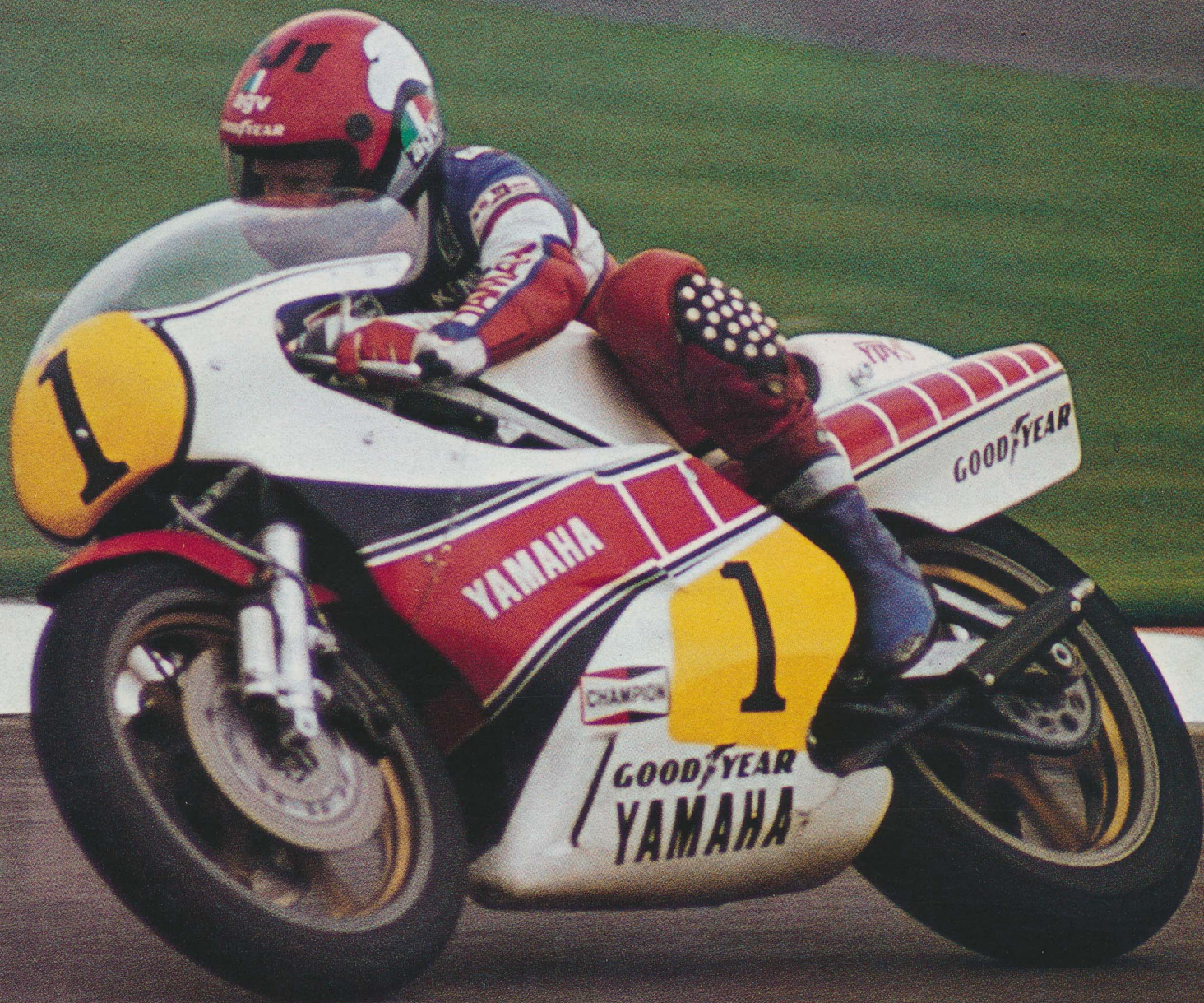


CIRCUIT



JUNE/JULY 1981 50p



SQUARE FOUR SENSATION! Yamaha GP winner colour close-up
DOUBLE TEST SPECIAL! The XV750 in Europe and America
VEE-TWIN DEVELOPMENT AND IN-DEPTH TECHNICAL FEATURE

SQUARE FOUR SENSATION

It has always been acknowledged that the precisely-controlled induction timing allowed by a rotary valve geared to the engine crankshaft gives more horsepower than the more conventional piston-controlled method.

Indeed, back in the nineteen-sixties Yamaha won five World Championships in 125 and 250cc road racing classes with rotary valve twin cylinder and vee-four machines. That was in the days when the rival Suzuki 250cc square four was nicknamed "Whispering Death" by its rider Jack Ahearn because of its quiet engine coupled with a notorious proclivity for engine seizures!



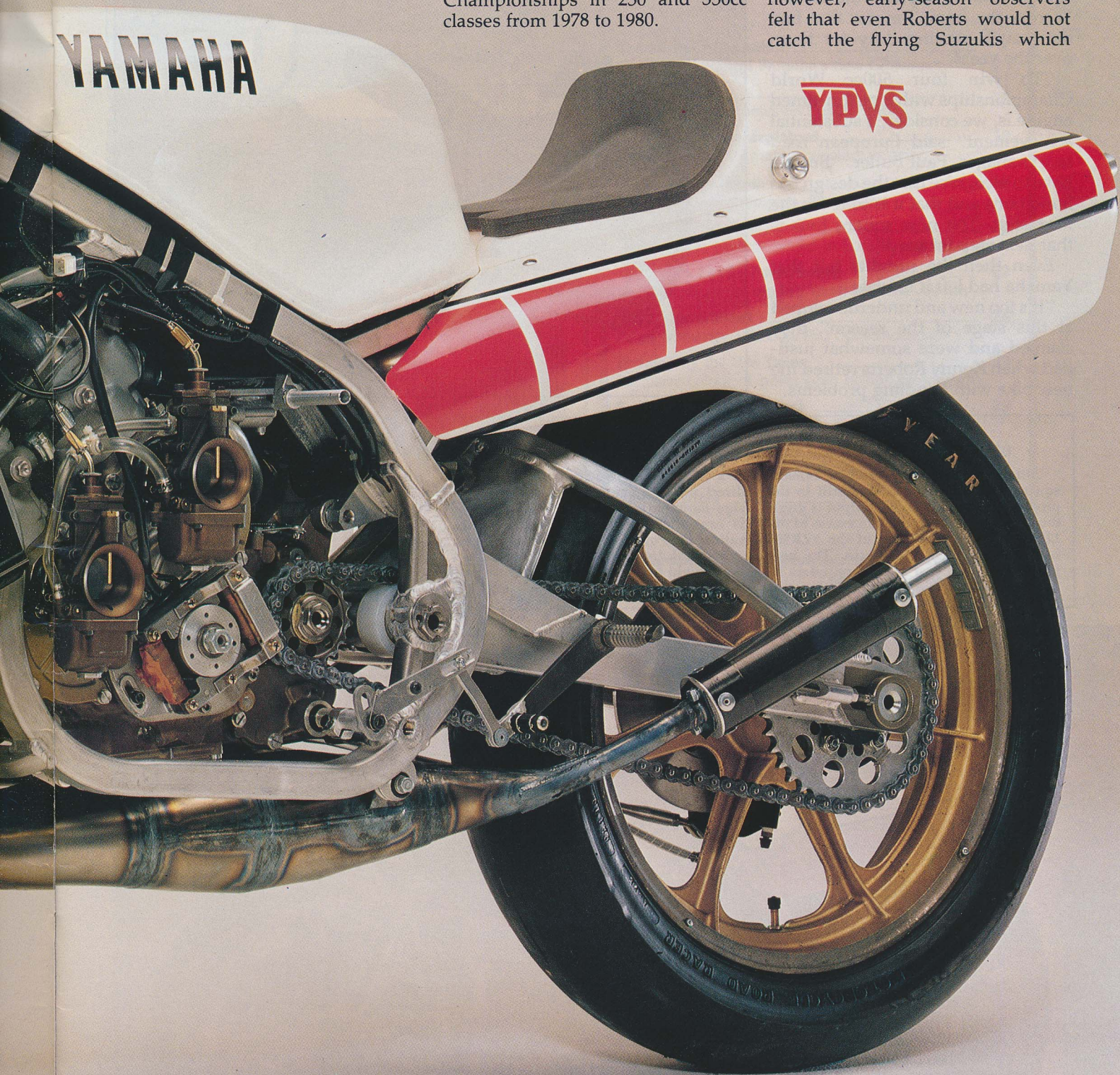
The fact that Yamaha had the rotary valve technology on tap – and that it is an admittedly superior induction method in sheer horsepower terms – makes the company's achievements in the nineteen-seventies and eighties even more amazing. While both Suzuki and Kawasaki went direct to rotary valves for their factory road racers, Yamaha remained faithful to the same piston and reed-valve controlled induction that is featured on

their street machines. They felt that to be winning races with the identical system to their production bikes was a far more significant achievement.

But Yamaha did more than just win races . . . as the title tally throughout the past decade shows. The complex rotary valve Suzuki fours won two World Championships – in 1976 and 1977. The "factory rider only" Kawasaki rotary valve twins won five World Championships in 250 and 350cc classes from 1978 to 1980.

With relatively-simple, piston-timed engines, Yamaha won an amazing 25 titles from 1970 through 1980! These came in 125cc, 250cc, 350cc, 500cc, 750cc and Sidecar classes and the largest percentage of them were won by "privateer" riders on production racing machines.

In the 500cc "glamour" class, Yamaha were aided by the riding brilliance of first Giacomo Agostini and then Kenny Roberts. This year, however, early-season observers felt that even Roberts would not catch the flying Suzukis which



proved obviously faster than the Yamahas in pre-GP competition.

They reckoned without two things. They failed to realise that Yamaha had seen the writing on the wall and that the company had all of the technology available to build a rotary valve winner . . . a fact which had been amply proved almost 20 years ago!

At the opening Grand Prix in Austria there was sensation when Yamaha wheeled out a rotary valve square four to replace the in-line "across the frame" motor that had done such sterling duty for them over the years.

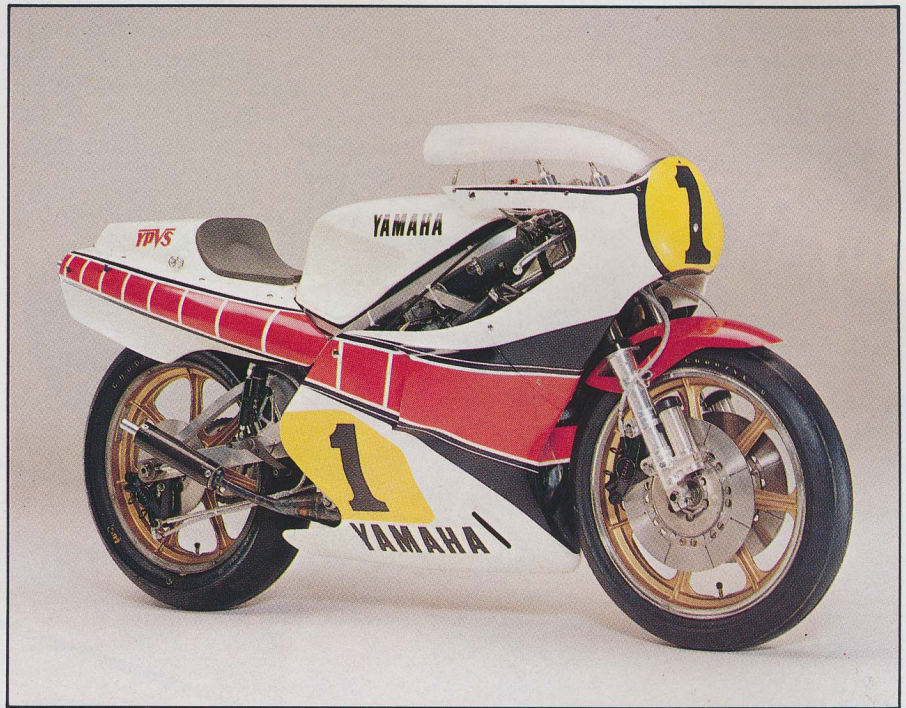
"To win four 500cc World Championships with a piston-timed engine is, we consider, a substantial achievement" said European road race manager, Paul Butler. "But we have to recognise that the design has limitations and that it is time for the next step. The new square four is that next step forward".

Even then the pundits felt that Yamaha had left it too late.

"It's too new and underdeveloped at this stage of the season" they claimed and were somewhat justified when Kenny Roberts retired the new bike with handling problems.

A week later, however, on the ultra-fast Hockenheim track, Roberts proved able to match the Suzukis pace for pace and sensationally won the German Grand Prix . . . on just the second outing of the new Yamaha square four!

In the recent history of motorcycle World Championship road racing, no new design has proved itself a winner in such a short space of time. More evidence of Yamaha's unsurpassable capabilities in the world of two-stroke engineering.



TECHNICAL BRIEF - THE YAMAHA SQUARE FOUR PROTOTYPE

Little is being revealed about the Yamaha square four sensation as it is still in the prototype stage. No power output is given though it is obviously well in excess of the 120bhp-plus at 10,500rpm of the YZR500 in-line four which it replaces. The new power pack has two sets of cylinders in "square four" formation, inclined forward

at a slight angle. Rotary valve induction direct into the crankcase is utilised with side-mounted carburetors. Exhaust timing is controlled by another Yamaha innovation, the Power Valve System in which a cylindrical drum in the exhaust port links port height to throttle opening. This combination of precisely-timed inlet and

exhaust porting is unique to Yamaha.

Transmission on the new unit is basically similar to the previous engine and it is mounted in the same square-tube chassis which now has a combination of mono-shock and rocker arm to give the Yamaha a rising rate suspension.

