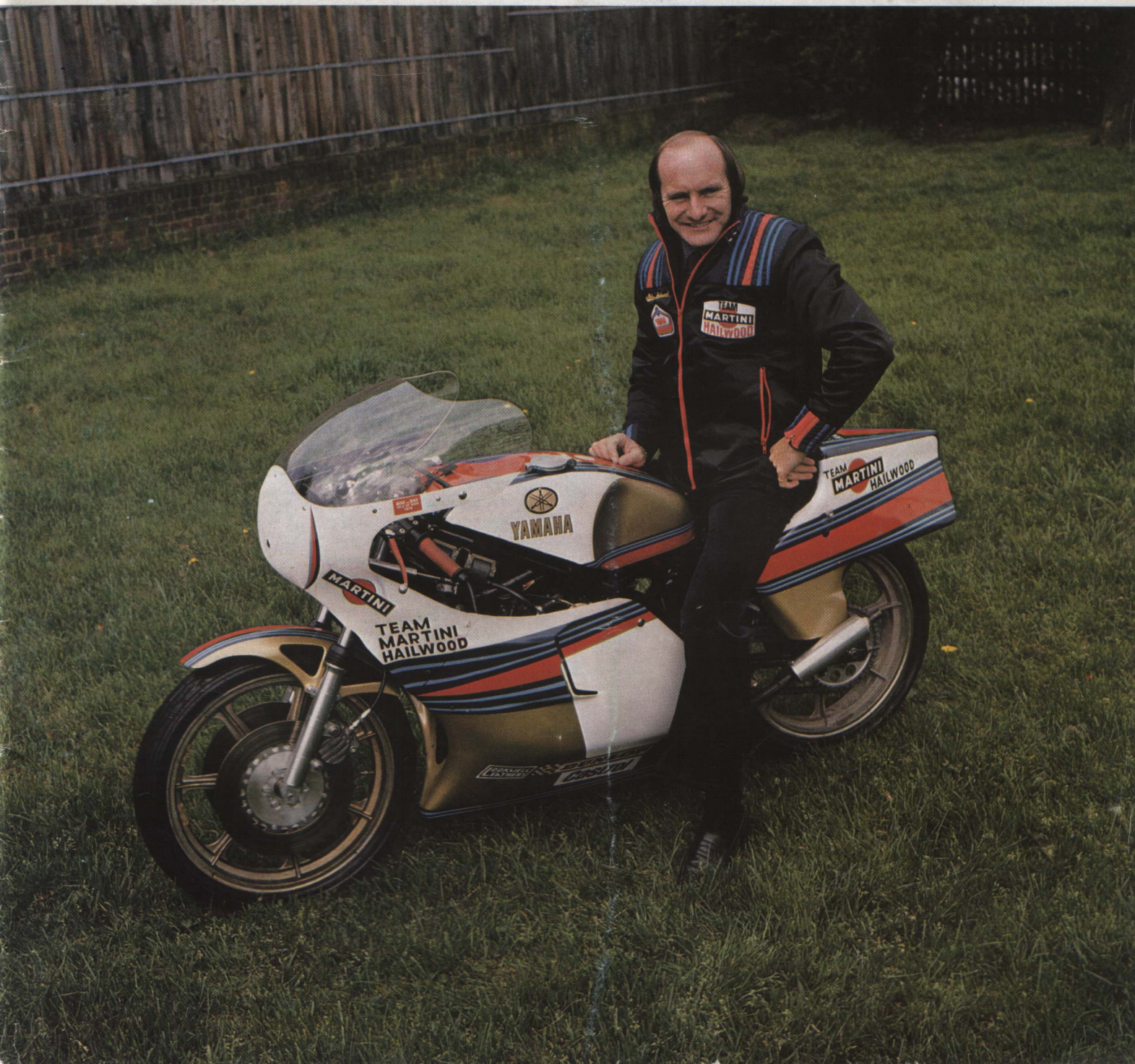


# YAMAHA



1978/2



## TALKING SUSPENSION WITH "MR SHOCK ABSORBER"

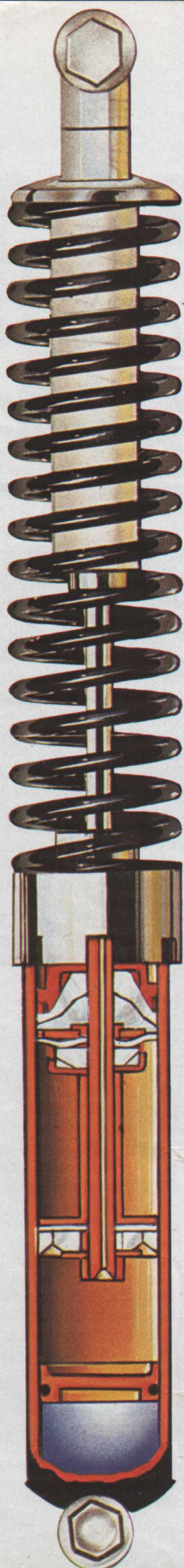
The Yamaha monoshock chassis suspension system has revolutionised the world of motorcycle chassis design and an integral component of that system is the long De Carbon shock absorber that acts as the actual suspension medium.

The De Carbon shock uses nitrogen gas as an extra springing medium, separated from the damping oil by a floating piston. A regular spring deals with the initial (and most of the) compression of the shock absorber. Then when the spring nears the limit of its compression and the shock is close to the end of its travel, the nitrogen gas cell in the base of the shock absorber takes over. The more the nitrogen gas is compressed, then the more resistance that it offers and so there is still effective absorption at a point where most shocks have given up. Suspension bottoming is a thing of the past, except under the most extreme conditions.

Producer of the De Carbon shock is a Frenchman, M. Christian Bourcier de Carbon. For over 30 years he has been an engineer, mainly in the motoring and aeronautical industries....including a spell with O.N.E.R.A., the French national Aeronautical Study and Research Centre.

After some 20 years of producing shocks mainly for the major French car manufacturers, M. de Carbon joined forces with Yamaha to come up with the shock absorber for their production version of the new monocross suspension invented by Belgian engineer, Lucien Tilkens.

Earlier he had entered into another licensing agreement with a Japanese company, but this firm altered his



design in such a way as to make it dangerous in M. de Carbon's opinion.

"They eliminated the floating piston that separates the oil from the nitrogen" he says.

De Carbon prefers to forget this unhappy association and talk of his new collaboration with Yamaha which has resulted in the most advanced motorcycle suspension on the market today.

A shock absorber for a motocross machine, says M. de Carbon, is almost the equivalent of landing gear on an aeroplane. The actual impact of landing after a jump produces piston speeds within the shock absorber which simply do not occur with the average car or street motorcycle.

This piston speed within the shock produces incredible temperatures both in the shock absorber body and the internals. So high that one Yamaha mechanic badly burned his hand when he touched a shock absorber after a tough series of tests. Temperatures after such tests have been found to be in the region of 190F degrees!

Talking of his own shock absorbers, M. de Carbon says that although their most obvious feature is the pressurised nitrogen cell, this is not the most important one.

Most important, he feels, is the design of the piston. A single tube shock absorber body can have a larger piston than double-tube designs which use valving to control damping. Thus pistons in double-tube shocks are, of necessity, smaller.

It is possible to make single-tube shock absorbers with oil-controlled damping but M. de Carbon feels that there are great problems with the design of the piston for such a unit....both in terms of hydrodynamics and material strength.

He prefers to achieve the damping effect by the use of gas under pressure, separated from the oil by a diaphragm. Provided that the gas pressure is sufficient, he says, there is no need for valves.

He uses a very high nitrogen pressure (over 213lbs per square inch on the production Yamaha DT models, for example) and says "the pressure of the gas must be higher than the maximum compression force that the unit is capable of, so that the gas itself won't

collapse or suffer cavitation".

How does M. de Carbon see the future of motorcycle suspension?

"In the past" he says "spring movement was too little and damping was nowhere near good enough. Motorcycle suspension is aided by the fact that the rider's weight is supported to a great degree by his feet on the footrests. Thus the rider unconsciously uses his muscles to assist the suspension, whereas the car driver is nothing more than a dead weight on the seat.

"Therefore, with more attention paid to chassis design, seating and shock absorbers, it should be possible to travel greater distances by motorcycle in comfort than it is in a car.

"I feel that the next development in motorcycle suspension might be a very flexible seat, or even one supported by its own shock absorber. Flexible seats in a car would not be practicable as the seat is the driver's only means of support. But on a motorcycle, with the rider instinctively helping to support himself by use of his arm and leg muscles, a flexible seat would be quite possible...and a definite aid to comfort."

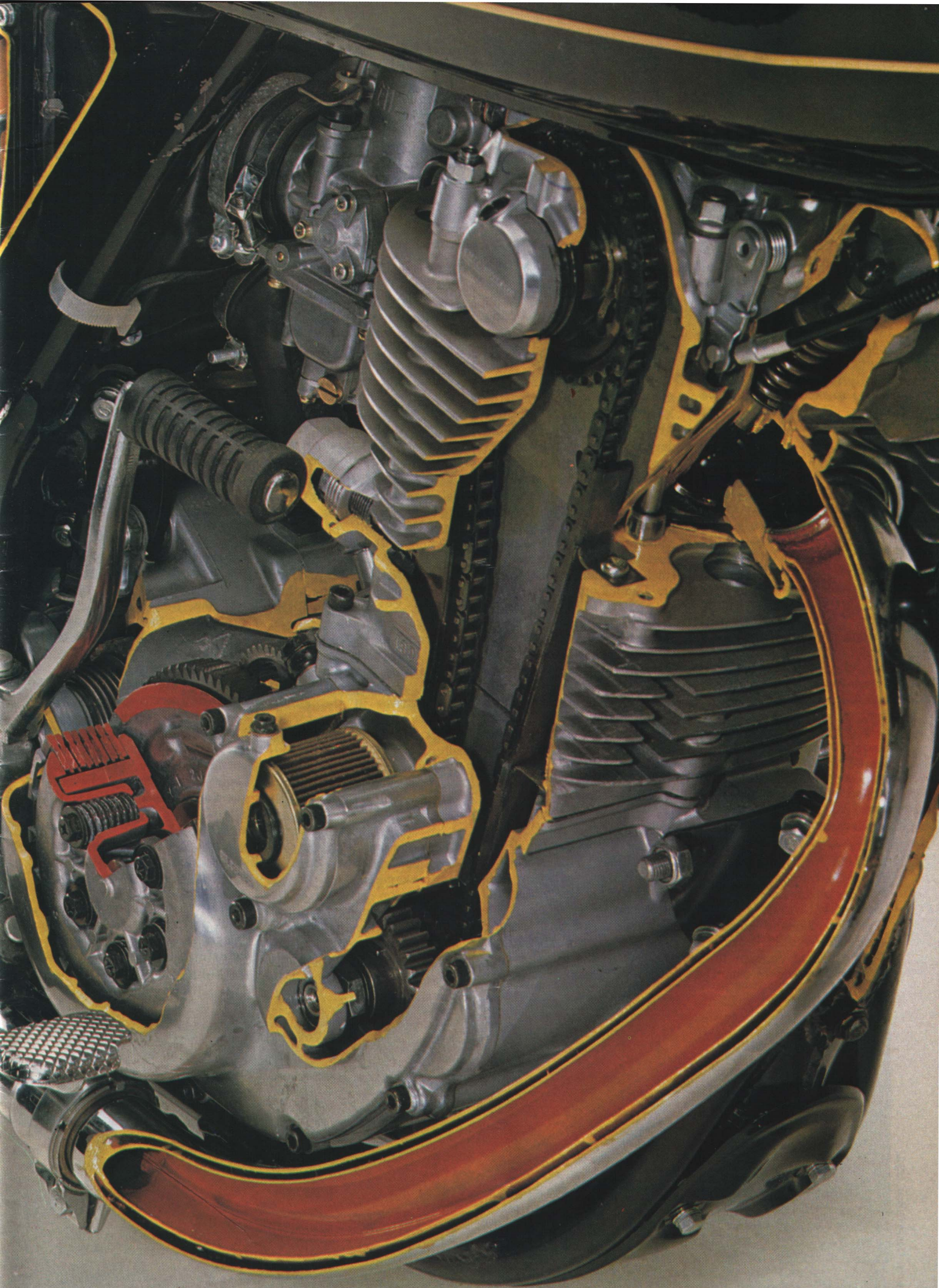
Will we be seeing flexible seats on motorcycles in the future? Judging by many other predictions by M. de Carbon that have become reality in the world of automotive suspension, this must be considered a distinct possibility.

## X-RAY VIEW

So that enthusiasts can see exactly what makes Yamaha machines perform so well, engineers at the factory in Japan have put various models "under the knife", operating upon them and dissecting them so that all of the working parts can be seen in both engines and chassis.

On the opposite page is a close-up of the "cut" SR500 engine while the colour spread on Pages 6 and 7 shows a complete XS1100 with many of the castings, etc. cut away to show the working parts.

The machines will be used at various shows and exhibitions all over the world.



# Yamaha's XS1100 - The Versatile Superbike

BY JOHN HARTLEY.

With a maximum speed of 215 km/h (135 mph), and the ability to cover 400 m from a standing start in 12 seconds, the Yamaha XS1100 is a real flier. But, thanks to the engine's remarkably wide spread of power, the XS1100 is also an excellent high-speed tourer. This aspect of the machine is enhanced by the use of shaft drive, which eliminates the bugbear of frequent chain adjustment and replacement.

This combination of a superb engine and a well-equipped motor cycle mean that the XS1100 appeals equally to the rider who wants sheer power or to the one that wants to be able to tour effortlessly across Europe. It was because they sought this dual-personality that the Yamaha engineers opted for an 1100 cc engine rather than the 1000 cc unit they might have been expected to adopt. The extra capacity was used to boost torque rather than power; not that the XS1100 is short of either, with 95 bhp at 8,000 rpm, and 66 lb ft at 6,500 rpm.

Powerhouse of the Yamaha XS1100, of course, is the across-the-frame, in-line four cylinder engine and five speed gearbox with shaft drive. So why did Yamaha engineers adopt this layout? Because it is an excellent concept for a large motorcycle in that the

engine is well-balanced but fairly narrow. Also, the across-the-frame installation allows the use of air-cooling, which simplifies the design and saves weight.

Of course, there are narrower engines than the XS1100 but many of these vibrate badly, while the cylinder size of 250-280 cc gives excellent combustion with a four-stroke. In fact, both the XS750 and XS1100 are very smooth engines, with complete primary balance, and rubber engine mountings on the XS1100 ensure that the small vibrations that do exist are damped out.

Just as there are narrower engines than the XS1100, so there are wider ones that may appear, in theory, to be smoother. But in practice, these tend to be very heavy and ungainly; so the in-line four is, in many respects, the optimum engine for a large motorcycle.

Bore and stroke of the XS1100 power unit are 71.5 x 68.6 mm, giving a displacement of 1102cc with slightly "oversquare" dimensions. This is a good compromise between the ability to rev freely that the large bore gives and the excellent torque that is found in most engines with longer strokes. Of course, this is an overhead camshaft design...in

this case, twin overhead camshafts with direct-acting valve gear having been chosen for maximum performance.

In line with existing Yamaha practice, the engine casings are all aluminium die-castings, the crankcase being split along the axes of the crankshaft and the gearbox shafts. A five-bearing crankshaft is carried in shell bearings, which are more compact and generally quieter than ball and roller bearings. The big-end bearings are also of the shell type.

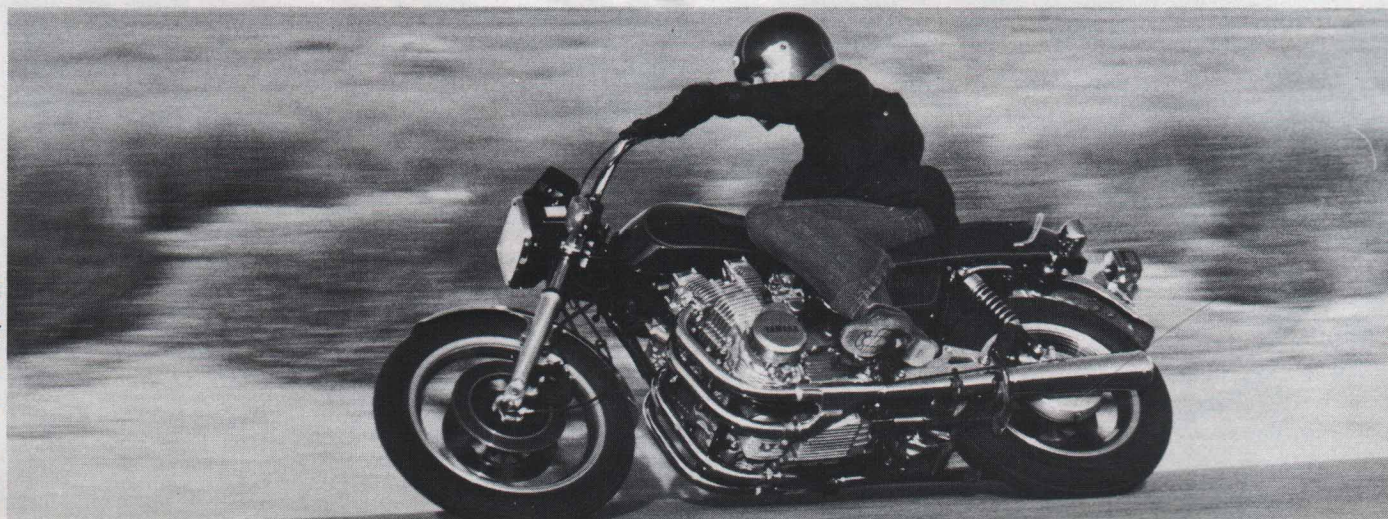
Whereas the drive for the XS750 was taken from one end of the crank, and the timing chain from the other, on the XS1100 both drives are taken from the middle of the crankshaft. This arrangement was adopted because with a four, the crankshaft is longer, so the positioning of these drives in the middle reduces any tendency for the crankshaft to vibrate torsionally.

Stiff, forged steel connecting rods carry the aluminium pistons which have slightly raised flat crowns, with small valve clearance cut-outs. These combine with the shallow part-spherical combustion chambers to give a compression ratio of 9.2:1. Since the chambers are shallow, the flamepath from the sparking plug to the extremities of the chamber is short, and this feature promotes

good combustion. At the same time, there is room for large valves, the inlet having a head of 36 mm and the exhaust 31 mm. In fact, these are the same size as those in the XS750, so there would be room for slightly larger valves if more power were needed!

The valve timing is also identical to that of the XS750 with the inlet opening 40 deg BTDC, and closing 64 deg ABDC, and the exhaust opening 64 deg BBDC, and closing 40 deg ATDC. On the other hand, valve lift is 0.5 mm greater, at 8.8 mm for the inlet, and 8.3 mm for the exhaust. The extra lift helps give the extra torque as well as power, while the timing gives the engine a nice sporty feel. Rapid response to the throttle is obtained by the use of four Mikuni BS 34 mm carburettors.

Performance and reliability are essential features of any successful motorcycle, but these days, people want to spend less time maintaining their machines or having them maintained, and ease of servicing is a recurring theme on the XS1100. In the engine, the valve clearance and timing chain adjustment are typical of this approach, as is the use of electronic transistorised ignition. The cams act directly on inverted bucket tappets, which in turn actuate the valves, and to speed up the job of adjusting



Picture: Cycle Guide, USA.

the valve clearances, the adjustment shims are installed in recesses in the tops of the tappets — not beneath them, as on some machines. Then, Yamaha engineers have devised a simple tool to hold the tappet down while the shim is removed and a new one inserted.

Since the timing chain is supported over virtually its whole length, it is unlikely to need adjustment often, but again, when it does, the job is very simple. It is merely a question of turning the crankshaft to the correct position, slackening off the tensioner lock-nut and stopper bolt, allowing the tensioner to take up the slack, and then retightening. In other words, the actual tensioning operation is automatic, and does not require any skill on the part of the mechanic. Thus, the job can be completed quickly and simply.

To eliminate the need for resetting and replacement of the contact-breaker points, an electronic system without points is used. The contact-breaker points are replaced by a special rotor and magnetic pick-ups. The rotor is mounted at the left-hand end of the crankshaft, and as a projection on the rotor passes the pick-up, a small current is induced in the pick-up. This current is passed to the transistorised control unit, which amplifies it so that the coil can be energised in the normal way. This is a simple and reliable system that produces plenty of power at the sparking plugs in all conditions throughout the life of the engine. It also keeps the ignition timing constant, and overall, it improves performance while cutting maintenance costs. To further refine the ignition, there is a vacuum advance unit, which improves fuel consumption when the engine is running at light loads.

A quick look at the XS1100 power unit shows that all the components are robust, and well able to withstand the stresses involved, but to be on the safe side, there is a full-pressure lubrication system to the critical engine components and the shafts of the gearbox. Then, to suit European conditions, an oil cooler is fitted as standard.

In several ways, the XS1100 transmission differs from that of the XS750 — both the layout and ratios are different, for example. The

primary drive, which takes the form of an inverted tooth 'silent' chain that requires neither adjustment nor tensioning, has a 1:1 ratio, and drives from the middle of the crankshaft to the middle of the primary or intermediate shaft. This enables the drive to be taken outboard to a gear drive to the multi-plate clutch, but it also leaves space for an interesting cushion drive. The drive is taken from the sprocket through a spring-loaded cam to the shaft. If the power is applied suddenly, the sprocket will ride up the cam, pushing the sleeve along the shaft, and compressing a spring. Thus, the shock is absorbed, and less stresses are applied to the transmission — an ingenious solution to a problem on all motorcycles.

From the primary shaft, there is a 1.66:1 gear reduction to the clutch, which is at the right-hand end of the input shaft of the gearbox. Gearbox ratios of 2.24, 1.63, 1.29, 1.03 and 0.88:1 give maximum speeds in the gears of about 80, 120, 150, 180 and 215 km/h — or 50, 75, 93, 110 and 135 mph. All nicely spaced.

To suit the shaft drive, there is an extra shaft behind the gearbox output shaft. It is spur driven, at the right-hand end, with a ratio of 0.94:1, and there is a bevel gear set at the left-hand end taking the drive through 90 degrees to the shaft. This has a ratio of 1.06:1, and the drive then passes through the universal to the shaft enclosed in the swinging arm. At the hub, of course, there is the final bevel gear reduction drive, which has a ratio of 3.3:1.

All the components in the shaft-drive system are designed for long lives, and all the shafts are supported in generously-sized bearings. Normally, all of them would last the life of the motorcycle. On the other hand, chain drives, which are exposed to dirt and water, need regular attention, and with the sort of power and torque the XS1100 produces, would not last long. In fact, the extra cost of the shaft drive is probably paid for the first or second time the owner of a competitive machine renews his chain — which may not last for more than 8,000 km.

All in all, massive performance and long life sum up the XS1100 — a machine definitely on the way to the top.



Serge Bacou (left) with Sonauto Director, Jean-Claude Olivier

## Serge Bacou Joins Yamaha In France

France's leading moto-cross rider, Serge Bacou, has joined Yamaha. He will ride a YZ400 in this year's French National Championships as well as major International races and will be supported by French Yamaha importers, Sonauto.

Serge first came to the notice of French moto-cross fans when he was second in the French National Class Championships for 1965. Three years later he had

established himself in the top International class and was second in the French Championships in 1968, 1969 and 1970.

A year later he won his first French title, taking both the 250 and 500cc Championships and since then he has won another five French 500cc titles. He was Champion in 1972, 1973, 1974, 1976 and 1977.

So, for 1978, will it be Bacou and Yamaha as French Champions? Why not?

## Supertracker Series For Britain

A new series comes to Britain this year and Yamaha machines will be one of the leading teams to compete. Anglo-American race promoters, Trippe, Cox Associates, have introduced a five race "Supertracker Series" which will feature American-style 750cc dirt track machines racing on the British grass tracks.

Trippe Cox's own team of five Yamaha 750cc twins (similar to the models raced by Kenny Roberts in the USA in recent years) will spearhead the series and will face tough opposition from British firms such as Weslake, famous for their speedway and 750cc twin cylinder grass track and moto-cross sidecar engines.

The series opens on July 2nd at the classic Western Winner meeting at Exeter and all of the meetings are of National or International calibre.

On July 23rd, for example, the Supertrackers will run in conjunction with the European Grass Track

Championships at Hereford. On August 20th they will run at Sandford, Shropshire, on September 17th at Rochester Airport in Kent and the final race will be at the British Grass Track Championship Finals at Evesham on September 24th.

Additionally, the Trippe, Cox team will be demonstrating the new style of racing at various other British, and possibly other European, events.

For example, at the spectacular grass track meeting that will be held during Isle of Man TT week, four of the Supertrackers will be ridden by Barry Briggs and Peter Collins (both former World Speedway Champions), British Speedway Champion, Michael Lee and British grass track ace Richard "Chippy" Moore.

These are the calibre of riders showing an interest in this new-to-Europe sport and next year Trippe, Cox hope to be able to expand the series across the Channel, should any European clubs be interested.







# The Return Of The King

Mike Hailwood. Ten years ago, and for most of the ten years preceding that, this name was on the lips of every road racing fan in the world. The lean, balding Briton was the acknowledged king of the road racing scene. Now, for one week in June, the king has returned. Returned to the scene of some of his greatest conquests...the legendary Isle of Man.

It was over a decade ago that Hailwood quit the world of Grand Prix road racing, when the Honda team pulled

out of the World Championships at the end of 1967. Such was Hailwood's ability at that time, the peak of his career, that Honda allowed him to keep their factory machinery for non-Championship International events and paid him a fortune NOT to ride in the World Championships. They couldn't stomach the thought that, despite the official Honda withdrawal, Hailwood might well win the title on machines without any factory support, thus leading

fans to believe that the man, rather than the machine, had been mainly responsible for their World Championship successes. Or, even worse, Hailwood might switch to another factory and add to his string of nine World Championships without the aid of Honda.

So, for the whole of 1968, Mike ran his "private" Hondas in lucrative International events and missed the Grands Prix in favour of building the foundations of a successful car racing career.

Now, ten years later, Hailwood is back at the place where he first captured the imagination of the motorcycling public...the Isle of Man, with its winding, climbing, 37¼ miles (60.4kms) of asphalt known as the "Mountain Circuit".

It was eleven years ago that he lapped the Island at a record-shattering 108mph plus. Since then, with smooth re-surfacing on much of the public roads that make up the track, with super-sticky "slick" tires, half as wide

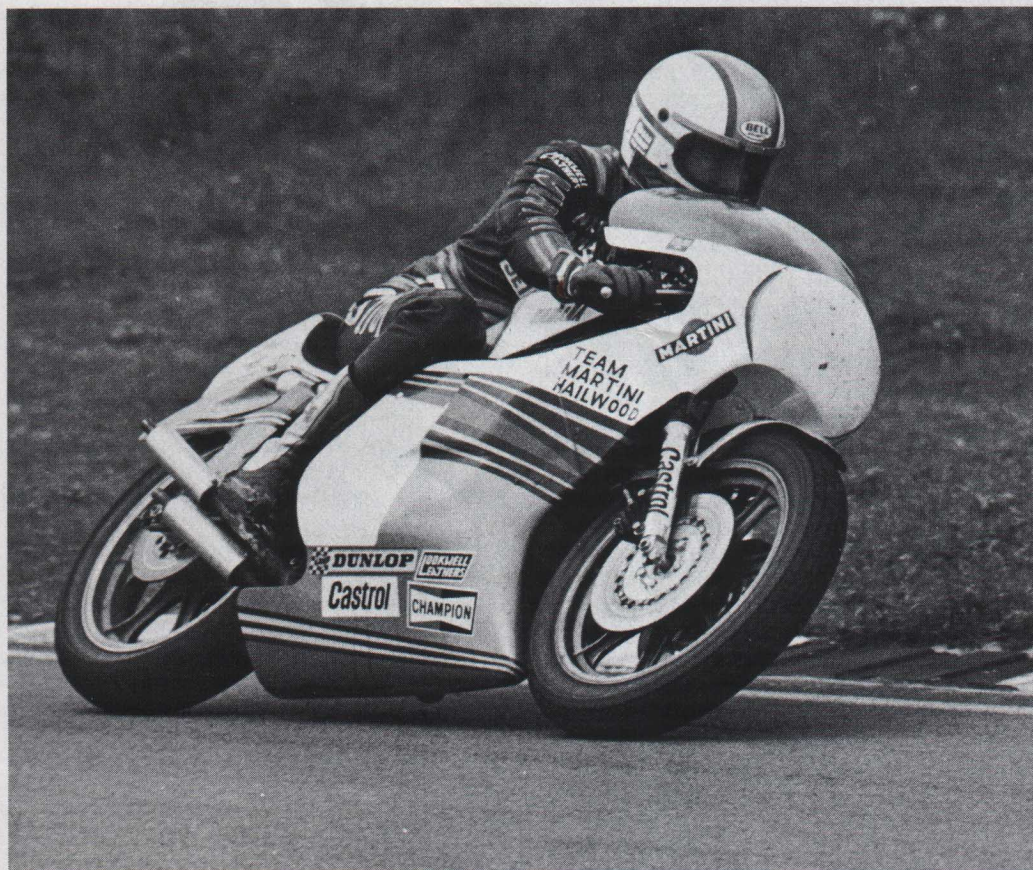
again as the skinny rubber on which Hailwood rode, with 750cc engines pushing out over 130bhp (probably 40 or more horsepower up on Hailwood's Honda four), with all of the handling advances that suspension developments have brought, with giant disc brakes and better aerodynamics, with all of this... today's riders have been unable to put more than 5mph on Mike's record. That, indeed, is a measure of the man's immense ability and talent.

That talent has remained a legend. So much so that, when Mike wheels out his 250cc, 500cc and 750cc Yamahas for his TT comeback, he will be cheered on by young fans who never even saw him ride. Though they may never have seen him, however, they all know the name. His fame has endured ten years away from motorcycle racing and the charisma is still as strong as ever.

This year you can't get a flight or boat booking to the Isle of Man during TT week...and even if you could, then you wouldn't be able to find anywhere to stay. Every hotel, boarding house, campsite and even the guest rooms of private houses, are full up for the TT week...a happy circumstance for the hotel owners who will all tell you that the presence of Mike Hailwood is one of the key reasons for their good fortune.

For the reasons why Hailwood's name is still such a draw, 11 years after his retirement from Grand Prix racing, we must take a quick look at his incredible career on both two wheels and four.

It all began over 20 years ago when Mike was a skinny, 17 year old. He was the son of Stan Hailwood, a character in his own right, who had made a millionaire-sized fortune from a chain of motorcycle dealerships. Despite being born with the privileges of the wealthy, Mike was no different from most teenagers of his day. He had completed a public





school education with very little distinction and from that upper-crust atmosphere, Stan had brought him down to earth with a bump, pulling some strings to get him an apprenticeship at the Triumph motorcycle factory, doing rather boring and menial work for very little reward.

It was Stan's insistence that Mike made his own way in life which probably made the young Hailwood so dedicated to proving that it was his own ability that won him races, and not his parent's money. Tragically, Stan died earlier this year otherwise his silver-haired profile with its prominent nose would certainly have been in evidence back on the Isle of Man where he and Mike experienced some of the greatest moments of their lives.

On Easter Monday, 1957 the pair turned up at Oulton Park where Mike was to race a borrowed 125cc MV Agusta against the cream of the lightweight racers of that era. He finished 11th and the die was cast. For three months after that debut race he never finished lower than fifth and soon the press was dubbing him a 'teenage wonderboy'.

A winter racing (and winning frequently) in South Africa added valuable experience and in June 1958 Mike appeared in the Isle of Man for the first time. At that time even he probably wouldn't have thought that he would be racing there again, twenty years on!

In 1958 he was the only rider entered in all four solo classes - 125cc, 250cc, 350cc and 500cc. It was a more than satisfactory Isle of Man debut. He finished third in the 250cc race, behind the two Italian superstars, Carlo Ubbiali and Tarquinio Provini, seventh in the 125, 12th in the 350 and 13th in the 500cc race.

The next year he was back in the Island and marked 1959 with a third place in the 500cc event. En route to this placing he posted one of the first-ever 100mph laps of the Mountain circuit on a single cylinder machine.

That same season he won his first Grand Prix (the 125cc Ulster) and finished third in the 125cc World Championship and fifth in the 250. Also that year he failed his motorcycle driving test three times!

It was in 1961, however,

that he wrote himself firmly into Isle of Man history by winning three of the four solo classes and missing a clean sweep by a hairsbreadth.

Mike took Hondas to victory in 125 and 250cc races and won the 500 with his Norton. Leading the 350cc race by a comfortable margin on his AJS, a piston pin broke with just 13 miles to go...a heartbreaking failure after over 200 miles of racing.

Consolation came later in the year, however, when he won his first World Championship, clinching the 250cc title at the Swedish Grand Prix.

The 1961 season saw the name Hailwood entered in the record books for the first time as a TT winner and a World Champion. He was to finish his GP career with 12 TT wins and nine World Championships.

For 1962 Mike got his first factory ride, on the near-invincible MV Agustas. For them he won several 350 and 500cc World Championships and carried on winning titles when he switched to Honda in 1966. Mike is convinced, however, that it was Honda's inability to wrest the 500cc title from MV Agusta that led to their pull-out from racing in 1967 to concentrate on commercial ventures. He had come so close to winning the coveted 500cc title for them but broke down with just three minutes to go in the last race of the 1967 season. The championship went to Giacomo Agostini and the MV Agusta and the disillusioned Honda team went back to Japan and have not been seen in Grand Prix racing since.

For several seasons Mike had dabbled in car racing and Honda's disappearance from the scene gave him the chance to expand this ambition.

He had first tried four wheels in 1960 when he tried a Lotus Climax F1 car and crashed during some wet-weather testing. That tempered his enthusiasm for a while but two years later he bought a Formula Junior Brabham, took fifth in his first race and then won three more in succession.

This prompted him to try Formula One but it was a costly and disappointing experience. He owned a share in the Parnell team with their Lotus-BRM vee-eights but all that he had to show for the

1963/4/5 seasons was a single World Championship point from a sixth place finish at Monaco.

Mike pushed his F1 ambitions aside to concentrate on winning motorcycle titles but his retirement from GP bike racing in 1967 allowed him the time to devote the necessary concentration to a car racing career. He established himself over the next couple of seasons as a fast and winning long-distance sports car driver and then, in the early nineteen-seventies, became one of the leading Formula 5000 drivers. The F5000 cars were single seaters with big, powerful American V8 engines and from the way that Hailwood handled them, it was obvious that he would soon be back in Formula One.

One of the high points of his car racing career was winning the European Formula Two Championship for Surtees in 1972...from which it was but a short step into the Surtees Grand Prix team.

After two years with Surtees, Mike's F1 talents were finally fully recognised when he was signed for McLaren...then, as now, one of the top teams in the business. But just on the threshold of what looked like

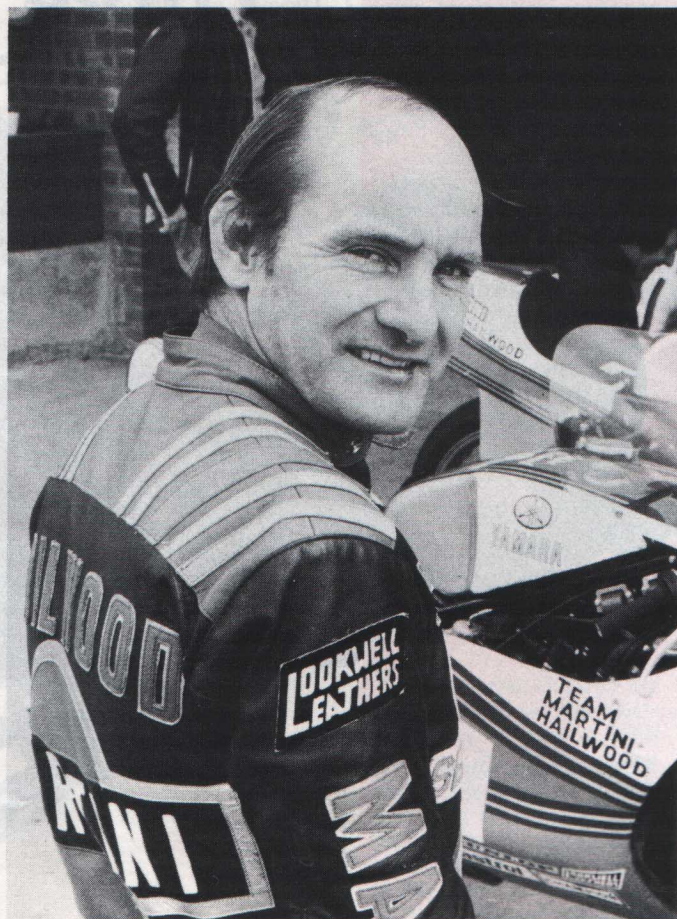
being his best car racing season ever, disaster struck. Mike crashed at over 140mph at the Nurburgring, shattered his ankle and his career was over.

Nursing the slow-mending ankle he retired to New Zealand to invest in a boat-building business with former World F1 Champion, Denny Hulme and former McLaren team manager, Phil Kerr.

Mike had never won a Formula One Grand Prix but was often one of the front-runners and a consistent finisher in the top six places. To be reckoned as one of the best half-dozen Grand Prix car drivers in the world is achievement enough.

Throughout his car racing days, Mike had retained a love of motorcycles and on two or three occasions had ventured back on to two wheels to race BSA/Triumphs at Daytona in 1970 and 1971 and a Yamaha at Silverstone. In each case, he was in contention for the win before being either slowed or forced out by mechanical bothers.

Now he's back again! "Eleven years is a long time away from a track as demanding as the Isle of Man" says Mike. "Still, as long as I enjoy myself, I'll be happy".



Strange as it may seem, a serious contender for the World Sidecar Championship has never had any trouble in choosing a suitable engine for his title bid. Thirty years ago, the single cylinder Manx Norton reigned supreme. In the nineteen-fifties, sixties and even early in the seventies, it was the flat-twin BMW that ruled, finally giving best to modified outboard motor engines from the German Konig factory, which became the favoured power unit for a few seasons.

Naturally, there have been exceptions, with the most notable ones being the motors produced by German tuning wizard Helmut Fath. He won the title himself late in the nineteen-sixties with his four-cylinder URS four-stroke and these days Werner Schwarzel is a top contender with Fath's ARO two-stroke four.

But these exceptions have always only gone to prove the general rule...and the rule these days is Yamaha!

Last year, Britain's George O'Dell gave Yamaha their first World Sidecar Championship, using a 500cc version of the TZ750 four to beat similarly-mounted Swiss ace, Rolf Biland.

This year, It's all Yamaha, with the top four crews (and nine of the top ten) choosing the four-cylinder TZ power unit reduced to 500cc by the expedient method of using



## Yamahas On Three Wheels

Colour Photography by Derek Berwin.

the horsepower and torque characteristics necessary for sidecar racing.

Of the three sidecar races held so far this season, all have been won by Rolf Biland. He seems to be determined to wipe out the memory of his ignominious defeat in the British GP at Silverstone last August, where a wrong choice of tire saw him floundering in the wet, lapped by O'Dell who cruised to a safe third place and the world title.

The Briton had a super-consistent season, winning no Championship races but scoring solid top places in all rounds.

Biland, who won more Grands Prix than any of his rivals, obviously considered himself the moral victor and has set out to hammer that point home this season. He has had two outfits constructed for 1978. One is fairly conventional by today's standards but the other is a truly radical "flying saucer" that takes full advantage of the FIM rules and is a cross between a racing car and a sidecar outfit.

Not that Biland couldn't win with a more "normal" machine. He opened the season in Austria with his conventional outfit and blew everyone else off and then, to the obvious chagrin of his fellow competitors, wheeled out the "flying saucer" to win in both France and Italy. Biland's radical new outfit is described in the feature accompanying this article.

O'Dell used two Yamaha-powered outfits last year to win his title and it was this choice of machine which proved a decisive



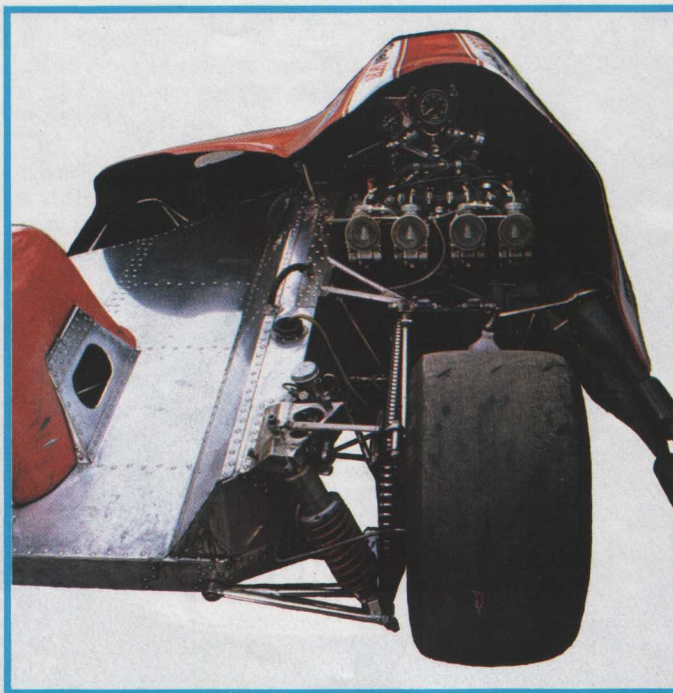
TZ250 cylinder barrels on the TZ750 bottom end. Many other power units have been tried...even Suzuki's full Grand Prix square four. None, however, seem able to match the Yamaha engine for

factor in the consistent points-scoring that took him to the title. One of the outfits was the hub-centre steering Seymaz which Biland used in 1976 while the other was a British-built Windle chassis with conventional front fork steering. Some tracks suited the "old-fashioned" Windle better than the Seymaz so George was able to ring the changes or make a substitution should he strike any trouble in practice.

Following his narrow loss of the title last year, Biland is following the O'Dell two-outfit approach, although he is utilising rather more unusual machinery!

Having proved that the two-machine approach pays dividends, O'Dell will continue in that vein for 1978 but has updated his machinery. The "old" Windle has been sold and the Seymaz now becomes the "number two" outfit. For the first string to his bow, George will use a chassis built by Herman Schmid...the Swiss sidecar racer and chassis constructor who built the outfit that Biland used last year.

George is still having problems with the leg that he badly broke in an American race crash at the end of last season but lies fifth in the Championship, having scored fourth places in the two opening rounds then slipping to tenth in Italy with a loose throttle necessitating a pit-stop.



The outfit that Biland used last year has now been bought by British veteran, Mac Hobson who has been one of the sensations of the Championship season so far.

This is his first full Grand Prix year and he opened up with a great second place to Biland in Austria and then took third behind Biland and French driver, Alain Michel. Hobson had trouble in Italy and finished, out of the points, in twelfth spot. His rival Michel, however, went out with a seized engine so he and Hobson still share second place in the Championship table behind the runaway Biland.

Hobson is obviously out to prove that, for sidecar racers at least, "life begins at forty"!

And there must be something about British sidecar passengers that brings almost as much success to a driver as the choice of a Yamaha power unit. Four of the top six passengers in current points are British. Ken Williams rides with Biland, Kenny Birch with Mac Hobson, Stu Collins with Alain Michel and Cliff Holland with George O'Dell.

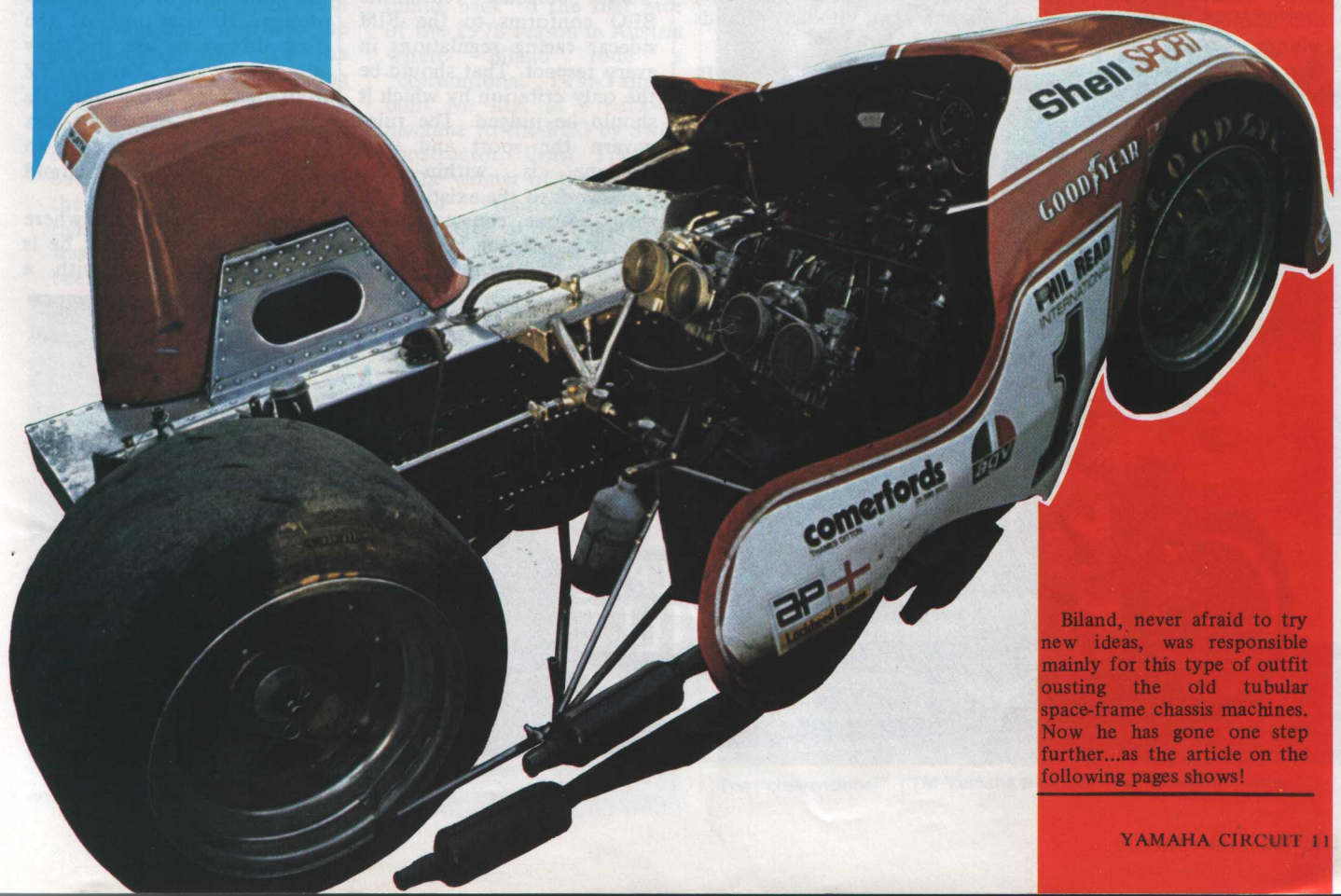
The season is still young at the time of writing (mid-May) but with only Werner Schwarzel and Andreas Huber (who are fifth at the moment

with Helmuth Fath's ARO) providing any significant opposition, it does seem likely that Yamaha will celebrate their second World Sidecar Championship in 1978.

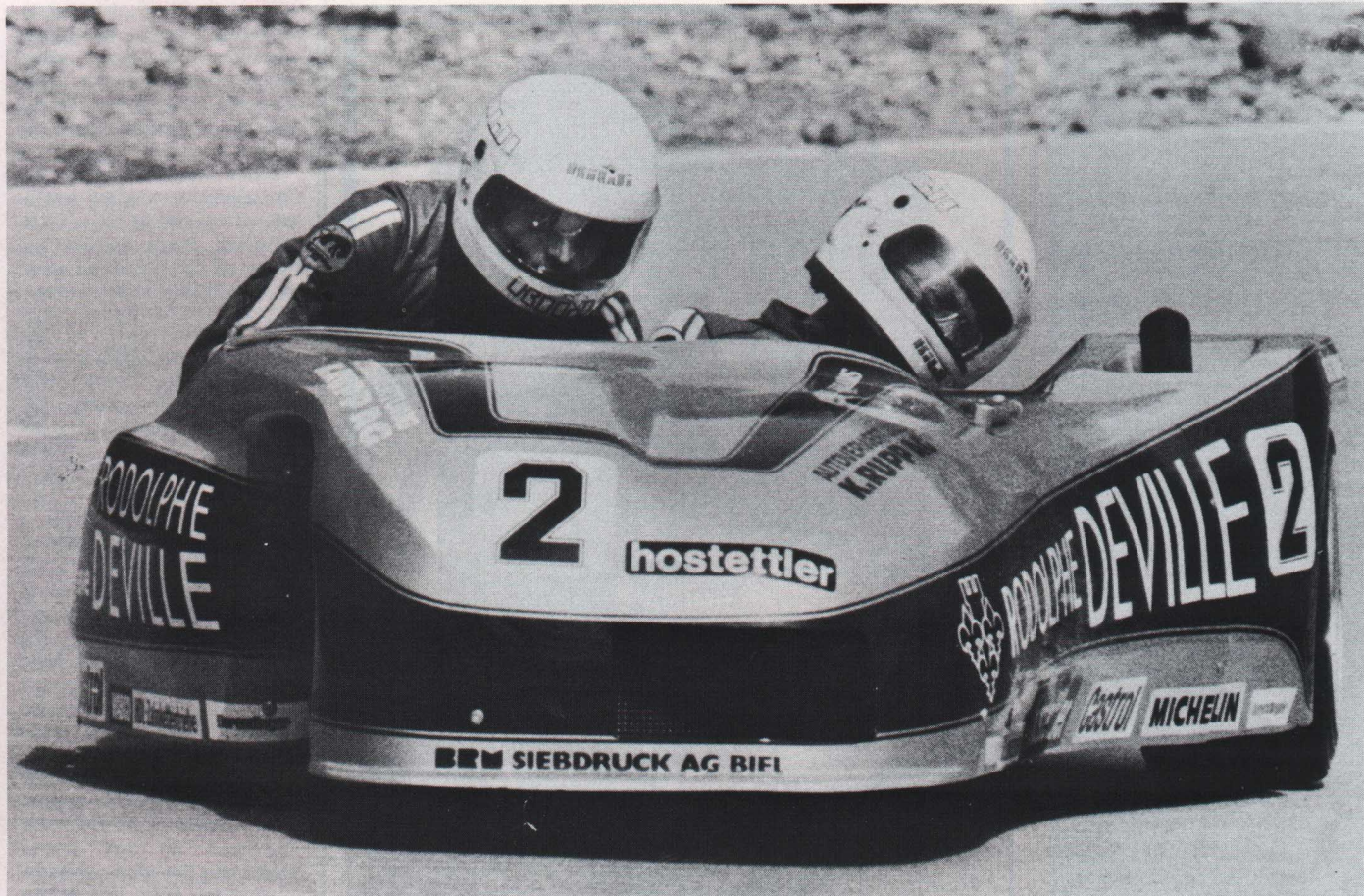
Which crew handles the Championship-winning outfit will, of course, be the subject of much fierce battling on tracks all over Europe until the season ends in September.

The current state of the sidecar chassis-building art is typified by the Seymaz outfit pictured on these pages...the one which helped George O'Dell to the World Championship last year. Literally the "backbone" of the outfit is the monocoque box section that everything else attaches to. On the left-hand side of the outfit is the passenger tray or "chair" with the sidecar wheel. The right-hand side provides pick-up points for the racing car-style wishbone suspension while the engine is mounted outrigger-fashion to the central monocoque. Hub-centre steering is employed to cut overall height and the whole machine is covered with lightweight glass-fibre bodywork.

This was the outfit which Rolf Biland first brought to fame and which he rode until the beginning of 1977 when he sold it to George...who promptly edged him out of the world title!



Biland, never afraid to try new ideas, was responsible mainly for this type of outfit ousting the old tubular space-frame chassis machines. Now he has gone one step further...as the article on the following pages shows!



# SIDECAR REVOLUTION

Last year, Rolf Biland seemed an odds-on favourite for the World Sidecar Championship and - with more wins in 1977 than any other sidecar racer - his top rating was justified.

Rolf, however, lacked the consistency of eventual winner, George O'Dell, and saw the title snatched from his fingers right at the end of the season.

At the time Biland was obviously upset but throughout the winter he put those feelings behind him, drew a veil over the unhappy finish to 1977 and

concentrated all of his energies on 1978.

That concentration began paying dividends right away for Biland has won all of the three sidecar races held so far this year (the Austrian, French and Italian Grands Prix).

The last two races were won with a revolutionary new outfit that has caused Rolf's rivals to complain that it is more racing car than sidecar.

On first examination of the "flying saucer" BEO-Yamaha, their complaints seem justified. The Yamaha engine

sits at the rear of the sidecar platform, driving both rear wheels and the passenger sits ahead of it in a racing kart seat, unable to move more than his head.

But consider this...the BEO conforms to the FIM sidecar racing regulations in every respect. That should be the only criterion by which it should be judged. The rules govern the sport and if a machine is within the framework of the existing rules then no-one can complain. Biland is winning because he is not scared to depart from

the normal and try new ideas.

The name of the game is progress. Progress towards the most efficient machines that the rules will allow.

Biland has always been in the forefront of new sidecar design. He was one of the first drivers to use the now almost-universal Yamaha TZ four cylinder power unit. He had one of the first Seymaz outfits, swapping that for an even-more radical Schmid chassis in 1977.

Now, by venturing where others feared to tread, he is heading the table with a



design that has worked perfectly almost right off the drawing board.

Brains behind the BEO "Imagine 1" outfit are two young Swiss engineers, Beat Schmid and Guido Sieber. Graduating from the Biel Technical High School, they first went into the world of racing cars. Then they became friendly with Biland, visited a few Grands Prix and started thinking about the design of a totally new outfit.

Some trips in the sidecar of Biland's machine proved to them that their trackside observations on sidecar handling seemed to have been correct. A sidecar outfit in the present state of development was, they felt, a violation of physical and dynamic laws. There had to be a better way.

The better way turned out to be the BEO "Imagine 1" - a prototype that was constructed last autumn for basic tests. What prompted Schmid and Sieber's research into three-wheeler dynamics was when they noticed that Biland even had to counter-steer on the straights to correct the outfit's inherent desire to turn around its sidecar wheel.

From the initial "Imagine 1" prototype was developed the BEO 77A, the machine with which Biland has won his last two Grands Prix. The thing that immediately makes the BEO 77A different from a conventional outfit is the position of the Yamaha engine. Instead of roaring away under the rider's body and alongside the passenger's ear, the power unit sits at the back of the chassis, between the two rear wheels. That's right...two rear wheels! What was the "sidecar" wheel has been moved backwards and in

line with the rear wheel of the "motorcycle". A drive chain from the engine runs to a specially designed "power distributor" which transmits the power to both rear wheels, doing the same job as a differential drive in a car's rear axle.

The position of the rear wheels and the engine obviously dictates a different riding position for the passenger. Kenny Williams now sits in a racing kart seat, ahead of the engine and spends his race simply sat tight! Hanging it out is a thing of the past!

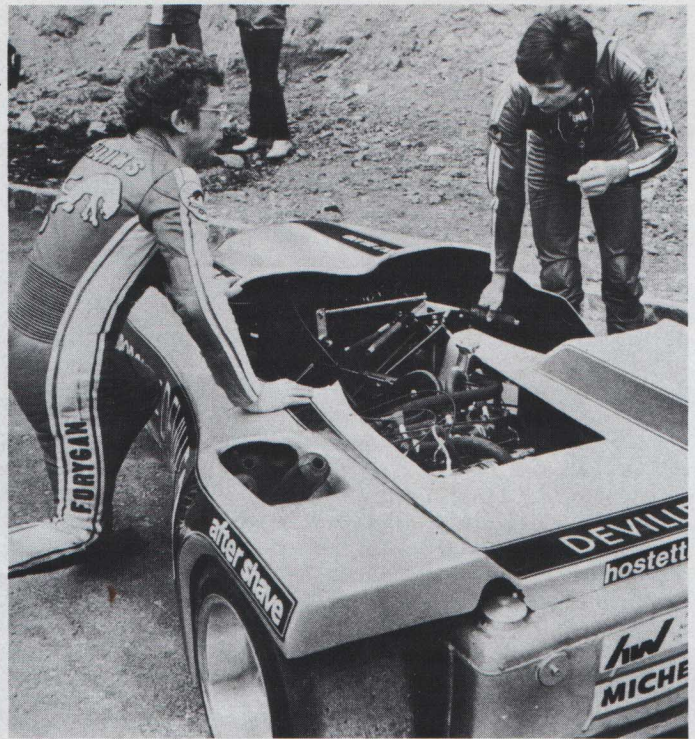
Biland keeps his normal seating position but, instead of a screaming engine beneath him, there is just the steering gear for the hub-centre steering assembly.

Front wheel of the outfit is offset towards the centre of the machine for better steering in left hand bends but, thanks to the width of the racing car tyres the machine still conforms to the FIM "two track" rule. Two wheels are considered to be in a single track by the FIM if their centre lines are not more than three inches apart.

So there it is...the BEO 77A Yamaha...a revolution in sidecar racing that is earning Rolf Biland and Kenny Williams Championship points along with the moans and groans of their rivals.

Perhaps the moaners and groaners should cast their minds back to the first race of the 1978 season in Austria where Biland rode a "conventional" TTM-Yamaha built for him as a back-up machine to the BEO by Swiss constructor, Ernst Trachsel.

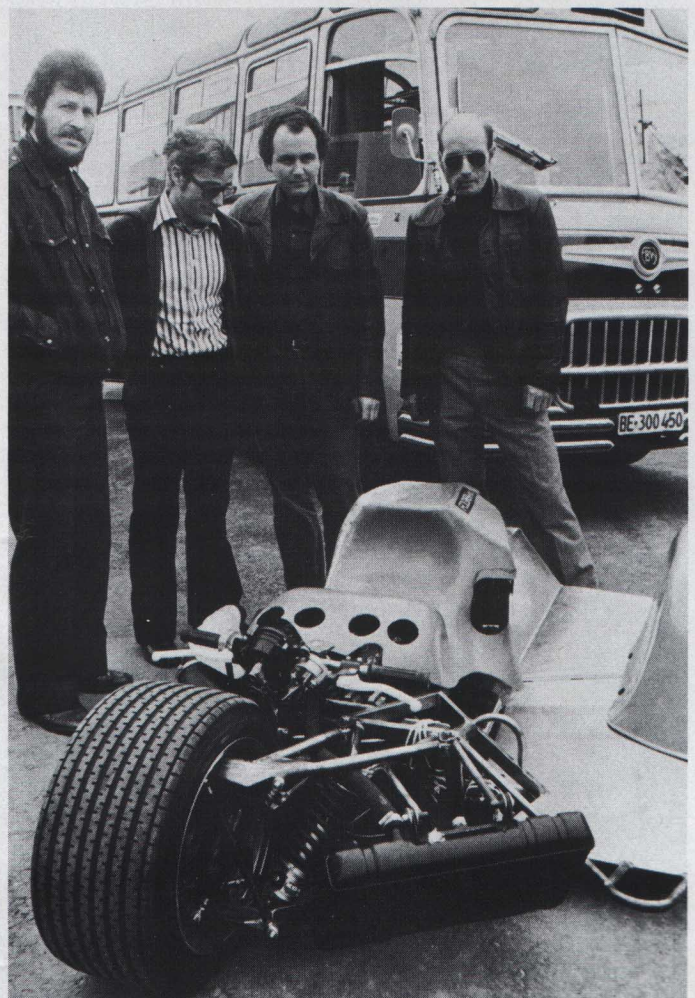
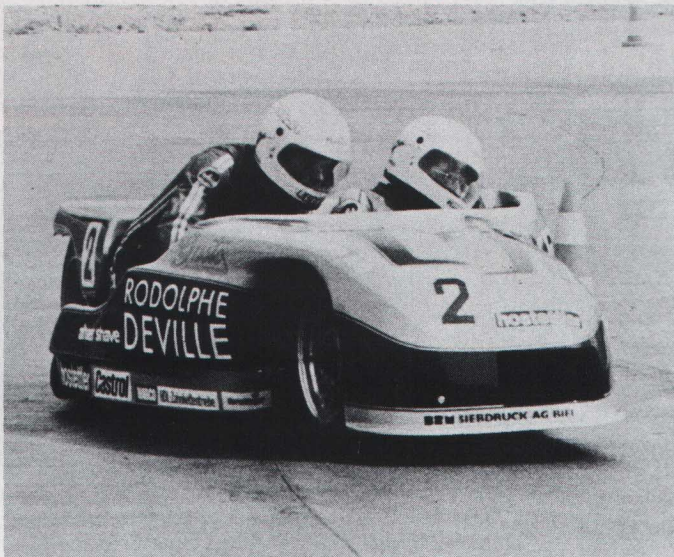
The winner of the Austrian Grand Prix...without the advantages of the new BEO "design revolution"...was, once again, Rolf Biland!



Kenny Williams (left) and Rolf Biland with the revolutionary BEO-77A.

The spectacular oil painting on the following pages shows Rolf Biland and Kenny Williams in action last year, when Kenny actually had to hang out of the chair and work for a living! The outfit is the Schmid-chassis Yamaha with which Biland took the

runner-up position behind George O'Dell in Championship points. This outfit has now been sold to British veteran, Mac Hobson who currently holds joint second place in the title standings behind Biland.



The "conventional" TTM Yamaha that Biland will hold in reserve.



MAY

ROLF BILAND

AUTOVERWERTUNG  
K. RUPP  
AG

AUTOVERWERTUNG  
K. RUPP

4

Prostetler

BREND

DIXEN

Castrol

SIEBDRU



Castrol

WAVE

hostetter

DRUCK AG BIEL

Rock Williamson  
1977

# Two Across

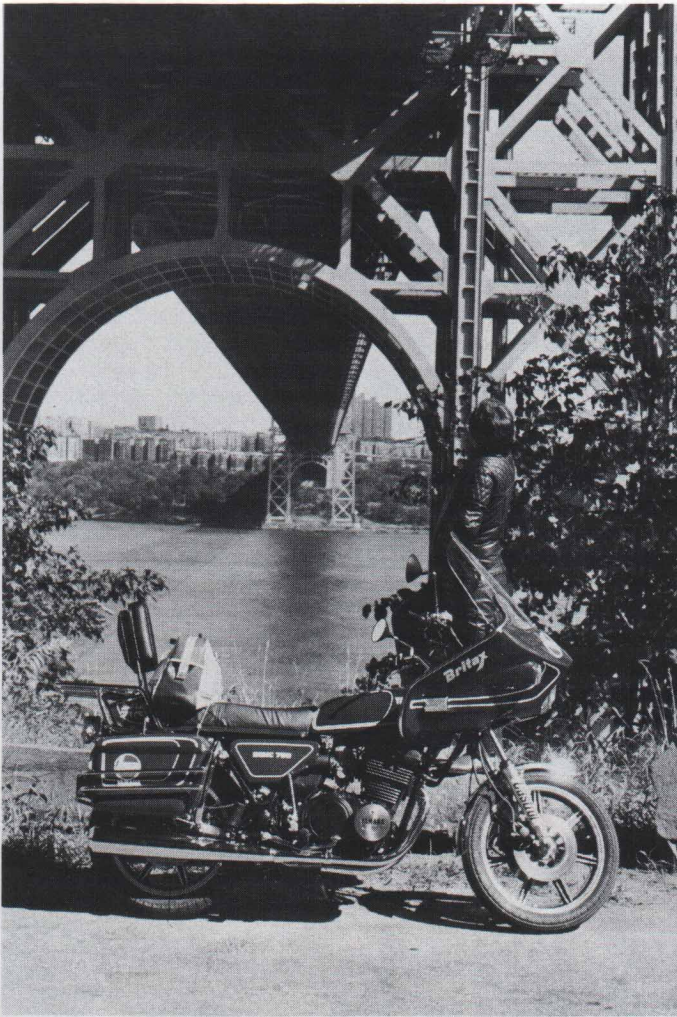
It's a long, long way across the United States of America....a whole lot further than most European riders think. Matching the distance to European equivalents, a trip from New York to Los Angeles is like riding from Paris to Istanbul and halfway back again or from Norway's North Cape to the Rock of Gibraltar!

This special "Circuit" feature highlights two trans-USA trips. It opens with an account of a 5,618 mile (8989km) solo ride which took British journalist, John Nutting, from Philadelphia up into Eastern Canada, across the American Mid-West and over the Rocky Mountains into the Western Desert, and finally the Pacific Coast at San Francisco.

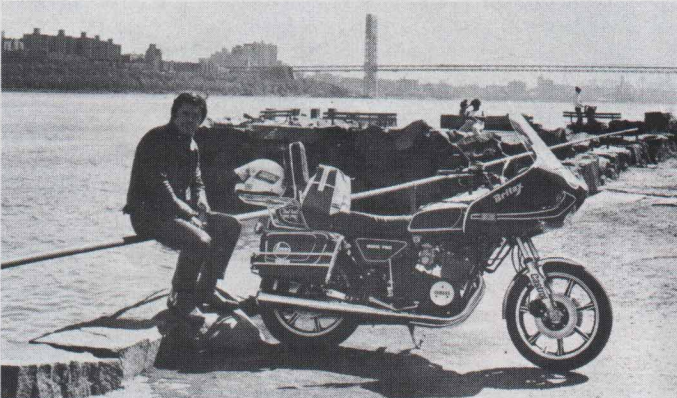
There were numerous side trips during the 26 day trek and Nutting accomplished the journey on his Yamaha XS750 with the conviction that "...the Yamaha had proved many times over that it is one of the best touring machines today.

Our other cross-country jaunt was a somewhat shorter one in mileage and a whole lot shorter in time! Four members of the staff of the American magazine "Motorcyclist" took a standard XS1100 and rode the 2963 miles (4740kms) from Los Angeles in California to New York in exactly 59½ hours! The only times that the XS1100 stopped running were to change riders, take on fuel and oil, meal breaks and a lengthy stop at a Colorado police station to explain away a 103mph traffic ticket! To add an even more unusual touch to this out-of-the-ordinary road test, the magazine began the cross-country trip by first taking the absolutely standard XS1100 to a local drag strip and recording standing-start quarter mile times of 11.73 seconds...fastest ever recorded by a standard street machine! Some prelude to a near-3000 mile, virtually non-stop run! The intrepid riders were all "Motorcyclist" staff men. Former road race ace, Jody Nicholas did the drag strip work and a 657 mile stint in the Mid-West while the three other men on the road were Brad Zimmerman, Rich Cox and Dale Boller.

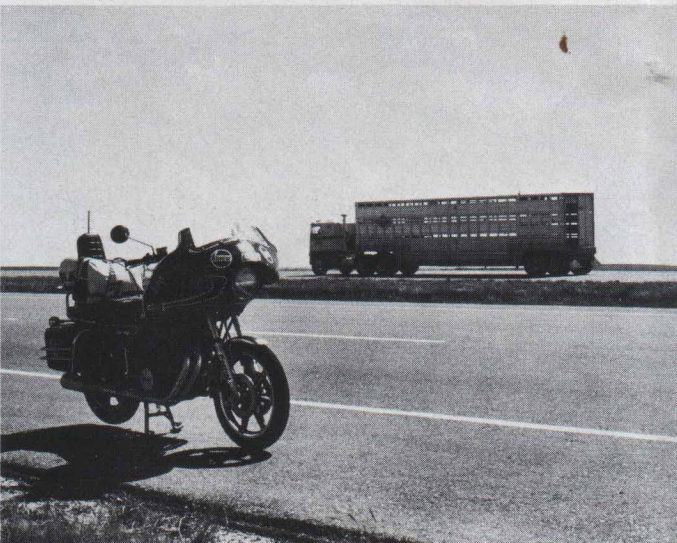
The stories of both of these marathons begin here.....



John Nutting and Yamaha XS750 beneath New York's Brooklyn Bridge.



Another New York bridge...this time the George Washington



Heavy metal on the US highway.



Lonely petrol stop in the Western Desert.



# Ways America

North America is a big country by anybody's reckoning. Just how big I had never imagined, however, until I crossed it from east to west on a Yamaha XS750 Triple last September. What had looked like short hops on the map turned out to be day-long endurance tests for man and machine that dwarfed any trip through comparatively rural Europe.

So as I set off from the suburban outskirts of upper New York I had no inkling of what was in store. Just take it as it comes I thought. Let the next step be the one to worry about.

Ten days and 4,500 miles later, as I cruised into a golden sunset over the San Francisco bay I knew what it had been to tackle one of the great motor cycling trips.

The Yamaha had unfailingly hauled me across the broad, flat expanses of Kansas; the middle America of Indiana and Illinois; lakeland Michigan; the Nightmarish Detroit; torrential rain in Ontario, Canada; up to over 11,000 feet in the Rockies; down the winding Colorado valley, across the wind-lashed salt flats in Utah; through the lonely and desolate stretches between the gambling towns of Nevada and the thrilling super-highways that carve up and down the Redwood-carpeted mountains of northern California.

After a stay near San Francisco for a few days, to take in the San Jose Mile track race and sight-seeing, the final leg took me down the stunning Pacific Coast Highway south through Monterey (home of writer John Steinbeck's 'Cannery Row'), Big Sur and Santa Barbara into the smokey Los Angeles basin.

In 26 days in America I had clocked 5,618 miles on the Yamaha which had become a dear friend and companion, miles which would undoubtedly be the hardest of its life.

I flew into New York, dipping down over the famous sky-line as the jumbo-jet banked into

Kennedy Airport. There to meet me was Mike Gibson, Castrol marketing manager in the States, and next day we swished the 150 miles south to Philadelphia... cruising silently at 55mph (the American speed limit) down the New Jersey turnpike in his monster white Cadillac.

Yamaha have their East Coast US headquarters in Philadelphia and it was from there that my cross-country trek was to begin.

At George Lowell's Yamaha Eastern service-training school was a brand new XS750-2D complete with a touring fairing, pannier boxes back-rest in a lush maroon livery and with just 45 miles on the clock. All I had to do was get on and ride.

Tucking my gear into the stowage compartments in the fairing and boxes I set off back that afternoon along the freeway into upper New York State and the Finger Lakes area reminiscent of England's Lake District. Here at Watkins Glen, home of the American car GP 350 miles out I was to arrange for the Yamaha's first service the next morning, Monday.

That day was my first real recollection of hitting the genuine America. Taking the side roads towards Buffalo near Niagara Falls (where I was to meet Tony Mills, Dunlop's chief tyre designer who emigrated to the States last year) everything was there; wayside truck stops with massive eighteen-wheelers parked outside, signs calling you to vote for the new Sheriff and rickety corner stores with stubbly-faced old guys slumped outside in chairs on the porch.

Tuesday wasn't quite so romantic. After seeing the Falls the previous day, the weather that two days earlier had flooded Kansas City hit Buffalo as I set off on the way to Detroit, taking the Peace Bridge into Ontario, Canada. Torrential rain chased me all the way as I cruised down the bolt-straight McDonald-Cartier freeway, stopped enough to lure me into switching back into dry



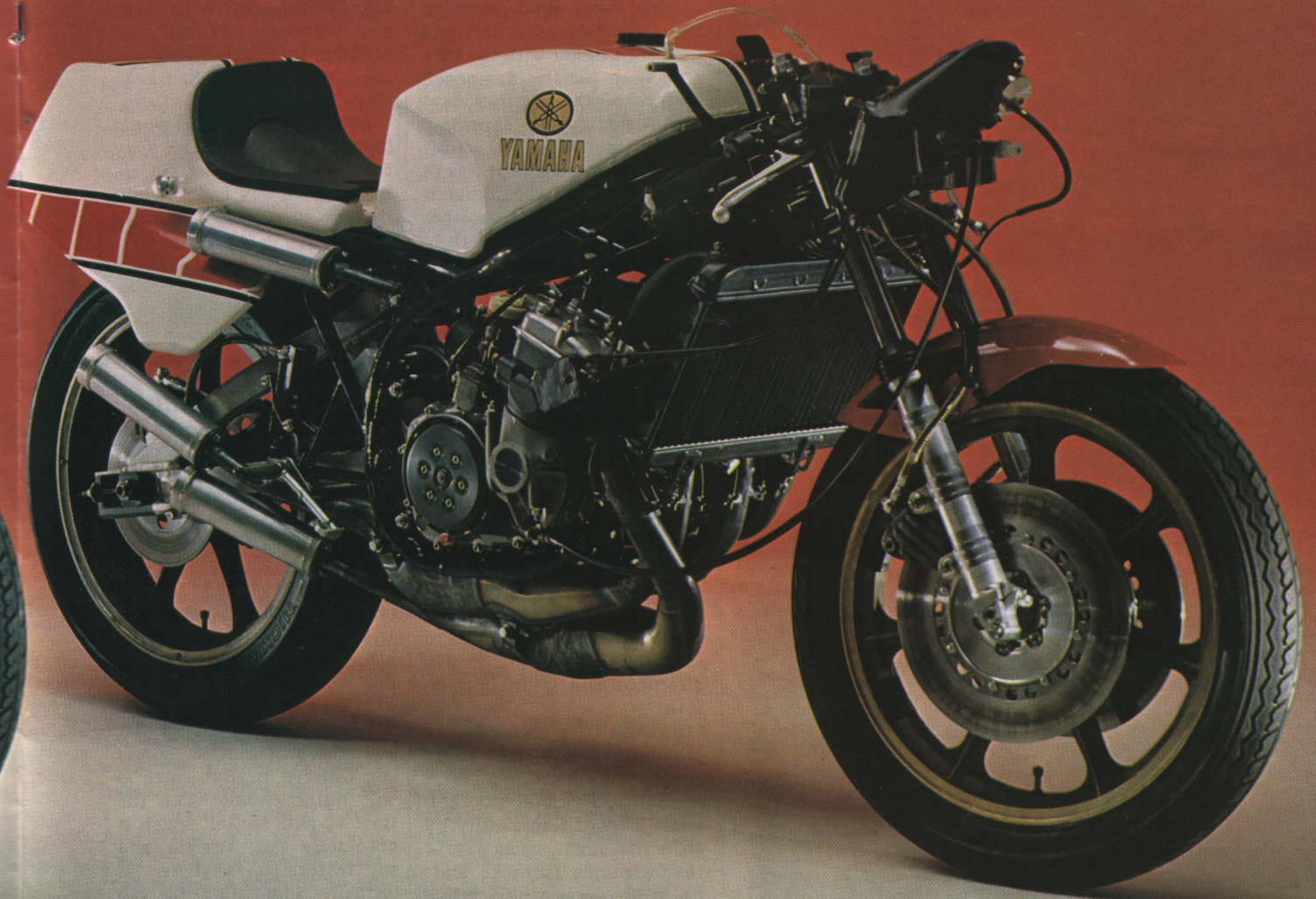
The famous Golden Gate bridge, on the Pacific Coast at San Francisco.

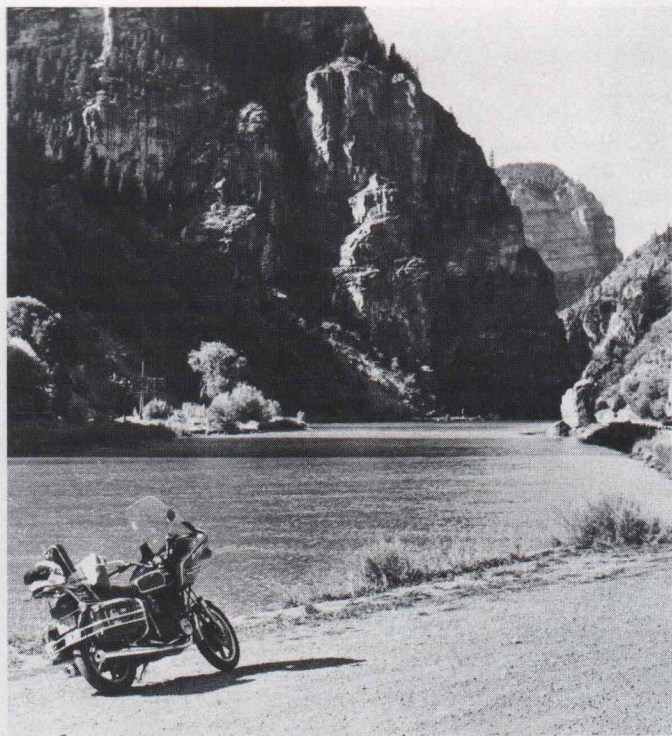


Spectacular Rocky Mountain scenery.

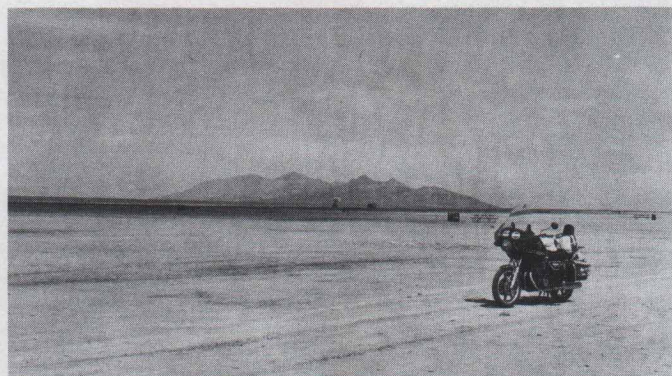
CONTINUED ON PAGE 20.







The beautiful Colorado River gorge sweeping out of the Rockies.



Desolation typified.....the Bonneville Salt Flats in Utah.



Giant cowboy waves a welcome to Nevada's gambling saloons.

## TWO WAYS ACROSS AMERICA

(CONTINUED).

gear and started again, staying all the way back into America as I dived into Detroit and the evening rush hour. Wet through I decided to keep pushing on to Pontiac, 25 miles north in Michigan to meet friends and a welcome bed.

I had every good reason to take the Wednesday off and used it to tinker with the bike and wash all the dampened clothes of the previous day!

But next day, Thursday, proved just as bad as I set off for Indianapolis and it wasn't until I reached the flatlands of Illinois that the weather cleared and the temperature began to rise into the high seventies. As it turned out I made such good time that I stayed on the freeway and clocked 590 miles that day as I reached St Louis, Missouri.

With 1,500 miles logged in three days riding I reckoned on a morning's sight-seeing in St Louis, the Gateway to the West - marked by the fabulous 630-foot stainless steel Gateway Arch, but it wasn't the case. By the time I would get to Denver, 1,000 miles away, the bike would be well overdue for its first major service and I had just Friday afternoon and Saturday to do it in.

So the flat expanses of Missouri, Kansas and eastern Colorado were lost in a blur. I made it to Junction City, 150 miles west of Kansas City by eight that night, using part of the Oklahoma Turnpike and its lovely service area attendant girls ("I just love your accent"). Then I set off at seven the next morning, after a meal of grilled catfish, for the final blast into Denver along the ruler-straight Route 70 to arrive at four in the afternoon.

Denver is the real cross-roads of central America. It marks the division of the Rocky Mountains that loom out of the plains and though it looks flat it is in fact a mile above sea level. That Sunday was spent on a run into the hills with a local bike club but time was pressing and that evening I set off west to cross the Continental Divide by way of the 11,000 foot

high Eisenhower Tunnel, dropping down the other side to stay overnight in the replica Alpine ski-ing village of Vail, a welcome stop because the elevation (around 7,500 feet) and the darkness had dropped the temperature into the low forties.

The next day, just over a week after I'd started, was the greatest contrast of all. Leaving Vail, Route 70 took me down the stunning Colorado gorge and out into the desert in Utah at Grand Junction. From here it's real desolation with not even the haunting hoots of the Southern Pacific diesels to keep you company: 57 miles of nothing to Green River and the turn-off toward Salt Lake City.

But for a puncture I would have made Salt Lake City that night, 550 miles in all. But a small nail had cut into the rear tyre just in the small town of Price, Utah, and after phoning the nearest Yamaha dealer, six miles up the highway (in the appropriately-named coal-mining town of Helper), I set to and changed the rear tube.

It proved more difficult than I had expected to get the rear wheel out with all the surrounding luggage gear, but I was more than thankful that the puncture occurred in a town, next to a garage, than in the previous 62 miles of nothing!

Salt Lake City, capital of Utah and the Mormon world, came and went as I struck due west across the 120 miles of the Great Salt Lake. Surprisingly, it's not all flat and three mountain ranges cut through it. But there is still nothing quite like the final 42-mile section which is absolutely flat, straight and so featureless that it is virtually impossible to tell whether or not you are actually moving over the Bonneville Salt Flats (where the speed records are set) towards Wendover and the mountains of Nevada.

Nevada is one of the few States gambling is legal and you are immediately assailed by massive signs on the state line in Wendover proclaiming the first casino. There is very little else in Nevada except for amazing vistas and more straight freeways that swoop across the valleys between the little gambling towns like Elko and Battle Mountain. I made it another 500 miles to Winnemucca and crashed for the night in yet another motel.

By this time I was almost in a state of limbo, my only contacts with people being with motel desk clerks, petrol station attendants and waitresses at diners. But it was only one day's ride to San Francisco so I took it easy through Reno, which is northern Nevada's answer to Las Vegas, and cut south into the hills to see Virginia City, which has been preserved almost in the same appearance it had in the 19th-century gold rush.

Then to Nevada's State capital, Carson City, and the state line with California at spectacularly beautiful Lake Tahoe.

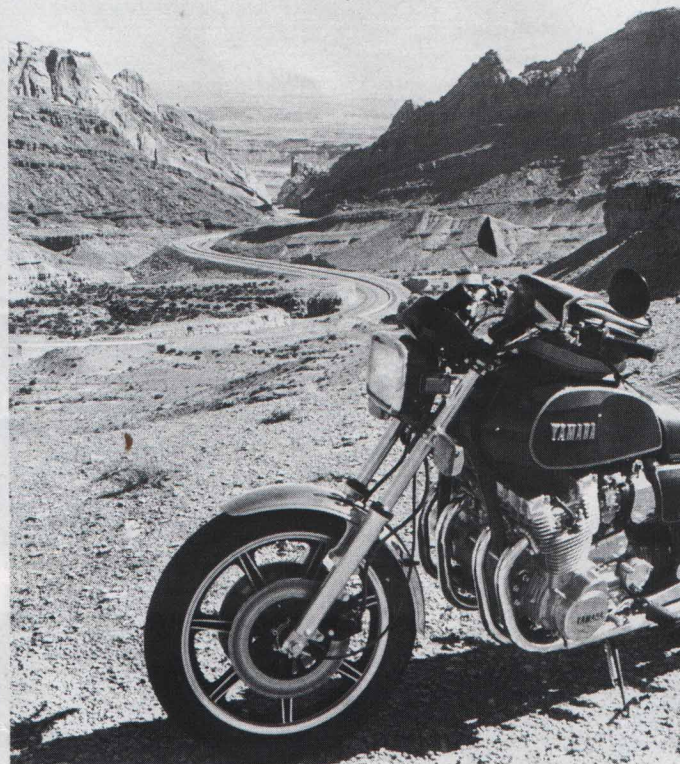
From there on it was all downhill - literally! The bike zoomed down out of the mountains into the State capital of Sacramento and an hour or two later that evening

I saw the sun set over the Golden Gate bridge and the Pacific Ocean. It had been ten days hard riding and 4,500 miles from the Eastern Seaboard.

The bike hadn't missed a beat. Taking me up to 95 mph across Nevada or slog-ging through the Rockies, gasping at the rarified air, the Yamaha had proved many times over that it is one of the best large-capacity touring bikes made today.

Apart from routine servicing it hadn't been touched. Only later on the trip south from San Francisco did a fairing bracket break and a front fork seal start to leak.

Trouble is, now the long-distance travelling bug has bitten, where do I go from here? They tell me that riding overland to Australia is interesting . . . !!!



The XS1100 on a Rocky Mountain pass.

(528kms) on the big four-cylinder machine before "Motorcyclist" staff were knocking on the workshop door to collect the machine en route to the Orange County Raceway drag strip. Their idea of getting the bike in trim for a non-stop cross-country trip was to spend a day at the local drag strip trying to prove the Yamaha claim that the XS1100 would be the first standard street bike able to break into the 11 second bracket for the quarter mile.

The XS1100 wasn't long in proving itself. Former road race ace, Jody Nicholas,

dropped the clutch for a first "familiarisation run" and right away recorded a 12.8s pass at 107.9mph...without even trying!

The next pass through the timing lights proved the Yamaha claim - 11.88s at 114.10mph! A third run was the best of the day - 11.73s at a scorching 114.79mph!

"Motorcyclist" felt that with a little more familiarisation, some fiddling with tire pressures and so on, plus a looser engine with more than 300 miles on the clock, they would see the XS1100 regularly posting times

**CONTINUED ON PAGE 33.**

## L.A. TO NEW YORK -



### 59½ HOURS BY XS1100

It's difficult to do anything different these days in terms of magazine road tests.

Everything's been done before....done, and often overdone to the point of nausea! Therefore, the idea of a non-stop run across America (except for gas and food stops and rider changes) represented a formidable bit of original thinking on the part of the editorial staff of the US magazine, "Motorcyclist". It also represented a formidable test for the standard XS1100 Yamaha that was to make the near-3000 mile trip from Los Angeles to New York in a projected time of 55 hours!

Logistically, the trip was like a military operation. The four riders flew into airports across the USA with usually nothing more than a matter of hours before they were due to swing into the saddle of the XS1100 and take off again...this time flying close to the ground!

Before Associate Editor, Rich Cox, left Los Angeles on

the first 811 mile leg, however, there was other work to be done.

Service personnel at the Yamaha Motor US headquarters in Buena Park, California had just enough time to uncrate an XS1100 and put 330 break-in miles



Spectacular cliffs line the Pacific Ocean in beautiful Big Sur, California.

# Riding With

STORY: BARRY COLEMAN.  
COLOUR PHOTOGRAPHY:  
DEREK BERWIN.



# A Fairing - It's The Modern Way

Sitting up or semi-prone, your choice of riding position runs to two. Everything else is a variation on the theme.

Comfort or style seems to be the choice, but which one you go for will probably be decided by something else, because neither choice satisfies a rider's basic needs. Fashion is as much to blame as anything.

Not so long ago, the young bloods of the highway rode like frogs - splayed out, feet perched up at the rear and arms akimbo, wrists pinned back at right angles, the whole body slipping gracelessly down towards the front wheel spindle. Later they called it the 'cafe-racer' style. It had the compulsive madness of fashion but in it there was also just a dash of method: because the more sedate alternative wasn't all it appeared.

Here's a plain and irritating fact: as the speed of a motorcycle goes up, the comfort of its rider goes down. And that's just as true of the smoothest, best-handling machine in the world as it is of yesterday's gone-but-not-forgotten oil-spraying rattle-trap. It has nothing to do with mechanical efficiency: it's called wind resistance and it is, in every sense, a drag.

It could be worse, and it often is. Because sometimes it's cold, and sometimes it rains. Then the airstream chills and the water in it stings; and then as speed rises, discomfort rises faster and motorcycling gives way to masochism. Only crazies enjoy motorcycling like that. What keeps the rest of us going then is an optimist's memory (it didn't always hurt; there'll be another heat-wave).

That's when the old cafe-style made a little bit of sense, when hugging the tank from your elbows to your knees closer than a skin to its sausage brought just enough relief to be worth the athletic effort. You were out of the wind - a bit; out of the rain - a little; out of the cold - not much.

It was no good, either way. No good being savaged by the wind and no good being strung out on your bike like something fixing to be barbecued.

But there was something

else that was no good. Something called a fairing. There's nothing new about fairings. They've been around for years, long before the cafe crouch showed up. But they really haven't been good.

In the old days no one with high-octane blood in their veins wanted a fairing. They kept you warmer, drier, but they rattled, they slowed you down, and above all they looked dreadful, plodding, pedestrian. They looked unsporty, and they were.

Whatever we mean, exactly, by sporty, there's nothing wrong with it. What we mean is that we bought a motorcycle simply because we enjoy motorcycles. We might want to go fast or we might not. But if we wanted to be bored, we'd go on the 'bus. The fairings of the fifties and often of the sixties and seventies were the worst of both worlds. They took the sparkle out of the sport and, oddly enough, they didn't work very well.

Quite apart from the rattle and vibration, the awkward brackets and the mess they made of your wiring, they usually gave only partial, intermittent protection. Strange wind currents, unexpected little eddies, whipped cruel gusts of icy wind (and the rain that went with it) up your nostrils or into your kidneys. No wonder we stuck with the crouch: at least it was fun, until it began to hurt. No one had heard of aerodynamics; a wind tunnel was something that blew ladies' skirts up at fairgrounds.

Fairings have improved a lot. Over the last few years they have recognised, sometimes even foolishly pandered to, the bikers' liking for style

There have been half-fairings, handlebar fairings, racing-style fairings and even full fairings enveloping the front wheel. Some of them worked...though mostly you still had to ride with your head down, just like in the bad old days!

The Yamaha big-bike fairing is a revelation...or revolution. You can ride comfortably sitting up behind a big fairing styled to make Ferraris look like milk floats!

Do I exaggerate? Maybe, a little. But Yamaha's achieve-

ment merits stress. A large and blindingly fast motorcycle has been equipped from its inception with a fairing that provides total protection while celebrating the excitement of an astonishing performance.

The XS1100 was intended to operate on the fine edge of motorcycling and John Mockett's fairing was intended to hone that edge, to keep the experience vivid. Anyone who thinks that on the basis of its grand appearance the fairing is going to take the fun out of the XS1100 is making a big mistake. What takes the fun from riding any motorcycle, what could even cut the XS down to the size of the superbike in the street, is wind resistance, rain, numbing cold, and a stabbing pain in the small of the back. Try all that some time - at 135 mph.

I've never thought of motorcycles as being much like aeroplanes - until I rode the fully-faired XS. Fairings trap engine noise, they say. And that's true of the XS. Except that the engine noise is nothing more than a high-pitched hum from the transmission; the exhaust note trails sonorously somewhere out at the back. But that hum is the whine of a jet making ready to fly. And flying is the right image.

At night, the big square instruments are reflected in the underside of the screen; the wind hisses past, the hum rises to a whistle; when the road is clear and the traffic-control centre of your common sense says 'go', you gently unleash the power. Gently is all it takes. This isn't an aeroplane. But it is the fastest accelerating vehicle on the road, and that makes it feel like one.

The concentration required, the experience called upon, are a constant reminder that this is a powerful machine, one that above all calls for a pilot's sense of responsibility. Not least when slowing down. Reaching the end of a motorway, say, bears an uncanny resemblance to landing, the low transmission hum changes pitch; you check the instruments with special care. Sitting behind the fairing has unsettled your

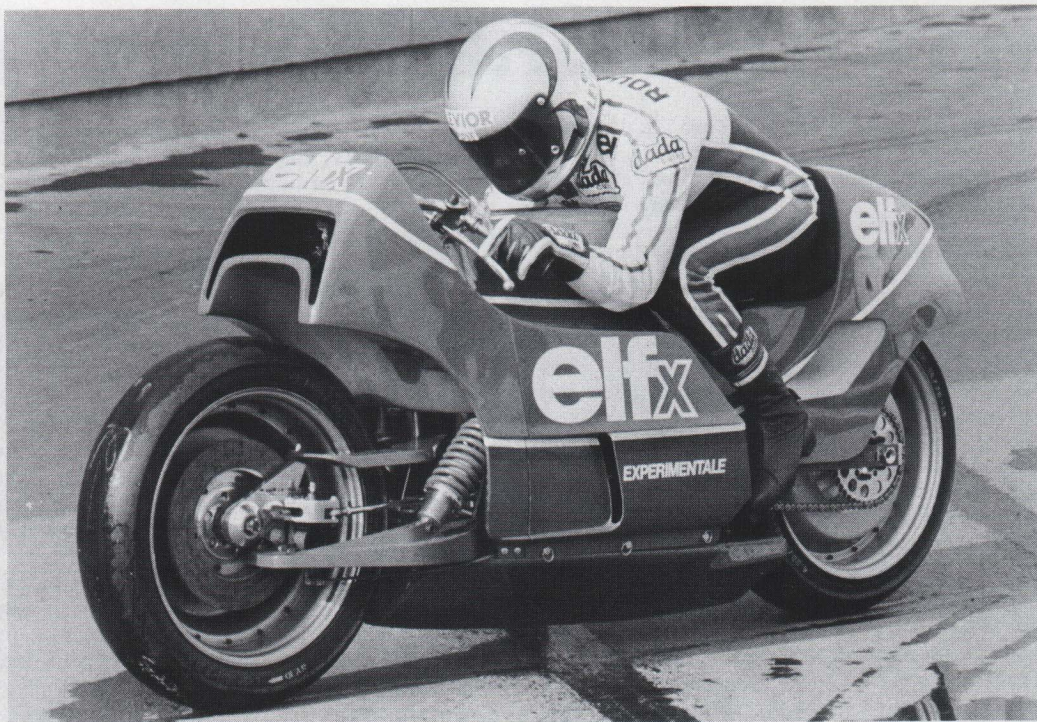
sense of speed. You learn nothing from the wind - it doesn't touch you. The bike itself is so superbly stable that except for the rushing of the scenery you could be anywhere within a range of a hundred miles an hour.

You learn to treat the XS with care, to be sure you know exactly how fast it's going and especially if there are unexpected bends arising. You bank the XS into bends, you don't throw it in, and you check the instruments and check them again. No wind resistance. No feedback from the weather. This flying demands a lot of care.

Don't imagine, though, that a high standard of comfort somehow isolates the rider from the world or from the spirit of motorcycling. On the contrary, it enables him or her to enjoy it to the full. There's no mistaking that you're on a motorcycle. Even the rushing of the wind reminds you of that - but it's going past you, not through you. It's easy to imagine: like a sports car with the roof off (though a little less blustery) or a saloon with the windows open.

The fairing brings freedom. The freedom to enjoy the machine, and also, to some extent, freedom from some of the awkward encumbrances of motorcycling. Clothing, for example. You still need the appropriate kind, but you need, in proportion to the weather, less of it.

Perhaps one of the most enjoyable features of the XS fairing is freedom from the crouch. Sitting comfortably, you're ready to do business, should you care to, with the fastest machinery there is. You wouldn't, of course, because XS1100 riders are sensible - they have to be with a machine so potent, however impeccable its manners - but there's a wickedly enjoyable feeling to be had sitting there like that: no one, crouched or otherwise, is about to leave you behind. 'King of the Road', that sort of thing. The XS1100 rules OK; and rules in style. Of course, it feels a bit like an aeroplane. But surveying the world from that serene centre, that Olympian powerhouse, it feels a whole lot more like a flying throne!



Pictures: "Motor Cycle" UK.

# Elf - X "Experimentale"

The worlds of car and motorcycle racing don't have much in common....least of all the paths of thought trod by the various designers in the respective fields. In motorcycle racing, the engine seems to be the factor upon which most designers concentrate (though the Yamaha monoshock did mark a giant step forward in chassis construction). However, with

factories building square-fours, transverse fours, twins, threes, transverse and vee-sixes, two-strokes or four-strokes, it is easy to see that the motorcycle designer's priority lies very much with the power unit.

In car racing it's a lot different. Ferrari's flat-12 is a constantly updated design with over five years behind it, the Alfa Romeo is a similar layout proven in years of

sports car racing and the Cosworth-Ford, still a leader in GP racing, celebrated its tenth anniversary last year! Apart from the turbocharged 1½litre Renault and the V12 Ligier Matra, there is very little new in the world of Grand Prix car engines.

Development in car racing goes along the lines of better handling and better aerodynamics.

However, there are signs of the times changing in motorcycle racing and it may be more than just a coincidence that it is a Frenchman breathing the wind of change.

Andre De Cortanze has a lot of experience in the field of car design and this experience shows in the revolutionary Elf-X that was unveiled in Paris earlier this year. The "X" stands for "Experimentale" and that's all the bike is at present. French rider, Michel Rougerie will test the machine throughout the coming season and race it when it is ready and proven. Meanwhile his normal actual racing program will be done with conventional machines.

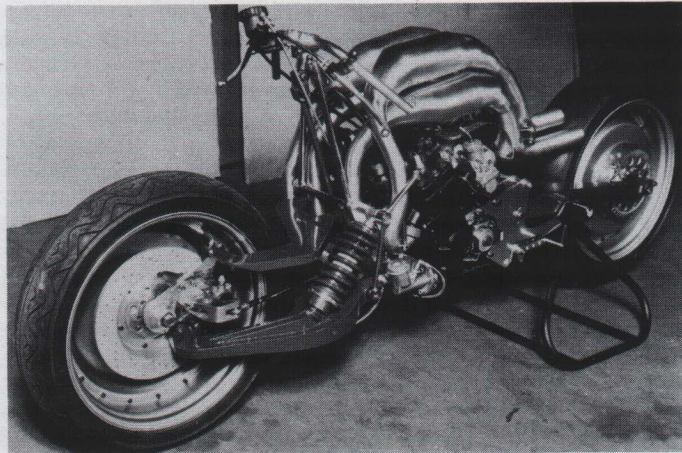
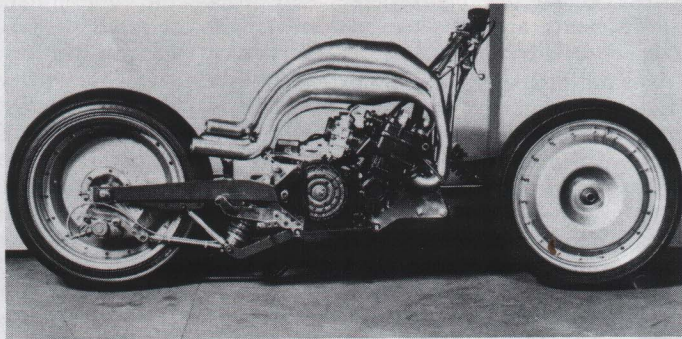
Supporting De Cortanze in his venture to change the face of motorcycle racing are the giant Elf petrol concern...a French company with strong national ties that have long been a leading name in Formula One, Formula Two

and sports car racing. Coincidentally, Elf are heavily-involved with both the Renault and Ligier/Matra GP car projects so are obviously more than willing to support any designed with fresh ideas in his mind.

Basic design principles of the Elf-X are the use of the engine as a load-bearing unit, car-type suspension, hub-centre steering and some drastic re-thinking on the subject of weight-distribution and aerodynamics.

The nett result of the basic concepts is a 750cc Yamaha-powered race weighing in at a mere 288lbs! The nucleus of the machine is the power unit, which has strengthened mounting-bosses to carry the suspension components. Both front and rear suspension arms attach directly to the engine!

Front suspension is unusual (even more unusual, that is!) in that it has both upper and lower pivoted arms. This prevents the steering axis in the hub-centre from tilting too much under suspension movement and it permits a suspension geometry arrangement that utilises the brake torque to cut out front-end dive under braking. The Elf-X is designed to maintain a level plane under braking rather than have all the weight shift forward as the front forks compress. This, says De Cortanze, is one





# WORLD CHAMPIONSHIP UPDATE

of the worst inherent features of conventional chassis design.

Suspension travel is controlled by a single Formula One De Carbon car racing shock absorber attached to the lower arm. A similar unit, mounted low beneath the back of the engine and compressed by a bell-crank arrangement, controls rear suspension movement. Both front and rear wheels are complete alloy discs, for maximum rigidity. Grand Prix car disc brakes are mounted in the dished portion of these wheels, both as an aid to air penetration and to combat the effects of rain on the brake.

The front wheel is attached only to the left-side of the massively-constructed front swinging arms.

Beneath the engine is the fuel-tank, bevelled at the sides for cornering clearance and packed with multi-cellular foam to minimise fire-risk in the case of a crash (another idea borrowed from the car racers).

Stainless steel lightweight exhaust pipes sweep up over the top of the engine and obviously weigh must less than a full tank of gas. The reversing of the positions of the exhaust pipes and the petrol tank make for an incredibly low centre of gravity.

A heat shield prevents exhaust pipe heat from upsetting carburation and the inside of the light (29lbs including the fuel tank) plastic bodywork is sprayed with zirconium to keep the heat from the rider. The bodywork is also well-ventilated to admit cool air and get rid of heat from the engine and transmission.

The De Cortanze design is a radical one indeed by motorcycle racing standards and even he is treading warily. So many "world beaters" have been promised and never materialised that he is taking the sensible approach of keeping the Elf-X "experimentale" until all concerned are satisfied that it is a competitive project.

Practice sometimes has a habit of taking no notice of theory but, by all the laws of mechanics and design, the Elf-X seems to be a likely candidate for the Grand-Prix winner of the not-so-distant future.

## GRAND PRIX

### ROAD RACING.

#### VENEZUELAN GP. MARCH 19.

**250cc:** 1, K. Roberts (Yamaha). 2, C. Lavados (Yamaha). 3, P. Fernandez (Yamaha). 4, K. Ballington (Kawasaki). 5, O. Chevalier (Yamaha). 6, M. Lega (Morbidelli).

**350cc:** 1, T. Katayama (Yamaha), 2, P. Fernandez (Yamaha). 3, P. Pileri (Morbidelli), 4, K. Ballington (Kawasaki). 5, P. Pons (Yamaha), 6, C. Sarron (Yamaha).

**500cc:** 1, B. Sheene (Suzuki), 2, P. Hennen (Suzuki), 3, S. Baker (Suzuki). 4, S. Parrish (Suzuki). 5, R. Pietri (Yamaha), 6, G. Voght (Yamaha).

#### SPANISH GP. APRIL 16.

**250cc:** 1, G. Hansford (Kawasaki). 2, K. Roberts (Yamaha). 3, F. Uncini (Yamaha). 4, K. Ballington (Kawasaki). 5, J. Ekerold (Yamaha). 6, M. Grant (Kawasaki).

**500cc:** 1, P. Hennen (Suzuki) 2, K. Roberts (Yamaha). 3, T. Katayama (Yamaha). 4, J. Cecotto (Yamaha). 5, B. Sheene (Suzuki), 6, S. Baker (Suzuki).

#### AUSTRIAN GP. APRIL 30.

**500cc:** 1, Kenny Roberts (Yamaha). 2, Johnny Cecotto (Yamaha). 3, Barry Sheene (Suzuki). 4, Marco Lucchinelli (Suzuki). 5, Tepi Lansivuori (Suzuki). 6, Michel Rougerie (Suzuki).

**350cc:** 1, Kork Ballington (Kawasaki). 2, Franco Uncini (Yamaha). 3, Takazumi Katayama (Yamaha). 4, Jon Ekerold (Yamaha). 5, Olivier Chevalier (Yamaha). 6, Michel Rougerie (Yamaha).

**SIDECAR:** 1, Rolf Biland/Ken Williams (Yamaha). 2, Mac Hobson/Kenny Birch (Yamaha). 3, Alain Michel/Stu Collins (Yamaha). 4, George O'Dell/Cliff Holland (Yamaha). 5, Bruno Holzer/Kurt Meierhaus (Yamaha). 6, Gote Brodin/Eric Wickstrom (Yamaha).

#### FRENCH GP, MAY 7.

1, Kenny Roberts (Yamaha). 2, Pat Hennen (Suzuki). 3, Barry Sheene (Suzuki). 4, Christian Estrosi (Suzuki). 5, Wil Hartog (Suzuki). 6, G. Rossi (Suzuki).

**350cc:** 1, Greg Hansford (Kawasaki). 2, Kork Ballington (Kawasaki). 3, Jon Ekerold (Yamaha). 4, Tom Herron (Yamaha). 5, Vic Soussan (Yamaha). 6, Patrick Fernandez (Yamaha).

**250cc:** 1, Greg Hansford (Kawasaki). 2, Kenny Roberts (Yamaha). 3, Kork Ballington (Kawasaki). 4, Jon Ekerold (Yamaha). 5, Tom Herron (Yamaha). 6, R. Roche (Yamaha).

**SIDECARS:** 1, Rolf Biland/Ken Williams (Yamaha). 2, Alain Michel / Stu Collins (Yamaha). 3, Mac Hobson / Kenny Birch (Yamaha). 4, George O'Dell / Cliff Holland (Yamaha). 5, Bruno Holzer / C. Mierhaus (Yamaha). 6, Werner Schwarzel / Andreas Huber (ARO).

#### ITALIAN GP. MAY 14.

**500cc:** 1, Kenny Roberts (Yamaha). 2, Pat Hennen (Suzuki). 3, Marco Lucchinelli (Suzuki). 4, Steve Baker (Suzuki). 5, Barry Sheene (Suzuki). 6, Wil Hartog (Suzuki).

**350cc:** 1, Kork Ballington (Kawasaki). 2, Greg Hansford (Kawasaki). 3, Takazumi Katayama (Yamaha). 4, Michel Rougerie (Yamaha). 5, Franco Uncini (Yamaha). 6, Marco Lucchinelli (Yamaha).

**250cc:** 1, Kork Ballington (Kawasaki). 2, Greg Hansford (Kawasaki). 3, Franco Uncini (Yamaha). 4, Tom Herron (Yamaha). 5, Patrick Fernandez (Yamaha). 6, Mario Lega (Morbidelli).

**SIDECAR:** 1 Rolf Biland/Kenny Williams (Yamaha). 2, Werner Schwarzel/Andreas Huber (ARO). 4, Jean-Francois Monnin / P. Miserez (Yamaha). 5, Dick Greasley/Graham Russell (Yamaha). 6, Bruno Holzer / K. Meierhaus (Yamaha).

#### WORLD CHAMPIONSHIP POINTS. (to MAY 21).

**500cc:** 1, Kenny Roberts (Yamaha) 57 pts. 2, Pat Hennen (Suzuki) 51, 3, Barry Sheene (Suzuki) 47. 4, Steve Baker (Suzuki) 23. 5, Johnny Cecotto (Yamaha), Michel Rougerie (Suzuki) 18.

**350cc:** 1, Kork Ballington (Kawasaki) 50 pts. 2, Takazumi Katayama (Yamaha) 35. 3, Greg Hansford (Kawasaki) 31. 4, Patrick Fernandez (Yamaha) 23. 5, Jon Ekerold (Yamaha) and Franco Uncini (Yamaha) 18.

**250cc:** 1, Greg Hansford (Kawasaki) 42. 2, Kork Ballington (Kawasaki) 41. 3, Kenny Roberts (Yamaha) 39. 4, Franco Uncini (Yamaha) 20. 5, Olivier Chevalier (Yamaha) & Tom Herron (Yamaha) 17.

**SIDECAR:** 1, Rolf Biland/ Kenny Williams (Yamaha), 45 pts. 2, Mac Hobson/Kenny Birch and Alain Michel / Stu Collins 22. 4, Bruno Holzer / Karl Meierhaus 18. 5, Werner Schwarzel/Andreas Huber (ARO) and George O'Dell / Cliff Holland (Yamaha) 17.

#### F750 ROAD RACING.

##### ITALY, APRIL 2.

1, J. Cecotto (Yamaha). 2, S. Baker (Yamaha). 3, C. Sarron (Yamaha). 4, G. Hansford (Kawasaki). 5, S. Asami (Yamaha). 6, P. Pons (Yamaha).

##### FRANCE, APRIL 9.

1, J. Cecotto (Yamaha). 2, K. Roberts (Yamaha). 3, S. Baker (Yamaha). 4, I. Takai (Yamaha). 5, P. Pons (Yamaha). 6, C. Estrosi (Yamaha).

##### GREAT BRITAIN, APRIL 23.

1, K. Roberts (Yamaha). 2, J. Cecotto (Yamaha). 3, P. Pons (Yamaha). 4, C. Sarron (Yamaha). 5, H. Rigal (Yamaha). 6, W. Willing (Yamaha).

#### WORLD CHAMPIONSHIP POINTS (to MAY 21).

1 Johnny Cecotto (Yamaha) 42pts. 2, Kenny Roberts (Yamaha) 27pts. 3, Steve Baker (Yamaha) 22, 4,

Patrick Pons (Yamaha) 21. 5, Christian Sarron (Yamaha) 18. 6, I. Takai (Yamaha) and Greg Hansford (Kawasaki) 8.

#### 500CC MOTOCROSS

##### SWITZERLAND, APRIL 9.

1, H. Mikkola (Yamaha). 2, R. De Coster (Suzuki). 3, B. Lackey (Honda). 4 J. Van Velthoven (KTM). 5, G. Wolsink (Suzuki). 6, A. Vromens (Suzuki).

**First Moto Placings:** Mikkola, De Coster, Van Velthoven, Vromens, Lackey, Graham Noyce (Honda).  
**Second Moto Placings:** Mikkola, Wolsink, Lackey, De Coster, A. Malherbe (KTM), Van Velthoven.

##### AUSTRIA, APRIL 16.

1, B. Lackey (Honda). 2, H. Schmitz (Maico). 3, H. Mikkola (Yamaha). 4, R. De Coster (Suzuki). 5, A. Malherbe (KTM). 6, G. Noyce (Honda).

**First Moto Placings:** Lackey, Schmitz, Mikkola, J. Bruno (KTM), J. Van Velthoven (KTM), Malherbe.  
**Second Moto Placings:** De Coster, Lackey, Schmitz, Noyce, Malherbe, Mikkola.

##### FRANCE. APRIL 30.

1, Heikki Mikkola (Yamaha). 2, Brad Lackey (Honda), 3, Hakan Andersson (Husqvarna). 4, Andre Malherbe (KTM). 5, Hubert Schmitz (Maico). 6, Roger De Coster (Suzuki).

**First Moto Placings:** 1 Lackey, 2, Mikkola. 3, Malherbe. 4, Schmitz, 5, Andersson. 6, Gerrit Wolsink (Suzuki).

**Second Moto Placings:** 1, Mikkola. 2, Lackey, 3, Andersson. 4, De Coster. 5, J. Bruno (KTM), 6 Malherbe.

##### DENMARK, MAY 7.

1, Heikki Mikkola (Yamaha). 2, Brad Lackey (Honda). 3, Gerrit Wolsink (Suzuki). 4, Roger De Coster (Suzuki). 5, Andre Malherbe (KTM). 6, Jaak Van Velthoven (KTM).

**First Moto Placings:** 1 Mikkola, 2 Lackey, 3 De Coster, 4 Wolsink, 5 Malherbe, 6 Hubert Schmitz (Maico).  
**Second Moto Placings:** 1 Mikkola, 2 Wolsink, 3 Lackey, 4 De Coster, 5 Malherbe, 6, Van Velthoven.

#### WORLD CHAMPIONSHIP POINTS (to MAY 21).

**500cc:** 1 Heikki Mikkola (Yamaha) 102 pts. 2, Brad Lackey (Honda) 92. 3, Roger De Coster (Suzuki) 61. 4, Andre Malherbe (KTM) 48. 5, Gerrit Wolsink (Suzuki) 46. 6, Hubert Schmitz (Maico) 38.

#### 125CC MOTOCROSS

##### AUSTRIA, APRIL 9.

1, G. Rahier (Suzuki). 2, G. Rond (Yamaha). 3, A. Watanabe (Suzuki). 4, J. Churavy (CZ). 5, S. Lerner (KTM). 6, V. Kudiakov (CZ).  
**First Moto Placings:** Rahier, Rond, Watanabe, Churavy, Lerner, A. Massant (Honda).

**Second Moto Placings:** Rahier, Rond, Watanabe, Kudiakov, Lerner, Churavy.

CONTINUED ON PAGE 30.



# Yamaha On The Water - A Leader In The Outboard Motor Field

Yamaha's continuous success in the world of motorcycle engineering has made it an obvious move for the company to take an interest in other applications of the internal combustion engine. The name of Yamaha is synonymous with excellent and progressive two-stroke engine design so the outboard boat motor field (where two-stroke engines are predominant) was a logical market in which to apply this engineering knowledge.

Yamaha have been building outboard engines since 1960 and achieved immediate success in this sphere. Now they are among the forefront of outboard engine

manufacturers and have a range of a dozen basic models with no less than 31 different versions of these basic engines. It is true to say that there is no facet of small marine engine requirements that cannot be handled by a Yamaha outboard. Yamaha engines are now powering thousands of light and medium-weight craft on the seas and waterways of the world...in applications ranging from one-man commercial fishing boats in under-developed countries to winning big powerboat races in Europe and the USA.

Top of the Yamaha range is the high-performance Yamaha 55. The model



numbers all indicate horsepower ratings and the Yamaha 55 produces that power from 760cc.

In common with all of the engines in the range - right down to the smallest 2hp model - it runs on a staggering 100:1 petrol to oil mix. This makes for a superbly clean-running power unit, an absolute necessity in the

pollution-conscious world of the seas and waterways.

Some people not conversant with the boating world might wonder at the need for a dozen different versions of those models. The answer to this is that every boat has an "optimum" engine that can be matched to it.

Speed of a boat, whether sail or power, is governed to a great degree by its length at the waterline. Many people make the mistake of buying a huge powerful engine for a boat with the totally wrong hull shape or size. The boat would, in fact, go just as quickly with a smaller engine....at a lot less cost and a lot more manageability.

Therefore, the wide-spread Yamaha range allows a boat-owner, with the help of his dealer, to choose a power unit that is as close to perfect as possible for his particular requirements.

So, wheels or propellers, road or water....Yamaha is, once again, a "better machine"!



# Yamaha in Germany - A Market Leader

The obvious Yamaha ambition in Europe is to establish itself as the biggest-selling brand of motorcycle on the market...an ambition that has already been realised in several individual countries.

A key market in Europe is the large German one and, therefore, it was with some joy that Yamaha's European marketing men greeted the news that, for the important summer season last year, Yamaha had pushed Honda out of the top sales spot in Germany.

Competition at the top is fierce and the battle see-saws back and forward between the big two, with their nearest challenger way in arrears. Machine availability, in fact, has played a crucial part in the overall sales position and at one point towards the end of 1977, Yamaha's German importers found that it was only the lack of available 360cc twins that kept them from pulling further into the lead!

German importers of Yamaha are Mitsui Maschinen GmbH, based in Meerbusch under the direction of Hiroshi Kawada. Main force behind the emergence of Yamaha as a market leader in Germany last year is the Sales Director, Hans-Ulrich Schmitz, while other important personnel are Publicity Director, Peter Gasche and Manfred Wehe, Mitsui's Service Director.

Mitsui took over the German importership of Yamaha in 1971 and since then have steadily built up a solid share of the market. An examination of the previous three years German registration figures will show how solidly.

In 1975, Honda had a stranglehold grip on the market with a 38.9% share of total sales. Yamaha were next but with only 18% share...less than half that of Honda. Next came BMW with 12.4%, Suzuki with 10.3% and Kawasaki with 5%.

One year later, things weren't a lot better. Honda had expanded their market

share to 40.2% and although Yamaha had also increased, it was only to 20.8%. BMW had dropped a little to 11.7% while both Suzuki and Kawasaki had made marginal gains at the lower end of the market...to 11% and 5.1% respectively.

But what a different story for Yamaha in 1977! Honda still led the year overall but their share of the market had been cut by over 25%. Now they held a 29% market share with Yamaha right on their shoulder at 28%! In fact, only the fact that Mitsui had sold their entire quota of the more popular machines prevented them from moving into the Number One position for the entire year. As it was, they led Honda for the big-selling April to August period and then only slipped back slightly behind as they ran out of machines!

Of the other competitive brands, Suzuki had made a slight increase to 14% and Kawasaki to 8.1% but BMW had slipped to a 9.8% share.

To all intents and purposes, however, these are all out of the running. Up front it is Yamaha and Honda battling it out for the sales lead.

One of the keys to the Yamaha success was the introduction of a specially detuned version of the XS360 to the German market. Its power had been cut to 27PS to enable riders to take advantage of favourable insurance rates for machines of this power output or less.

The decision by Yamaha's marketing men in Germany to offer a "low power" version of the XS360 was proved by the fact that, over the whole year, the XS360 captured 60.2% of the sales in the 27 horsepower category!

Actually, from January to August, the Yamaha four-stroke twin held a staggering 68% of the 27hp bracket and it was only the fact that Mitsui had by then completely sold out of XS360 models by September that pegged the share back to a still highly-creditable 60%.

For 1978, the Yamaha strength in the 27hp area has been boosted even more by the fact that special versions of the XT500 and SR500 single cylinder models have been produced with 27hp engines. The XS360 has been expanded in size to become the XS400 and there is naturally a 27hp version of this machine for the German market. So German riders have the choice of either a 400cc twin or two single cylinder five-hundreds in a section of the market that, up until Yamaha's intervention with the XS360 last year, had seen them restricted to two-fifties or less.

Naturally, rival manufacturers have followed Yamaha's lead and jumped on the bandwagon with their own 27hp four-hundreds but the addition of the SR500 to the 1978 range has made Mitsui confident of keeping the lead in this important category for 1978.

One of the ways they aim to do this is by some aggressive promotion within the 400cc capacity bracket to make potential customers even more aware of the XS400 twin and its merits. For example, the XS400 Cup (outlined in the accompanying feature) will help prove to would-be

## A New Clubman's Series - Germany's XS400 Cup

There's a new breed of Yamaha road racer on the German tracks this season and it's the first production Yamaha road racer that hasn't featured a high-revving two-stroke engine.

The new breed of clubman racer is based on the XS400 twin, one of the most popular machines in Germany, and its performance and handling emphasise the sporting qualities that have made the XS overhead camshaft twins such popular machines throughout Europe.

Obviously, the German series is intended for the novice, or relatively inexperienced riders, and it is a class of racing that other countries would do well to copy as a means of introducing a rider to road racing. The XS400 handles well, has good brakes and a smooth engine that is easy to cope with. In addition, even mildly-tuned versions of the engine will give over 100mph speeds, plenty high enough to help a rider learn the road race game.

A standard XS400 in

Germany will run at 140km/h (87.5mph) while the race-prepared machines that will be used in the series are capable of 180km/h (112.5mph). Power output is up from 27bhp to 38bhp.

The series is made up of eight races. At Kassel-Calden in the north of Germany on April 23rd and again in the north at Wunstorf on May 28th. Then the series moves over to the west and actually crosses the border into Belgium, where the German Aachen club will run their round of the series on June 24th at the Zolder track.

From there it is back to the north of Germany and the Schottenring on July 2nd and then west again to the famous Nurburgring two weeks later on July 15th.

On August 13th there's a change of style, with the XS400 riders tackling the famous Freiburg hillclimb in the south of Germany and a week later the riders can run in still more exalted company as part of the program on the German Grand Prix bill at the Nurburgring on August 19/20

buyers that the machine has all the sporting attributes that Yamaha's racing heritage can provide.

As important as promotion, feels sales manager, Hans-Ulrich Schmitz, is customer service. And Yamaha score heavily in this department.

All of the administrative work is handled from the Meerbusch office but Mitsui's spare parts division is totally separate and self-contained. So separate that it is at Loehne, 200 miles away from

the main office. Manfred Wehe, one of the original Yamaha importers, now handles the spare parts division at Loehne and has over 18,000 different spare parts in stock.

The Loehne plant handles nothing but the supply of spares to the Yamaha dealers, as does another warehouse (under Mr Wehe's overall direction) in Munich. Handling the Munich facility on the spot is Mr Spree, who is responsible for the supply

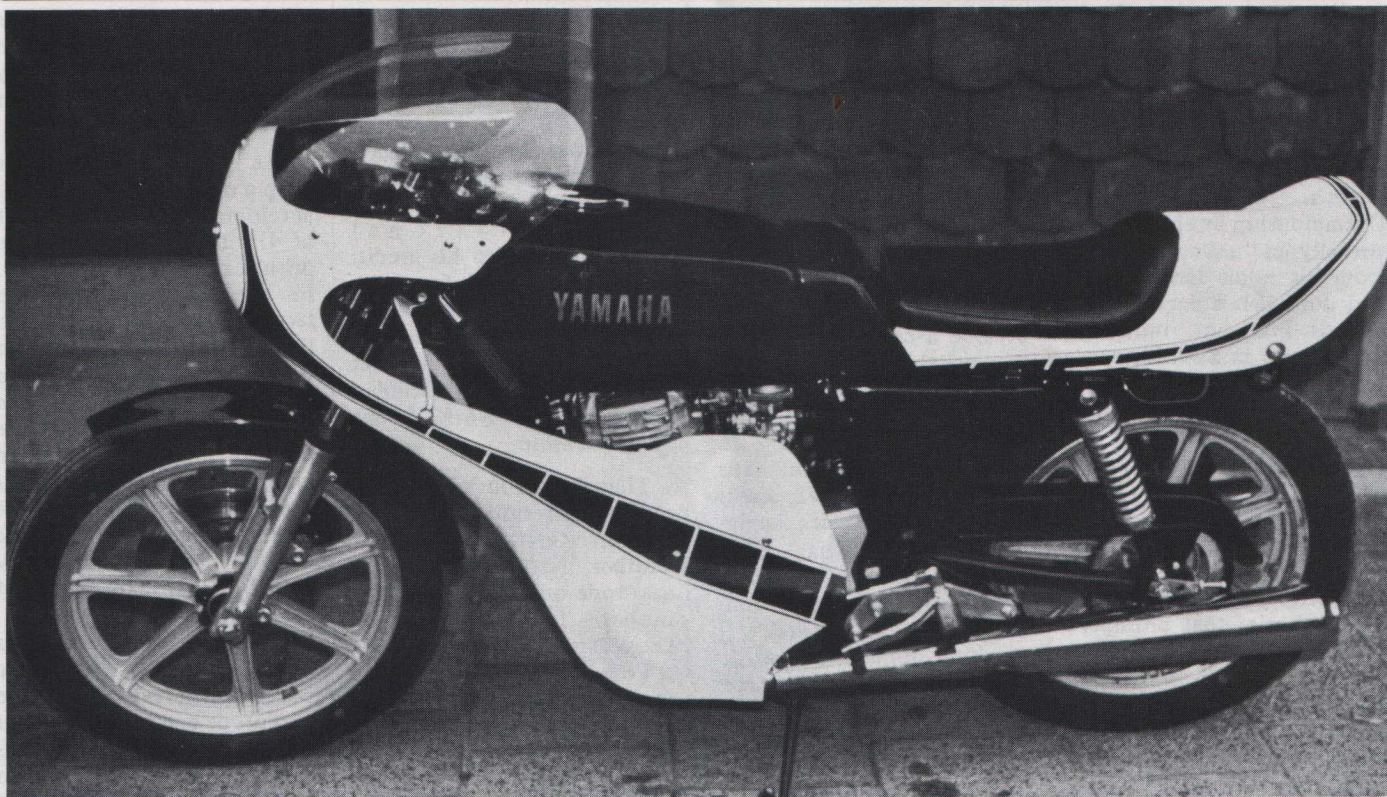
of spares to all dealers in Southern Germany.

Mitsui also have a giant warehouse in the port of Hamburg, from where complete machines are shipped direct to dealers all over Germany.

Mr Schmitz feels that this decentralization of activities is one of the reasons why Yamaha are recognised throughout Germany as being the best of the Japanese

manufacturers when it comes to the speedy and efficient supply of spare parts.

It is this sort of attitude to the customer, plus an innovative and forceful marketing program that has seen Mitsui take Yamaha from merely being one of the "also-rans" in Germany to that of a strong and competitive market leader in one of Germany's most important horsepower categories...and well on the way to that Number One position overall.



The XS400 Series closes on September 19th with the final event in the south of Germany organised by the Augsburg club.

Mitsui Maschinen GmbH, Yamaha importers for Germany, are presenting a handsome gold cup to the series winner as well as sponsoring the series in terms of prize money.

The XS400 Cup is restricted to young riders in the 19-24 years old age bracket and Mitsui prepared 50 identical racing versions of the XS400 which went to selected dealers all over Germany. First priority was given to exclusive Yamaha dealers, next to those stocking only Yamaha and non-Japanese brands, then to general dealers based on their geographic locality.

Dealers purchased the machines and could either sell them to prospective riders in the series or sponsor them for

publicity purposes. Riders interested in the series had to make the initial approach through their local Yamaha dealer, who would then select them on the basis of riding experience and skills.

Forty seven of the 50 XS400 racers came to the line for the first race at Kassel, where German Grand Prix driver, Jochen Mass dropped the starting flag (and later presented the trophies to the winner and other leading riders).

Jochen is a Yamaha enthusiast, riding an XS1100 in his leisure moments.

By the time of the first race, Yamaha's sponsorship had been boosted by support from the Valvoline Oil Company and Greyhound-FLM leathers. The series was already becoming established as one of the premier German events for novice riders.

Winner at Kassel was Hans-Georg Buhler, a 21 year

old student from Bad Homburg. He was followed by Wolfgang Mockel (20) of Erzhausen bei Darmstadt and 20 year old Franz Stampflmeier from Rosenheim.

During the course of the Kassel event, the 47 Yamaha XS400 twins covered a total

of 2,560 kilometres (1656 miles) around the track at racing speeds without any problems. For any young rider, a reliable racing machine is just as important as a fast one...and the new breed of Yamaha racer obviously has both of these attributes.

## Swiss Ski Team Train On Yamaha

As part of their summer training program, the Swiss National Ski team will be using Yamaha motocross machines! Prior to this five of the team had previously been using motorcycles as a way of keeping fit and of improving their balance and reactions during the off-season.

Yamaha's Swiss importer, Hostettler AG, provided five machines for the use of the team and these were received

recently by top Swiss mountaineer, Rolf Heft. The machines were introduced to ski team members by Swiss moto-cross champion, Fritz Graf and national trials champion, Gody Linder.

When the Swiss men's ski team have become familiar with the machines and integrated off-road motorcycling with their training program, then it is likely that the women's team will also take to two wheels!

# Gerard Rond - On His Way To A World Title?

It wasn't until mid-way through the 1977 season that Grand Prix moto-cross observers really started to take notice of Gerard Rond - the young Dutchman now in with a very solid chance of finally prising the World 125cc Championship title out of the clutches of Gaston Rahier.

At the beginning of that year, Gerard had just celebrated the winning of the Dutch National 250cc Championship but he was still virtually an "unknown" away from his home territory. He had done half a dozen 250cc Grands Prix but, until the final round in Sweden, never featured high in the results. Indeed, he had so much bad luck that season that he rarely even made the finishers list, let alone the leader board! Sweden, however, saw the young Dutchman take sixth place points and it was this effort, plus the 250cc National win, that prompted Yamaha to choose Rond to spearhead their renewed assault on the 125cc class. In America Yamaha had scored some startling, and at first unexpected successes, with young riders, relatively inexperienced in the "big-time". Riders like Bob Hannah and Broc Glover who have brought the American titles to Yamaha for the past two years.

Now, with Rond, they were to try the same tactic on the Grand Prix scene in Europe.

Suzuki's Gaston Rahier had dominated the 125cc class almost since its inception a few years ago and, as predicted by most fans, he

started the 1977 season off in his usual winning way.

Suddenly, at the fourth 125cc GP of the year, over a hard, fast course in Denmark, Gaston suffered his first defeat. And the victor was none other than newcomer, Gerard Rond!

Gaston did suffer some machine problems in Denmark so people waited until the next race in Poland before deciding whether or not Rond's win had been a fluke. The answer soon came. Rond once again defeated Rahier and all of a sudden the World 125cc Championship became a competition rather than a Rahier walk-over.

This year, Gerard is locked into a top-of-the-table battle with Rahier and his team-mate Akira Watanabe. He started the 1978 season with a second place behind Rahier in Austria, broke down in one moto to register a disappointing sixth in Italy but then exploded to absolute domination of the Belgian and Dutch Grands Prix...winning all four motos at the two Benelux races!

Even though he staved off Rond's challenge in 1977, Rahier must be more than a little worried about his chances in 1978!

Still only 21 years old, Rond began riding in 1972 on a 50cc machine built by his father. He graduated to a 125 the next year (like the 50, it was called a Rond-Sachs) and in his second season of racing took second place in the Dutch National 125cc class.

His third year saw him National Champion in both 125cc and 50cc categories and with that came a switch to Yamaha for the 1975 season. The switch brought with it his first National 250cc title but three mechanical breakdowns robbed him of a repeat win in the 125cc class by a handful of points.

1976 was the start of bigger things for the teenager from Bennekom, Holland. With three National Championships to his credit, he gained support from the Dutch Yamaha importer, I.M.N. This support, as well as being aimed at another National 250cc title, included racing in the World 250cc Championship.

Though bad luck kept him out of the results in most GP events, Gerard did take another National title and also rode on the Dutch squad in both Trophee and Moto Cross Des Nations.

For 1977 he aimed at another year of support from I.M.N. on production machines in the World 250cc Championships but at the beginning of the year, all that changed.

Yamaha decided to contest the World 125cc Championships with water-cooled machines that had already shown potential in the States and I.M.N. were asked to switch their young rider to the smaller category.

Only eight of the water-cooled racers had at that time been built but a season of serious testing in America had proved that they

were likely to be competitive. American rules allow any rider in a race to "claim" another machine and pay 2000 dollars to purchase it. The owner has no option but to turn the bike over to the purchaser...otherwise he falls foul of the American federation and is penalised by loss of his racing licence, or other drastic punishment!

The idea is that it keeps expensive factory development "specials" out of US racing and gives the private rider a better chance. In practice, most of the factory riders are better than their "private" rivals and can beat them even on regular production machinery but, in Yamaha's case, the AMA rule worked. No-one in Japan wanted to take the chance of being forced to sell one of the "water-pumpers" to some unknown rider who probably wouldn't be able to do it justice anyway.

Therefore, America's loss became Europe's gain. The water-cooled machines came to Europe and now the World 125cc Championship has taken on new dimensions. No longer is it a "one-factory" class. Though Rahier is still very much at the top of the tree, even he will admit that he wouldn't put more than an even-money bet on retaining his title in the face of Gerard Rond's 1978 onslaught!

And, just as a post-script to this.... Yamaha riders, Bob Hannah and Broc Glover are still dominating the American 125cc scene, even without the aid of a water-cooled engine!

COLOUR PHOTOGRAPH BY HARRY VAN HEMMEN.

## World Championship Update

(CONTINUED)

### ITALY, APRIL 16.

1, G. Rahier (Suzuki), 2, A. Watanabe (Suzuki), 3, C. Maddi (Beta).

4, M. Rinaldi (TGM), 5, I. Alborghetti (Aprilla), 6, G. Rond (Yamaha).

**First Moto Placings:** Rahier, Rond, Watanabe, Alborghetti, Maddi, S. Lerner (KTM).

**Second Moto Placings:** Watanabe, Rahier, Rinaldi, Maddi, A. Massant (Honda), Lerner.

### BELGIUM, APRIL 23:

1 G. Rond (Yamaha), 2, G. Rahier (Suzuki), 3 A. Watanabe (Suzuki), 4, A. Massant (Honda), 5, M. Auttuo (Suzuki), 6, G. Liljegren (KTM).

**First Moto Placings:** Rond, Rahier, Watanabe, Massant, Auttuo, Liljegren.

**Second Moto Placings:** Rond, Rahier, Watanabe, Auttuo, Massant, Liljegren.

### HOLLAND, APRIL 30.

1, Gerard Rond (Yamaha), 2, Akira Watanabe (Suzuki), 3, Gaston Rahier (Suzuki), 4, Gote Liljegren (KTM), 5, Peter Groeneveld (Suzuki), 6, Andre Massant (Honda).

**First Moto Placings:** 1, Rond, 2, Watanabe, 3, Rahier, 4, Massant, 5, Matti Autio (Suzuki), 6, Dinant Zijlstra (Kawasaki).

**Second Moto Placings:** 1, Rond, 2, Watanabe, 3, Liljegren, 4, Yuri Khudiakov (CZ), 5, Groeneveld, 6, Kenk van Mierlo (Kawasaki).

### FRANCE, MAY 7.

1 Gaston Rahier (Suzuki), 2, Akira Watanabe (Suzuki), 3, Siegfried Lerner (KTM), 4, Corrado Maddi (Beta), 5, Ivan Alborghetti (Aprilla), 6, Gerard Rond (Yamaha).

**First Moto Placings:** 1 Rahier, 2 Watanabe, 3 Lerner, 4 Maddi, 5 Alborghetti, 6 Pauli Pippola (Husqvarna).

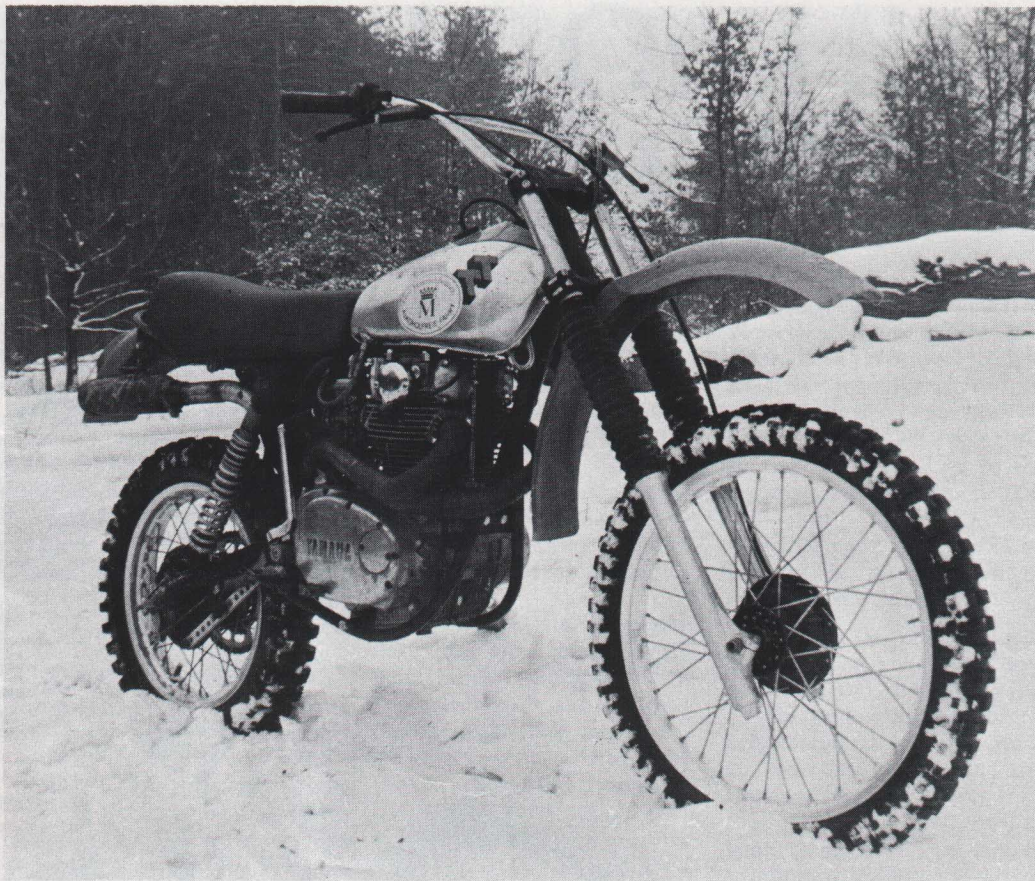
**Second Moto Placings:** 1 Rahier, 2 Watanabe, 3 Rond, 4 Lerner, 5 Alborghetti, 6 Maddi.

**WORLD CHAMPIONSHIP POINTS (to MAY 20).** 1 Gaston Rahier (Suzuki), 121pts, 2, Akira Watanabe (Suzuki), 113, 3, Gerard Rond (Yamaha), 106, 4, Siegfried Lerner (KTM), 48, 5, Andre Massant, and Corrado Maddi, 37.



The International Six Days Trial has been termed "The Olympics of Motorcycling" and it is a well-earned comparison. Individual contestants' efforts are overshadowed by team results and, while it is a great honour indeed for a rider to earn a Gold Medal for an unpenalised performance, it is a greater honour yet for that rider to have assisted his national team to win the coveted ISDT Trophy.

Very few of the hundreds of riders in any ISDT are actually competing as individuals. They ride either on a six-man National squad in the prestigious ISDT Trophy category, on a four-man National team in the slightly less-important ISDT Vase competition or for various Club or Manufacturer's teams. Despite this, most of the riders in the contest are amateurs rather than factory-sponsored professionals. They may get support from certain manufacturers but none are on the lucrative contracts common in other branches of



Yamaha 760cc Enduro twin!

Photographs by Robert Poensgen.

# Enduros - German Style

our sport. They are riders who compete throughout the season, all over Europe, in Enduros (an American term now becoming popular in Europe) or, as the FIM term the sport, Off-Road Reliability Trials.

These trials cram up to 200 miles in a single day's off-road riding and sometimes cover an entire weekend. There is, in fact, a European Two Day Trials Championship covering seven countries - Czechoslovakia, France, Spain, Italy, Poland, Germany and Austria.

Not every enduro rider ever aspires to a ride in the European Championships or the ISDT but the sport gives pleasure to literally thousands of skilled, not-so-skilled and merely enthusiastic riders all over the world. It combines the techniques of trials, moto-cross and even fast road riding, with marks being lost for being late at certain control points along the route. Many enduros (though the ISDT is not one of them) also penalise riders who arrive too early at the controls. This places a great emphasis on timekeeping and sensible riding and has the effect of stopping the event merely

being a day-long race and a survival of the fittest - or craziest!

Enduros are really popular in Germany, and the German competition rules are fairly typical of the sport in Europe. Usually there is a single lap of about 75 kms, which riders cover three times. On each lap there are three or four time checks and an average speed set for these stages. Usual average is in the region of 40 km/h in normal weather conditions. Each minute early at a control means 60 marks lost.

The rider can be up to two minutes late without penalty but then every minute late

after that means another 60 marks lost.

Included with this reliability competition are two cross-country "special tests" where the essence is on flat-out riding. This gives the speed merchants a chance to make up anything they might have lost by not paying too much attention to timekeeping. Usually these tests are along a dirt road or across open country for up to 4 kms. Each 1/10th of a second of elapsed time taken by the rider means 1/10th of a mark lost. Thus the fastest rider loses the least marks.

Finally, machine preparation is taken into

account by the starting test. The machines have been impounded overnight in the open air in a special sealed area. When he is given his signal to start, a rider then has 60 seconds to kick his machine into life and ride across a line 20 metres away. Otherwise, that's another 50 marks gone!

With more and more off-road machines on the market, this branch of the sport is growing rapidly all over Europe. Take the German statistics, for example. In 1970 each event averaged about 150 starters. Last year that figure was more than doubled and in the opening events of 1978, many organisers have had to turn down entries as they cannot handle the great numbers of riders wishing to take part. For instance, the first German event of 1978 had 500 entries...with 144 of them having to be turned down by the organisers.

As far as spectators go, it is impossible to judge how many people watch the riders as they cover the 75 km lap, often passing through villages and farms. An indication, however, of the general interest is that German events average between 5000 and



Special XT500 Enduro



10,000 spectators at the special cross-country speed tests alone!

In Germany, as in most other countries, Yamaha machines are popular with the riders. The DT Enduro range gives riders a chance to compete in classes from 100 to 500cc while for the more serious competitors, the YZ motocross racers can be modified to ISDT-style specification by the adding of certain components.

The XT500 is another popular Enduro machine, although in Germany it is handicapped by being sold with a 27bhp engine (for favourable insurance rates). Additionally, its extra weight puts it at even more of a disadvantage against the lighter, more powerful two-strokes like Yamaha's DT and YZ400 models.

German four-stroke fans have evolved a novel way of making the XT500 a winner in enduros....which is to bore it out to over 502cc and thus put it into the 501-750cc class!

Yamaha dealer, Kurt Tweesman, has built a 502cc version with 11:1 piston and a racing camshaft. It puts out 40hp and, in the hands of Tweesman's chief mechanic, Herbert Forester, it has won the Championship for German B-class riders (those who don't hold International competition licences) both in 1976 and 1977.

Tweesman also modifies the chassis, using Marzocchi front forks with 240mm of travel and Bilstein rear shocks giving 180mm of rear wheel

movement. Obviously the machine is now perfectly-suited to off-road competition.

Forester's success with the big-bore XT500 in 1976 brought several more of the Yamaha "thumpers" into competition for 1977 and many riders remained in the 500cc class despite the advantages of the two-strokes. One of these riders, Reinhold Behringer, took seventh place in the B-rider National 500cc Championship.

For 1978, the German Federation (OMK) have included another capacity class...for bikes over 750cc! Yamaha enthusiast, Kurt Tweesman, was quick to build machines for this category....very novel machines indeed. Tweesman took the XS650 Yamaha power unit, bored it to 760cc and fitted it into the modified XT500 frame that Forester used in 1977.

Three of these beasts were built and ridden in the opening German event of the year, at Eschwege, by Forester, Behringer and Kurt Distler. At the end of the first cross-country test the team held 2nd 3rd and 4th places in the class but all three crashed while forcing on for the lead. Distler finally placed fourth, Foerster fifth and Behringer eighth.

Their performance, however, was enough to show enduro fans that Yamaha have yet another string to their off-road bow. And this one has two cylinders and 760cc!



## TWO WAYS ACROSS AMERICA

(CONTINUED).

Twin towers of the World Trade Centre in New York.....tallest buildings in the known world!

around 11.4 seconds...a truly incredible time for a motorcycle weighing in excess of 600lbs (1320kgs)!

But there was no time for more than half a dozen runs. The bike was taken back to the Yamaha workshop and a new clutch installed (drag racing does tend to abuse the transmission!) and within a few hours the XS1100 was pointed East on the first stage of its trip to New York.

In the saddle was Rich Cox, whose stint was to take him 811 miles (1297kms) from Los Angeles to Grand Junction, Colorado...at the foot of the Rocky Mountains. Most of Rich's ride was across the vast Western Desert...interminable views of sand and sagebrush which, in Cox's case, were eerily lit by the moon for the most part. Starting at 11pm, he rode through the night before handing over to Feature Editor, Brad Zimmerman at 2.30pm the next day.

"Three hours into the ride, with Las Vegas ahead and the stars twinkling above me, my mind started settling down to the realisation of what this

superb machine is all about" wrote Cox. "It's a dream-mobile on two wheels. With ear-plugs installed to cut down wind-noise through my Bell helmet, the ride was incredibly quiet...to the point where it got a little spooky. The speedo showed 70mph and yet the bike feels like it's floating along six inches above the ground. There's no vibration, no rattles, no engine noise, no sense of time - it just eats up the road effortlessly".

From Grand Junction, Brad Zimmerman was to take the big four-cylinder up over the 10,000 ft mountain passes of the Rockies and out across the plains to Kansas City.

"The XS1100 was equally at home on twisting mountain roads as out on the wide, straight Interstate highways" says Brad. "It handled well at all speeds and only wobbled when there was a sudden change in the road surface. Otherwise it was rock-steady and pulled through corners nicely enough to deserve an occasional pat on the gas tank for a job well done".

CONTINUED ON PAGE 35.

## Enduro Across France

Yamaha's French distributor, Sonauto, are one of the main forces behind a unique new off-road event in France. Sonauto have collaborated with BP petrol and the Moto Club des Sables to introduce "La Croisiere Verte"....or the "green crossing". As its name implies, the event is an off-road rally that completely traverses France...from Le Touquet to Nice!

The rally route will take competitors from Le Touquet on the north coast of France, through the champagne country to Reims, then down through the mountains to Dijon, Bourg en Bresse, Clermont-Ferrand, Aubenas-Vals les Bains, Manosque and into Nice on the Riviera.

The event (from May 27 to June 3rd) will incorporate some roads in its route but will mainly be through forest and mountain terrain.

A report on the event will appear in the autumn issue of Yamaha Circuit.

## NVT - Yamaha Police Bike Sales In Middle East

The NVT-Yamaha police bike that we featured in the last issue of Circuit is already selling well in various parts of the world. Latest order was for 24 machines for one of the Middle Eastern states while other orders have stemmed from Holland and Belgium.

# Trail Riding Without Tears- Preparation Is The Key

Despite the misgivings of many average riders, off-road motorcycling isn't just the province of the moto-cross heroes, enduro tough-guys or trials balance-artists. In fact, trail riding is one of the most enjoyable forms of motorcycling whether the rider is experienced in the rough stuff or even a comparative novice. Simply getting on your motorcycle and taking off on a trail into the country is the true getaway experience and need have no fears for any reasonably capable rider.

Like any form of sport, however, there are a few ground rules that you should follow...a few lessons that you should make sure to learn before taking to the trails.

The first, and most important of all, is to never go

off trail riding alone. It would be quite simple to crash and injure yourself and then lay there for hours before some other outdoor enthusiast happened to pass by. Always ride with a companion, then if one rider gets hurt the other can make sure that he is comfortable before setting off to find help. If you ride carefully it is unlikely that you will have a heavy crash ...but accidents can happen.

So...before you and your friends plan your trail ride there are certain other things that you should have done. For one thing, you should have familiarised yourself with the mechanical servicing of your machine so that, if you break down in some lonely spot, you can get the machine going again.

Obviously you don't need to be able to perform a

complete overhaul out in the open but you should certainly know how to replace ignition parts, clean points and plus, dismantle and clean carburettor jets and air filters, mend your drive chain, replace cables, repair punctures and so on. A few evenings practising these "running repairs" might save you a long walk back to civilisation.

As we said previously, accidents can happen, so some knowledge of first aid is always a reassuring thing to have at the back of your mind. This is the second time that we have stressed the possibility of personal accident but this isn't because trail riding is a hazardous pastime. Far from it. Usually it is one of the most casual and relaxing forms of motorcycling. However, if "that accident" does happen it might take place miles out in the country, far from any medical facilities. So be prepared by brushing up your knowledge of first aid and also by taking with you an elementary first aid kit... bandages, plasters, a small bottle of surgical spirit and some antiseptic ointment. These can be packed in a small flat tin and slipped into

the pocket of your riding jacket.

Most experienced riders prepare their equipment at the start of the trail riding season and periodically check it and replace what is needed. A small first aid kit is a "must".

Other equipment you should carry either on your bike or your person is a set of tools that will fit any nut or bolt on your machine (including spanners big enough to remove the wheels plus a set of small tire levers), a compass (previously checked for its accuracy) and a map of the region in which you are riding. A pencil and paper is worth carrying, so that you can leave notes for anyone if you have to abandon your machine and start walking, and a couple of boxes of matches, wrapped in waterproof covering are essential. Another good idea is one of the "security blankets" popular with hikers and climbers. These are actually just large sheets of tough tin foil that fold down to a pocket-size package. But if you are caught in the outdoors overnight, you simply open them out and wrap yourself up. Body heat will be retained and keep you warm.



In fact, when you are out trail riding you will be getting into similar inaccessible areas to walkers and climbers so a visit to your local sports shop will show you some of the survival gear that is available. In addition to the blanket, some of the dehydrated foods and so on are well worth stuffing in your pockets. If you can't get this kind of thing, then some boxes of raisins, chocolate, dried meats and nuts are easy to carry and will fend off hunger should you breakdown and either have to trek back in from the wide open spaces or wait it out until help arrives.

There will initially be a temptation to try and carry too much with you, but a bit of thought will soon leave just the essentials and you will be surprised just how much can be carried in the pockets of your riding jacket or in a tank-top bag. One point on carrying things like tools in your riding jacket.... make sure that they are well-wrapped in a piece of rag for padding.

You'd be surprised how much it can hurt (and how seriously you can be injured) by falling heavily with some sharp object in your pockets.

It is best to ride with tools and similar things in a bag fastened securely to the top of the gas tank and then slip the softer items in your jacket pockets. One other essential is a long tow-rope so that if one rider breaks down, then the other can tow him in. If you don't have anywhere else to carry the rope (such as wound around the handlebar brace that many enduro machines feature) then simply wind it loosely around your body beneath your riding jacket.

As far as riding gear is concerned, make sure you have good, strong, knee-length boots...preferably the type worn by the moto-cross racers, waterproof jacket and trousers made of some tough material that will not get torn as you flick by bushes, branches and so on, moto-cross gloves (which have rubber strips on the knuckles to save you getting a painful rap from those same branches or flying stones) and a good quality crash helmet and goggles. If you have room to carry a spare pair of goggles, that's a good idea.

Finally, a "kidney belt". this is a wide elasticised belt that stops you shaking up your insides on a long ride. It

makes for more comfortable riding and alleviates a lot of backaches afterwards.

When choosing a helmet, it is best to ignore the full-face road racing type in favor of the open face variety. Full face helmets mist up in wet weather and are uncomfortable hot in warm conditions. With the open face helmet, wear one of the mouth guards that are popular with moto-cross racers. One smack in the mouth from a stone thrown up by the rear while of the bike in front will convince you that this is a worthwhile item!

Actually, Bell Helmets do make their "Moto Star" full coverage helmet which has a much larger opening than the regular full-face models so that goggles can be worn instead of the flip-up screen. This gives superb facial protection and has most of the ventilation advantages of the regular open-face headgear.

All of this might seem like a lot of preparation but trail riding is like any other sport. The better equipment you can get and the better prepared you are, then the more you will enjoy it.

If you are a novice at the trail riding game, begin your riding by sticking to very localised spots...even to a single field or riding area until you are confident enough to branch out. Then gradually make longer trips until your body is attuned to long periods in the saddle. A 100 miles of trail riding is a vastly different prospect from a hundred miles on the road... and your body will tell you so in no uncertain fashion at the conclusion of such a trip!

When you have got the necessary confidence in your abilities to take a long trip, then there is very little as stimulating as packing some gear on to your trail bike and taking off for a weekend's camping in some place that the four-wheeled "camping" fraternity just can't possibly reach.

Travel light, try to mount as much of your gear "between the wheels" as possible and pack soft items such as extra clothing in a small pack on your back.

Mount the pack so that it fits into the small of your back rather than high up on your shoulders. Then it won't affect your sense of balance as you stand on the footrests over rough terrain.

A lightweight sleeping bag can be lashed across the

## TWO WAYS ACROSS AMERICA

(CONTINUED).

Brad's ride was a rugged 889 miles (1422 kms) before handing over to Jody Nicholas in Kansas City, centre of the Great Plains, America's agricultural heartland.

Jody, who is Technical Editor of the magazine, took an uneventful 657 mile (1051kms) before handing over to Dale Boller, the "Motorcyclist" Editor, who was to take the XS1100 the final 560 miles (896kms) right into the centre of New York City.

Dale prefers off-road riding to the hard stuff - apart from some short, fast street rides on the mountain roads in California.

"I have a bottom that is incompatible with most motorcycle seats after a few hours" he says!



Brad Zimmerman (left) and Jody Nicholas swap over the riding chores.

handlebars (taking care that it does not interfere with the smooth operation of control levers) but avoid mounting anything heavy over the front end. This will cause the front wheel to "dig in" while cornering. Conversely, mounting too much weight over the rear wheels will make the front end "light"....and cause just as many handling problems.

As we said, try to mount as much of your load as possible "between the wheels". Typical ideally-balanced set-up would be lightweight sleeping bag lashed to the handlebars, tools, first-aid kit and other gear in a tank-top bag, soft items such as clothing, etc. in

But in the first 128 miles of his ride on the XS1100, Dale experienced a revelation.... "I suddenly realized that the XS1100 seat wasn't causing me any discomfort" he remembers. "and throughout the 560 miles, it never would. For a bike that east up the miles as easily as the XS1100, a comfortable seat is a necessity and the Yamaha's is the best I've ever experienced."

Talking of his overall impressions of the flagship of the Yamaha armada, Boller says "I could rattle off superlatives like a machine gun: acute speed, solid handling, Goliath brakes, armchair comfort, talcum smoothness, hushed exhaust, gorgeous instruments and absolutely violent power."

All of these attributes combined to make the 2963 mile (4740kms) crossing of the USA a completely uneventful trip, free of any dramas, discomforts or mechanical troubles. Two and a half days of virtually non-stop riding and not a blemish on the character of Yamaha's new street machine!

a back-pack and more stuff in a pack lashed to a small rear carrier mounted behind the seat and as close to a position over the rear wheel axle as possible. Add to that the capacity of the pockets of your riding suit and you can carry enough stuff for a camping weekend without making riding so difficult as to be miserable.

But whether a camping weekend or simply a local trail ride, good preparation can make all the difference between your expedition being one of the most enjoyable experiences imaginable, or a miserable struggle with the terrain and the elements.

