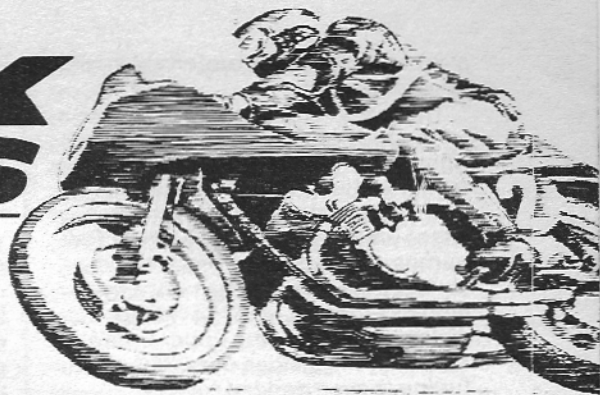


TRACK ANALYSIS

by Alan Cathcart



The sound of the sixties

GIVEN a choice between stepping into a snake pit and riding a priceless Latin classic in front of a crowd of fervent, envious Italian fans, I would normally decide that I had a burning interest in reptiles. However, when the chance came to sample one of the rarest of all works machines at the Misano Historic GP earlier this year, I couldn't refuse. Former rider Tarquinio Provini and his faithful mechanic Sergio Censi, who followed 'Old Elbows' from Mondial to MV, Morini and Benelli, were eager for me to try the 250cc Benelli four, and the organising Club Il Velocifero and its race director Sig Rubini kindly laid on a practice session after the last race of the day.

After a certain amount of discussion as to whether the test machine was the three-valve interim model or the four-valve prototype, Provini and Censi settled on the latter. The bike dates from 1966, and like all the small Benelli fours has the crankcase and gearbox casing cast in one large but very light piece of electron magnesium, with holes on either side through which the engine internals are slotted. This naturally results in a very strong bottom end that was also notably free from oil leaks, though the external oil lines were prone to coming adrift or splitting. A large rectangular front crankcase cover, coupled with four round side covers, two of which locate the ends of the six-bearing crankshaft in large ball bearings, enables the engine to be quickly rebuilt with the minimum of inconvenience.

Drive to the double overhead camshafts is by a train of three gears up the centre of the engine, and the cylinder head is split in two parts, divided at this point. The heads and the four separate finned barrels, the latter with austenitic liners, are made in light alloy, as is the long rectangular oil sump which holds only two litres of

Castrol R and is bolted to the underside of the engine. As with all Benelli fours, the primary drive is taken off a large pinion between the first and second crankshaft journals on the left. The forged conrods run in caged-roller bearings, with plain-bearing little-ends in spite of the high revs, and full-circle flywheels are pressed onto the built-up crank. A seven-speed gearbox is fitted to this particular bike, with a multi-plate air-cooled dry clutch on the left, similar to Honda units. Gearbox tooth contour and width were modified for the 1965 season to reduce friction.

The bike which appeared at Misano is fitted with a Mercury outboard magneto, bevel-driven off the central camshaft drive via a spur gear. Four rubber-mounted 24mm Dell 'Orto carburetors are used, with rod linkage and each pair sharing a single flat-sided float chamber. Compression ratio is between 10.5:1 and 11:1 — 'Feels like the lower end of the scale,' Censi joked as he turned the back wheel over with the bike in gear.

The chassis is the one which Provini himself had a hand in developing, and he pointed out to me the various bracing struts around the steering head which he had added in the course of sorting out the handling. It's a full-cradle duplex tubular frame with a long, slim, light-alloy fuel tank carrying 4.8 gallons (22 litres) of petrol and shaped in such a way as to allow the rider to get right under the screen. After the unsuccessful disc brake experiment, this bike has a four-leading-shoe Ceriani drum brake at the front, mounted on 35mm forks from the same manufacturer. An alloy splash guard underneath the headstock also serves to duct cool air to the cylinder heads. Despite the upright cylinder configuration, in marked contrast to the Hondas' forward inclination, even cooling of the heads was apparently never a

problem, even with the four-valves-per-cylinder layout.

As the last Manx Norton thumped its way off the track, Censi pushed me off on the Benelli for 20 minutes of rapturous delight. Having notched first gear — one up on the seven-speed box — I dropped the clutch after a couple of steps and as the engine fired instantly I clutched it again while the revs picked up. Blipping the throttle at around 5,000rpm, I cautiously moved out on to the circuit, focus of a thousand jealous pairs of eyes whose owners doubtless wanted to know why this foreigner was being allowed to ride their country's pride and joy, rather than them!

Feeding the clutch out gently so as not to stall, I noticed that despite the small-diameter flywheels the engine picked up cleanly from around 4,000rpm, up to my Censi-appointed limit of 13,000. Provini had told me beforehand that he regularly used to take the engine to 16,000 in top (while using 14,000-15,000 in the gears), and on occasion had even gone to 18,000 on the last lap without mishap. But he had been using a 14,000rpm ceiling earlier that day in his race, in deference to the bike's age, though it was evident from the superb response of the controls and the perfect engine note that it had been very well prepared in the Pesaro factory.

Sitting on the bike was surprisingly easy despite my long legs, though I had trouble with my right foot as the rests are mounted just above the gracefully upswept exhausts, resulting in my heel sitting on top of the pipe and slipping off it when I changed gear. It is indeed a small machine, with a 50.5in wheelbase rendered possible by the upright cylinders. But the very narrow clip-ons, which practically meet each other round the front of the steering head, are mounted so far forward that

a stretched-out but comfortable riding position results.

The fuel tank sat snugly into my lower body and allowed me to get right down under the screen on the straights, but its shape meant that it was impossible to grip it with my knees when I hit one of Misano's few bumps. Instead I was forced to squeeze the sides of the tank with my elbows — is that how Provini got his nickname? — and the upper frame rails with the insides of my knees: the tubing is even padded for this purpose. It's a bike built for getting down to it: Provini's style was always to ride with his head tucked behind the screen, even round relatively slow corners.

The controls are incredibly light, especially the clutch which you can work with a single finger. The bars are bound with red bandage rather than more conventional rubbers, but the complete lack of vibration from the beautifully-balanced engine makes any kind of cushioning for the hands unnecessary. The front brake lever needs only a light pull, but the brake takes a bit of getting used to if only because it's perfectly set up. It works only partially for the first half of its travel, then very strongly and suddenly, giving the rider the option of a delicate touch on the stoppers if he overcooks a corner slightly, as I did once going into the fast sweeper leading away from the pits, or strong, safe braking at the end of a straight.

Using only 13,000 revs — OK, maybe a bit more on a couple of laps! — on Misano gearing meant that I was probably doing 120-125mph at the end of the long straight. Yet once I got to feel at home on the bike I could regularly brake well within the 200-metre board, and that's without any real engine braking effect, thanks to the small flywheels.

But whatever the Benelli's flywheel diameter is, it must be greater than on the 250cc Honda six I rode last year in Canada, for the Italian bike had none of the Japanese machine's propensity to kill the engine stone dead below about 9,000rpm. Changing gear is easy, thanks to the short and precise lever action, and though I began by using the clutch in both directions I was soon making clutchless upward changes except at one place — in front of the pits, where the assembled gallery were doubtless hoping fervently I'd miss at least one cog so they could turn to their neighbours with a knowing look!

But the Benelli didn't let me down, though I was interested to note the choice of ratios. Bottom is very low, for ease of starting and getting round tight hairpins, but the next four gears are very close together before there is a noticeable gap between fifth and sixth, which has seventh gear very close to it.

When I mentioned this afterwards, Provini nodded: 'Sometimes on fast circuits we used to run with very tall gearing — like at Monza for instance. Having the top two gears close together was like having a kind of overdrive which could be invaluable if you came upon a slower rider in a fast corner, for example. Then the four middle gears are close together to keep the engine on the boil at tight circuits like Montjuich. I would only get top gear there once a lap, but the way the internal ratios were usually arranged I would have a gear for every corner.'

Provini told me that the Benelli had little torque but, determined to discover just how little, I got a pleasant surprise. Coming onto the main straight on one lap about three gears too high, I cracked the throttle

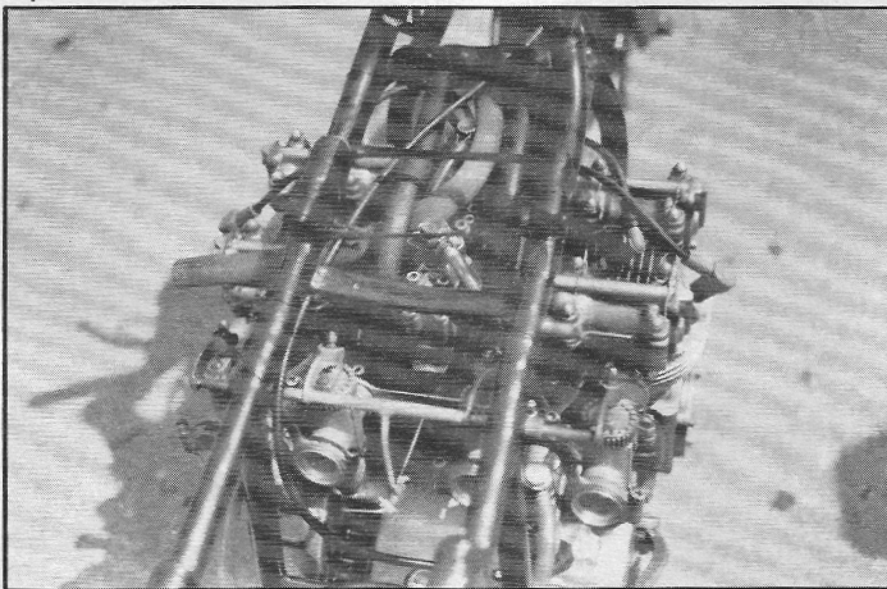
open wide at around 5,000rpm and was astonished when the machine pulled effortlessly through the rev range. Noticeable urge is apparent at around 7,000rpm, and at 8,500 the power comes in very strongly.

Nevertheless, for a four-cylinder racing machine of the classic era this was an impressive display of flexibility, which must have made the Benelli much easier to ride round a circuit like Montjuich than the Honda four-strokes and the Yamaha and MZ two-strokes with their razor-thin power bands. If it hadn't been for the restriction on the number of cylinders, the Benelli could certainly have lived with the FIM's short-sighted limit on the number of gears, the more so since the bike I was riding was the supposedly less flexible 16-valve unit.

Provini had obviously done his



The machine's compact dimensions, based on a 50.5in wheelbase, are apparent in profile.



Each pair of 24mm Dell'Orto carburetors shares a single flat-sided float chamber.

homework in the chassis department too, for the bike proved to be a fabulous steerer despite the weight and bulk of the engine sitting relatively high in the frame. Misano has several long, sweeping corners where a machine that isn't properly set up will understeer outwards or fall into the bend in a way that makes you reluctant to commit yourself to a fast line. The Benelli had perfectly neutral handling characteristics, almost finding its own way round the turns, although I didn't explore its cornering power at true racing speeds. Fifteen-year-old T-compound triangular tyres fitted to an Italian historical heirloom don't inspire confidence, and after the back end stepped out twice on one of the long left-handers I cooled my impetuosity: I decided I didn't want to live on a diet of pasta and water in a Latin lock-up

for the rest of my days.

Instead I concentrated on playing beautiful music on the four-cylinder organ. Each lap as I passed the pits I'd see out of the corner of my eye the crowded grandstands filled with people turning to each other, wreathed in smiles and shaking their hands in that peculiarly Italian gesture of appreciation: 'Che bella macchina, che bello rumor!' Indeed it is a lovely bike, and although by the time Censi waved me in I was beginning to wish I'd worn earplugs. I have to say that the Benelli's engine must be one of the sweetest-sounding four-cylinder trademarks ever heard.

'You sounded as if you had it running well,' said Provini as I lifted myself off the seat while Censi took the bike. 'What did you think of it?'

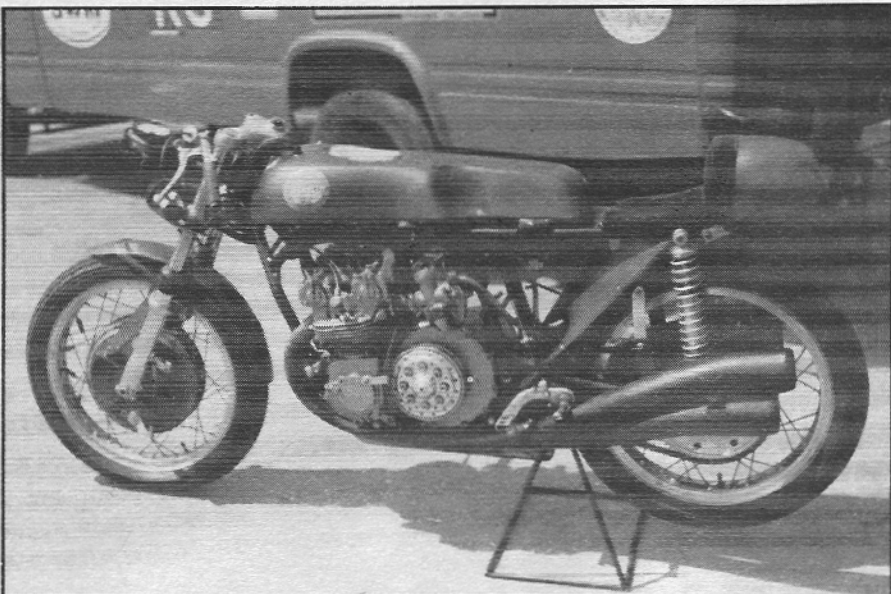
Well, firstly the bike is in really excellent condition, and a lesson to

other Italian manufacturers that there's no excuse for not preparing their similarly exotic machines for such outings. Full marks to Benelli, and here's hoping the bike will reappear to remind enthusiasts who were not at Misano of this factory's great racing history, which ultimately resulted in the 750 and 900cc six-cylinder road bikes and the oddly-styled but beautifully engineered four-cylinder 250cc roadster. Why Benelli haven't tried to identify that latter machine more closely with the racer is a mystery.

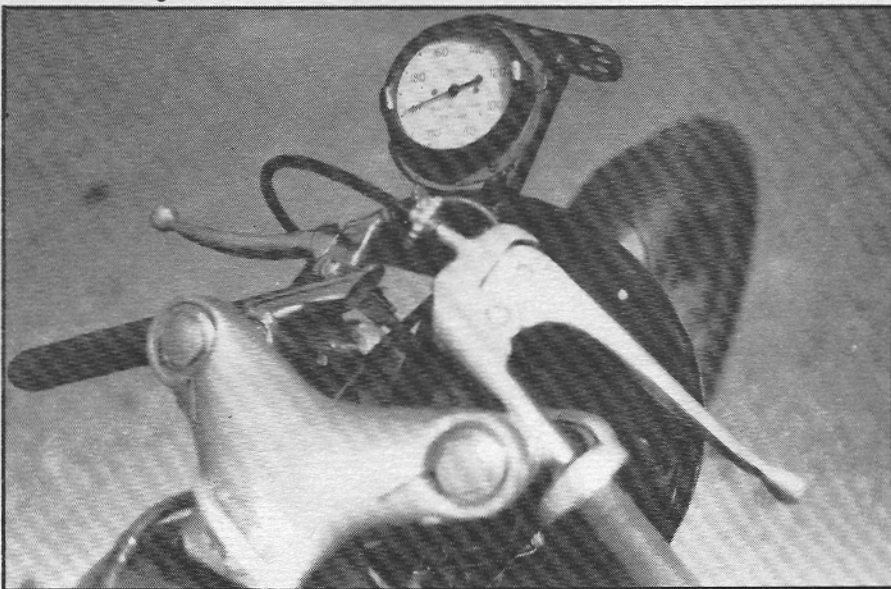
But besides all that I found the 250 Benelli four to be a surprise — perhaps revelation is not too strong a word for it. It's far easier to ride than a Honda six and surely also than a Yamaha or MZ, if not quite as powerful in the '66 form in which I tried it. I can't imagine how the handling could be faulted, so the reason that the bike took so long to take its world title must be due to a lack of money and power: it never quite had that little edge of performance necessary to win consistently. Though never confirmed, Carruthers' 16-valve engine was rumoured to be producing close on 60bhp in 1969. Had that sort of output been available earlier in the decade, Benelli might have won more than one world title.

Ultimately, as with the Honda six, the Benelli 250 four is a monument to the golden age of technical development in Grands Prix, a period which is unlikely to be equalled until the FIM abandon their constraints on designers. Indeed, even more than the Honda, the Benelli may claim to be the epitome of 1960s' GP development — a living, musical monument to the Classic Era. For its evolution lasted the whole decade: conceived in 1960, it finally reached fruition in 1969, just in time to be banned for being interesting, complicated and evolutionary. Sad, isn't it?

FRANCO ZAGARI



The full cradle frame carries bracing struts around the steering head added at Provini's instigation.



Needle on the Veglia tachometer spins to 18,000; Provini reckons he used all of them in last lap emergencies.

Data

Engine	dohc four
Bore x stroke	44 x 40.6mm
Capacity	246.8cc
Compression ratio	10.5:1
Carburation	4 x 24mm Dell'Orto
Ignition	Mercury magneto
Output	55bhp @ 15,000rpm
Gearbox	7 speed
Frame	double cradle
Suspension (front)	telescopic
(rear)	swinging arm
Brakes (front)	210mm 4ls drum
(rear)	190mm t/s drum
Tyres	3.00-18/3.00, 3.25-18
Weight	255lb
Top speed	146mph
Year	1966
Owner	Benelli SpA, Pesaro, Italy