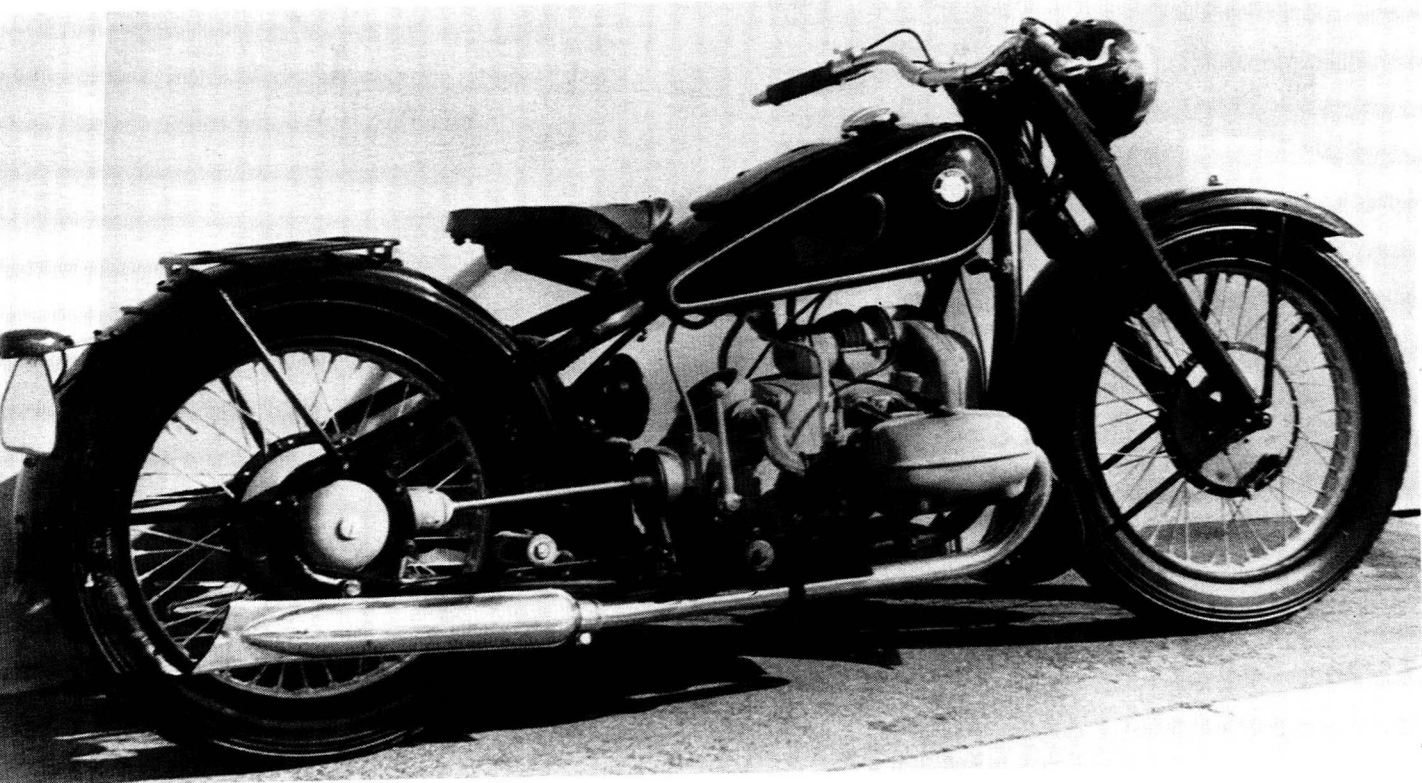
With the onset of war, BMW was obviously preoccupied with the production of aero engines. However, the efforts of the motorcycle division were also in demand because the *Wehrmacht* required large numbers for troop transport and fighting vehicles. These

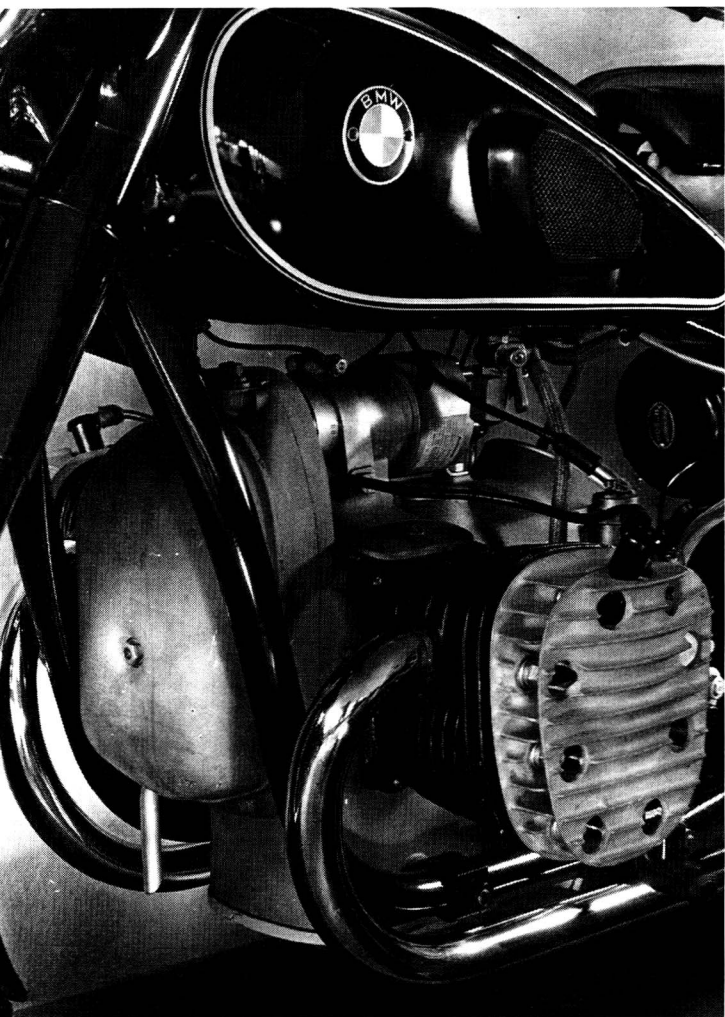
were provided by three main companies, Zündapp, NSU and, of course, BMW. Although there were other important military bikes, the definitive German motorcycle of the war was undoubtedly the BMW R75 flat-twin. Many of these R75s were used for sidecar duties, although they also found favour in solo guise. The war also brought management changes. Karl Popp, the first Managing Director, retired and his place was taken by Kurt Donarth. Just before the end of the conflict, in April 1945, Hitler ordered Donarth to destroy all production facilities immediately.

Heavy bombing had already taken its toll of the BMW facilities and by 1945 about a third of the Munich plants had been destroyed. But Donarth wisely chose to ignore the order. He did so again when it was later repeated. But this time it was the American garrison in Munich who decreed in October that the plant should be dismantled and destroyed. Anything of value should have been shipped back to the States. When the American forces had taken over Munich they removed many of the remaining machine tools. While in the East, BMW's Eisenach plant was occupied by the Soviet forces and found itself in the Russian sector of post-war Germany.

Because Munich had been the centre of BMW's wartime aero-engine production Eisenach had been used as the car and motorcycle plant. It was all commandeered by the Red Army. Later, in the hands of the civilian Communist government, it was used to construct the Russian's own BMW motorcycles (and cars), first from spare parts and later from parts manufactured by the new owners. Eventually production was transferred to the Soviet Union.

Meanwhile in its stripped, shattered Munich factory complex, BMW was fighting for its existence again. Under the Allied Control Commission, immediately following the war, German companies were prohibited from making motorcycles. So by September 1945 BMW were undertaking limited peacetime production of anything that would sell – cooking utensils, wood planing equipment and even bicycle parts. Later, in early 1946, the plant was used to service American military vehicles. As Germany's need to





become mobile again became more and more pressing, the Allied Control Commission began to relax its regulation of transport. Permission was granted to assemble a small batch of R23 247cc ohv singles from spare parts. Launch of the first *real* post-war BMW came in 1948, with the appearance of the R24 single.

Production of the R24 and later the R25 continued until 1950 when the first post-war flat-twin was offered. This was the R51/2, an updated version of the popular pre-war R51. The main changes consisted of new cylinder heads, the incorporation of a cam-type transmission shock absorber in the gearbox, and the employment of a new and much improved four-speed gearbox.

The following year BMW saw fit to replace the R51/2 with the R51/3 – essentially a modernised and improved version. Although the power output of 24bhp was identical, the engine was very different and set a style which in general appearance was still visible as late as 1969 on the R69S. The crankcase – a ‘tunnel’ casting – had an outstandingly clean appearance. Behind a rounded timing cover at the front was the gear drive to the camshaft and magneto ignition.

LEFT On the eve of war, BMW presented the R71 touring model, with slow revving side-valve engine. The photograph was taken at the 1939 Berlin Show

RIGHT A happy band of Scots pose in the late 1970s with Georg Meier's 500 supercharged BMW, winner 1939 Senior TT

BELOW RIGHT Early post-war R68 sports model. It could do a genuine 100 mph. Offered between 1952 and 1954. Fish-tail silencers denote this is one of the original production batch

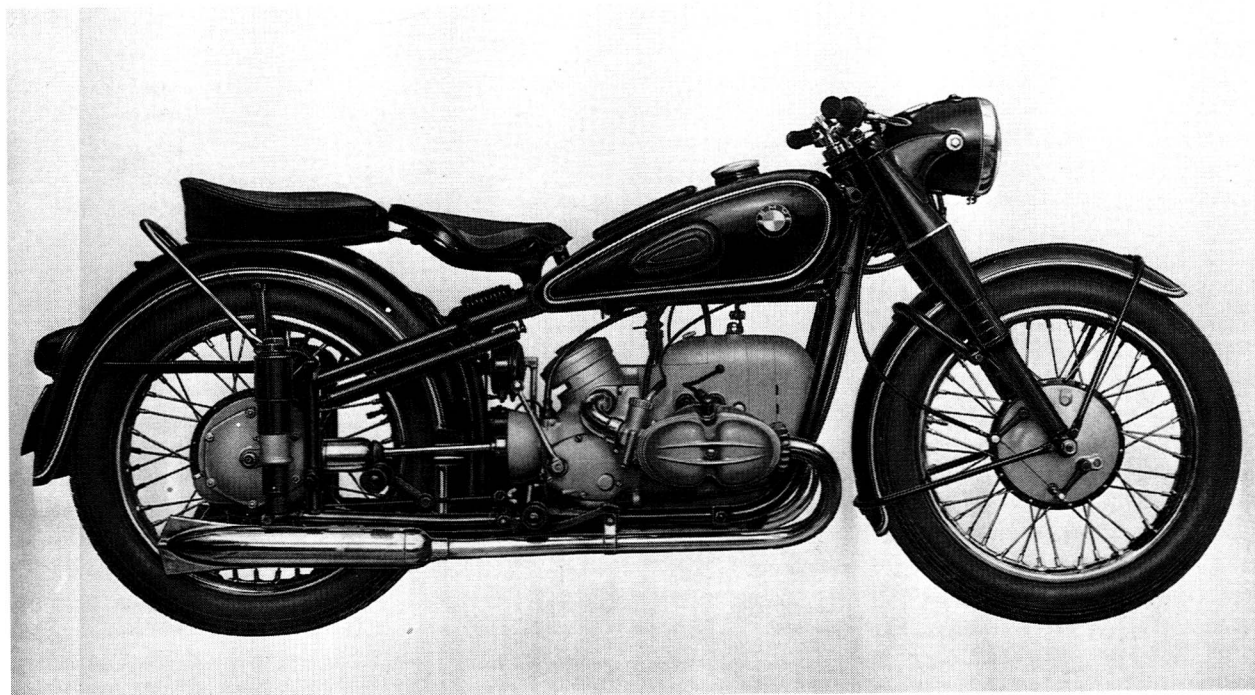
The rocker boxes atop the cylinders on each side were of a new shape and carried cooling fins, while the Bing carburettors were fully waterproofed and ducted into the top of the gearbox, above which was bolted a housing for the external air filter. The gearbox bolted to the back of the crankcase, carrying on its smooth lines, and for the first time it contained a switch which activated a light in the headlamp shell when neutral was selected. Running gear also saw changes, with the first use of full-width brake hubs on a production BMW, front fork gaiters and alloy wheel rims, a larger capacity fuel tank and new exhaust pipes and silencers (now without tail fins).

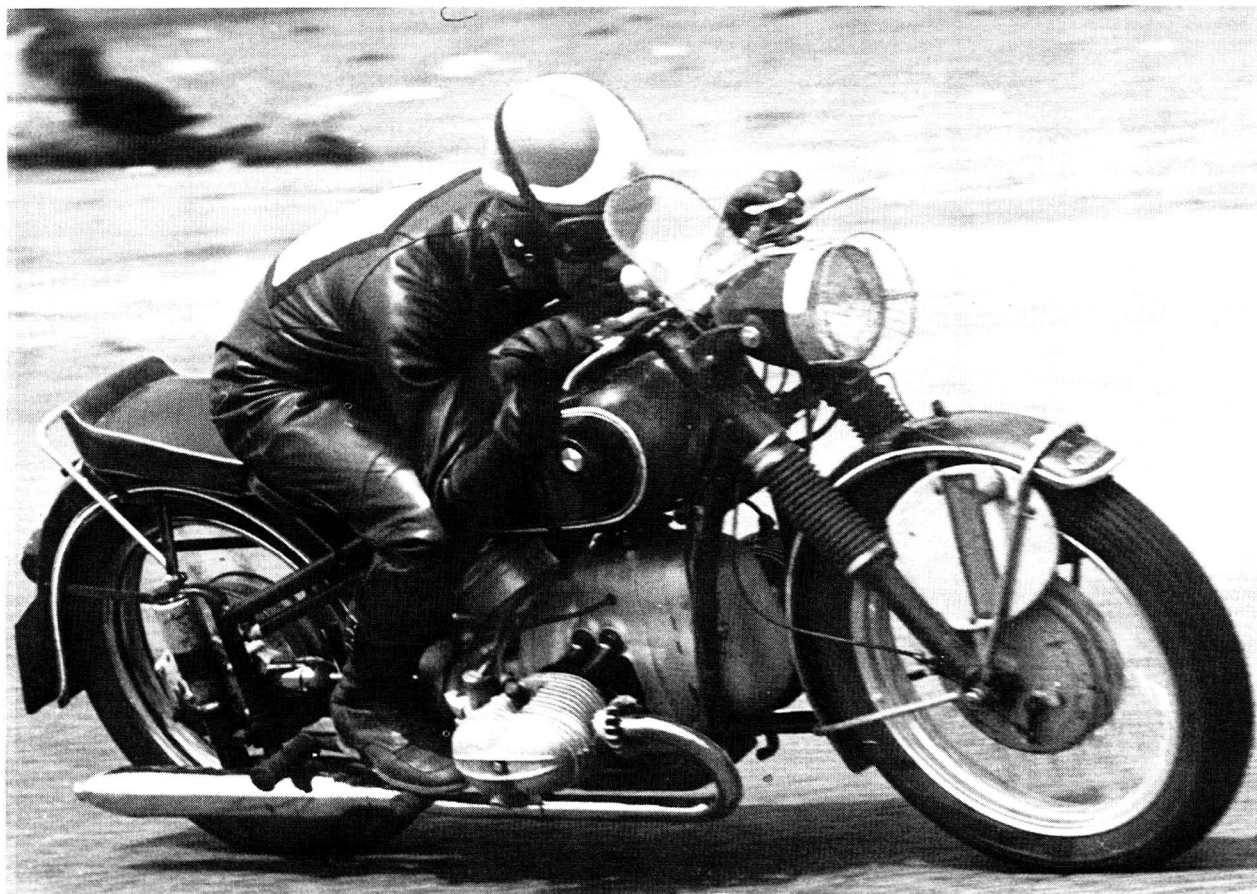
News of the R51/3 was released at the Brussels Salon in January 1951, where rumours were rife that BMW were also about to reintroduce a 600cc ohv twin. This was confirmed the following month when, at the Amsterdam Show, the R67 model made its debut. Powered by a 590cc (72 × 73mm) ohv engine unit which followed the general design of the R51/3 and produced 26bhp. Oddly, it employed the cycle parts of the earlier R51/2 – including fishtail silencers, black painted steel wheel rims and less powerful single-sided brakes.

In fact, the main reason for its appearance was market demand from sidecar enthusiasts who were looking for a suitable power unit with which to haul a third wheel. However, it was the first appearance of a BMW of over 500cc in the post-war period, and for that reason alone it is noteworthy, despite the fact that only 1,470 examples were ever produced.

The Swiss Show in Geneva during March 1952 heralded the sporting R68, for which the factory claimed a genuine 105mph. But although power output was up to 35bhp at 7,000rpm, largely as a result of engine tuning (including a higher compression ratio) the appearance and general specification followed the rather dated R67/2. Notable additions were a pillion seat as standard equipment, lighter mudguards and a twin leading shoe front brake operated by the cable inner pulling one shoe on while the cable outer pushed the other still to be found on the R60/6 almost 25 years later.

The R68 did not replace the R67/2, so BMW's 1952 flat-twin line-up contained two 600s as well as the





R51/3. And the machines remained unchanged until the 1954 season when all three were equipped with a new type of air filter system introduced some eighteen months before on the R25/3 single. There was also a modified exhaust system whereby both the intake and exhaust silencing were improved. The telescopic front forks on all three models featured improved hydraulic dampers offering not only a softer ride but also improved road holding. The R68, which in solo form was capable of over 100mph remained Germany's fastest standard production machine, and for 1954 was available with sidecar attachment lugs.

Things apparently evolved slowly and steadily. While other German manufacturers – rather like the Japanese today – were unveiling new designs at a frenetic pace in a bid to stay competitive, BMW relied on steady improvements and refinements to their basic 500 and 600 twins (plus of course the 250 single) and remained true to shaft drive and traditional all-black livery with contrasting white pinstriping. At least that was the face that BMW presented to the world. But within the corridors of corporate power, things were very different, for BMW's management were worried. Although their 100,000th post-war motorcycle had been built towards the end of the 1953 and sales were at record levels, management felt that the company was dangerously too exposed to the whims

ABOVE Winning R68 which had the distinction of taking victory in Australia's first-ever 24-hour race staged over the weekend of 3/4 October, 1954

ABOVE RIGHT In 1955 BMW launched its new Earles fork range; included in this were the R50, R60 and R69. The 1961 model year saw the arrival of the improved R60/2 and the R50S and R69S; the latter is shown here being ridden in that year

RIGHT Three prototype flat-twins, Isle of Man, June 1969. Note differing variations of front forks. Left to right: BMW telescopic eventually fitted to /5 series, BMW Earles, Italian Ceriani telescopic

of the enthusiast market when other manufacturers were getting involved with scooters and mini cars. Even in the car market, BMW was then concentrating on the luxury sector (actually a similar position to the one which it holds today, but in a vastly different economic climate).

To broaden its appeal therefore, BMW first built a scooter (which was a total flop, never leaving the prototype stage) and then took out a licence with the Italian Iso concern to produce the Isetta 'bubble car'. In modified form and powered by a single-cylinder BMW engine, this sold in both three- and four-

wheeled versions in considerable numbers (a stretched variant with 600cc flat-twin engine was also produced). Later, more use was made of motorcycle power by boring out the 600 flat-twin to 698cc (78×73mm) and fitting it to the excellent 700 Light Car which was offered in both standard and coupe forms from 1959 to 1964.

While the full story of these machines is outside the scope of this book, it should be stressed that they indicate how the use of motorcycle engines helped the company to make the most of its design work.

500 R50, 600 R69

Meanwhile, the company had also been exploiting its motorcycle development to the full. The 38th Brussels Show in January 1955 saw a sensation on the BMW stand – two sensations actually – in the form of a pair of brand new models. The newcomers were the five-hundred R50 and the six-hundred R69. Both featured Earles-type front forks and full swinging arm rear suspension bearing a clear resemblance to the company's works racers of the period. These machines mark the first of the models featured in detail in this book.

Besides the frame and suspension there were other major changes: an enclosed shaft drive within the off-side leg of the swinging arm; a deeper fuel tank (still with a 17-litre capacity) which featured a large lockable toolbox whose lid formed the left knee grip, smaller 18-inch alloy wheel rims, interchangeable





wheel hubs, new silencers and new mudguards (although the rear still had a much-appreciated hinged rear section for wheel removal).

Engines were largely unchanged, but power output was now up to 26bhp on the R50 and 35bhp on the R69 – both a considerable improvement on the models they replaced. The R50's 494cc (68 × 68mm) unit had a compression ratio of 6.8:1 (6.3:1 on the R51/3) 24mm (22mm) Bing carbs and slightly higher-lift cams. On the larger 594cc (72 × 73cc) R69 engine, only the compression ratio was changed to 8:1 instead of 7.5 or 7.7:1 – the cams and 26mm carbs remaining the same.

However, both engines gained a new diaphragm clutch and a new three-shaft gearbox in a redesigned housing, the rear of which carried the output flange to which was bolted the universal joint for the drive shaft and which also mounted the rubber gaiter covering the joint. Although the gearbox was basically the familiar four-speed design with a cam lobe shock absorber on the input shaft, it was modified slightly to improve the previously super-slow gearchange action – but by conventional motorcycle standards it was still far from perfect!

An R69 was tested by the British journal *Motor Cycling* in April 1956. The maximum speed was found to be 102mph with 61mph being achieved for the standing quarter mile. But the tester made the very valid point that even though the R69 was the 'sports'

The new /5 series was launched in late 1969. Both engine and frame substantially different, with new suspension fore and aft. The model shown is the R60/5

model in the BMW range, it was still a tourer at heart – albeit a fast, luxury example. As the tester put it, the model represented 'a vast improvement over its predecessors, which themselves held an enviable reputation.'

But despite having two significantly improved flat twins, plus a soon to be updated single, BMW was beginning to be affected by the upsurge of scooters and small cars on the home market. Even with the Isetta, things were getting tougher and tougher. 1956 was to prove a crunch year for the German motorcycle industry, BMW included. The latter saw sales scarcely half of the 1955 total, even though another new twin, the R60 had appeared. This was a replacement for the R67 and aimed at the same sidecar enthusiasts market. It therefore had a low compression, 28bhp and the cycle parts of the R50, together with the option of various sidecar ratios for the rear bevel box.

By the end of 1956, the company's management was in a state of turmoil with production drastically cut, a large number of workers made redundant and stocks rising rapidly in the firm's warehouse. In fact, had it not been for BMW's local Munich bank providing ad-