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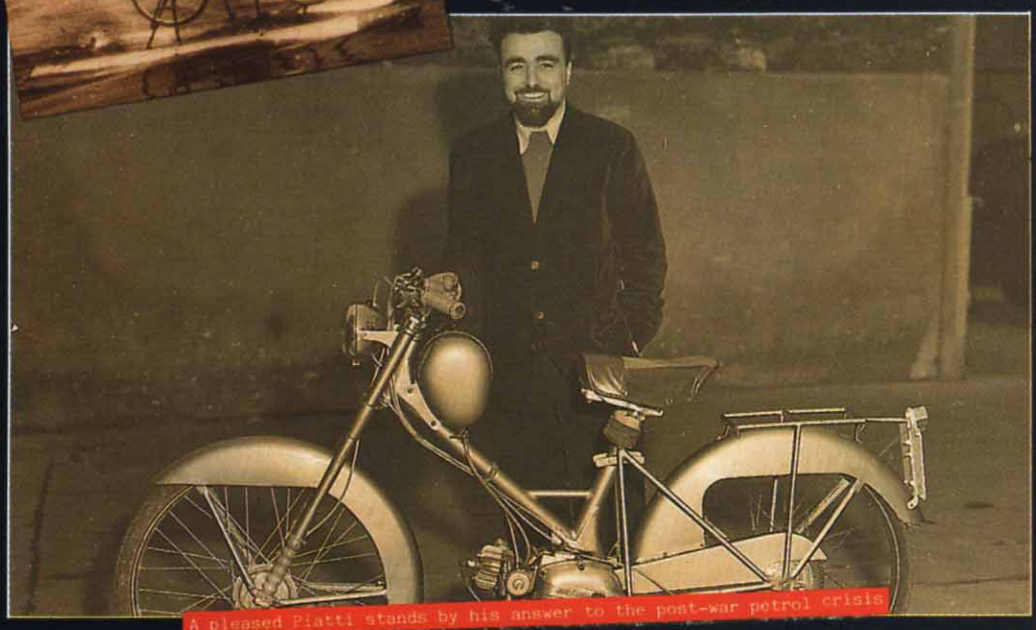
—is Italian for headmaker. So is Vincent Piatti. Pat Devereux talks to the man responsible for the TSCC head



A pleased Piatti stands by his answer to the post-war petrol crisis

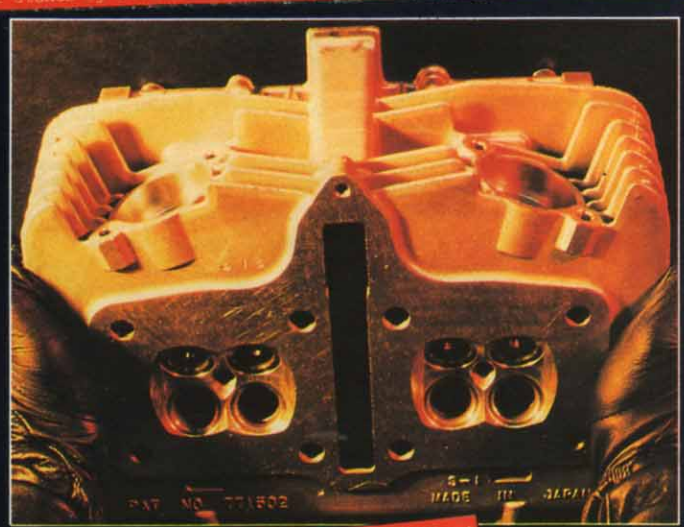
Life's full of surprises. When I was told I was to interview the man who designed Suzuki's TSCC cylinder head, one of the most celebrated and enduring Japanese creations in modern times, I couldn't believe my luck — a trip to Japan *on the firm*. There must be a catch.

There was. Searching my desk for the notional plane ticket and healthy advance expenses cheque, all I found was an out-of-date bus pass and an IOU for a fiver from a long-departed editor. Terrific! The rising sun of my expectations sank faster than an ocean-going Gold Wing, especially when I learnt that the celebrity in question lived four miles away.

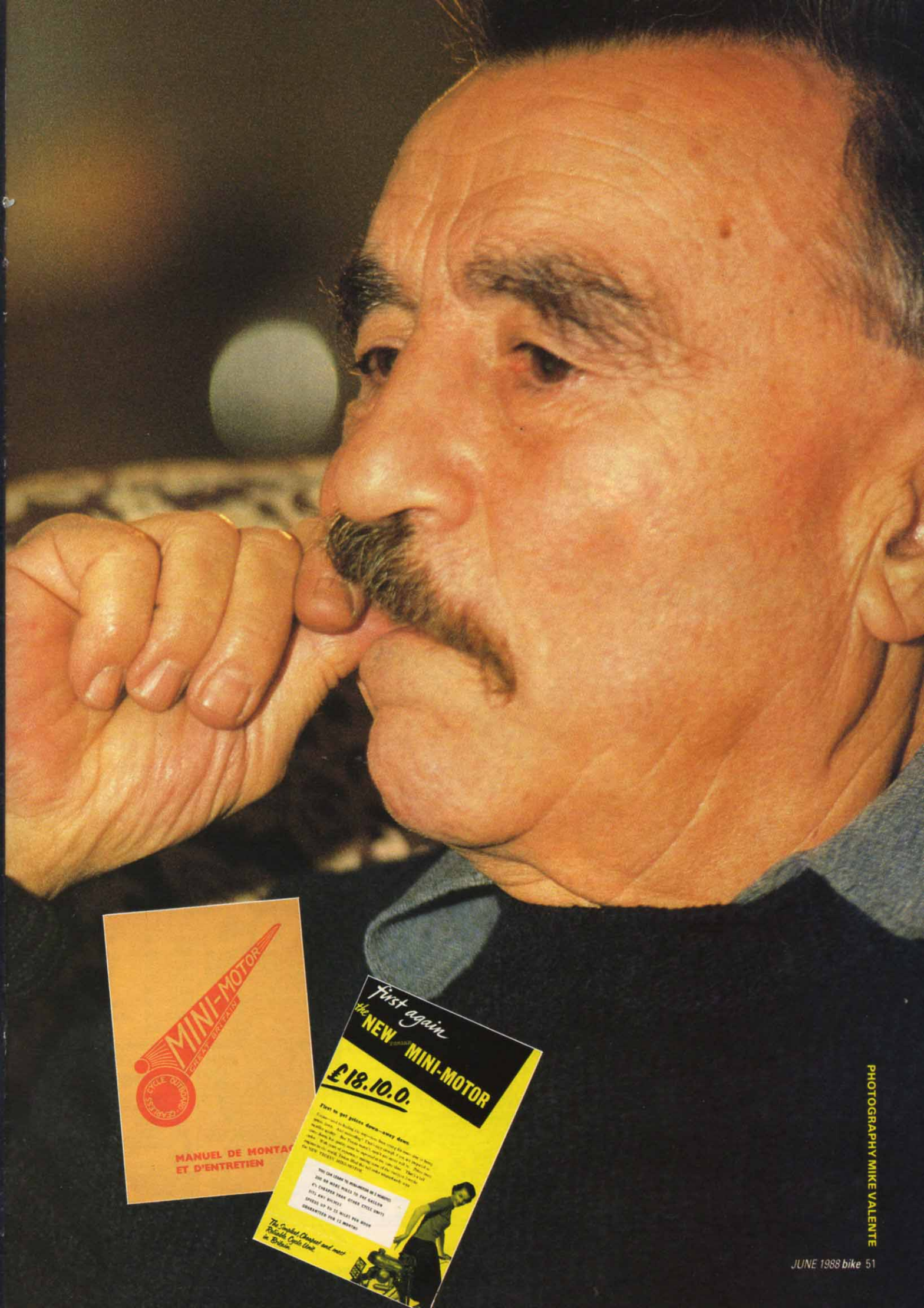
Still, I wondered, what was one of Japan's leading development engineers doing living just round the corner from Harrods? The commuting must be hell. Put it down to naivety or one over the eight at lunchtime, but I expected this guy to be Japanese, or at least of Far Eastern extraction. Surprise number two. Vincent Piatti, the man in question, is Italian. More than that, he's a brilliant engineer — as his illustrious history testifies.

These days Piatti, a man bearing a distinct resemblance to Salvador Dali, acts as a design consultant for many well-known and high-powered automotive concerns — Saab to name but one. But his career started in humbler circumstances. After graduating in aeronautical engineering from Paris (precisely *when* he wouldn't say, being superstitious about the whole process of growing old — "every time you tell someone how old you are, you age another ten years"), Piatti worked as a stress engineer for the legendary Vittore Bugatti. World War Two put paid to that job when his lack of sympathy with the Hitler charm school promoted a quick change of scenery.

But, even in post-war Italian deprivation, you can't keep a good man down. Piatti's mind turned to devising a cheap form of transport for Italy's petrol-starved, immobile masses. His solution — a tiny two-stroke engine designed to power a bicycle — was so successful that a British car manufacturer, Trojan, bought ▶



A piston's view of the TSCC head



PHOTOGRAPHY MIKE VALENTE

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the rights to manufacture it in England, too. *Motor Cycling*, one of the grandfathers of the British biking press, worked itself into quite a lather over the first scoop mega-test back in 1949: "Ten miles in London traffic, and a maximum of just over 30mph, all on a little over a quarter of a pint of petroil! Sounds pretty fantastic doesn't it?" Well, I suppose it did in an age of ration books and whale-grease sarnies.

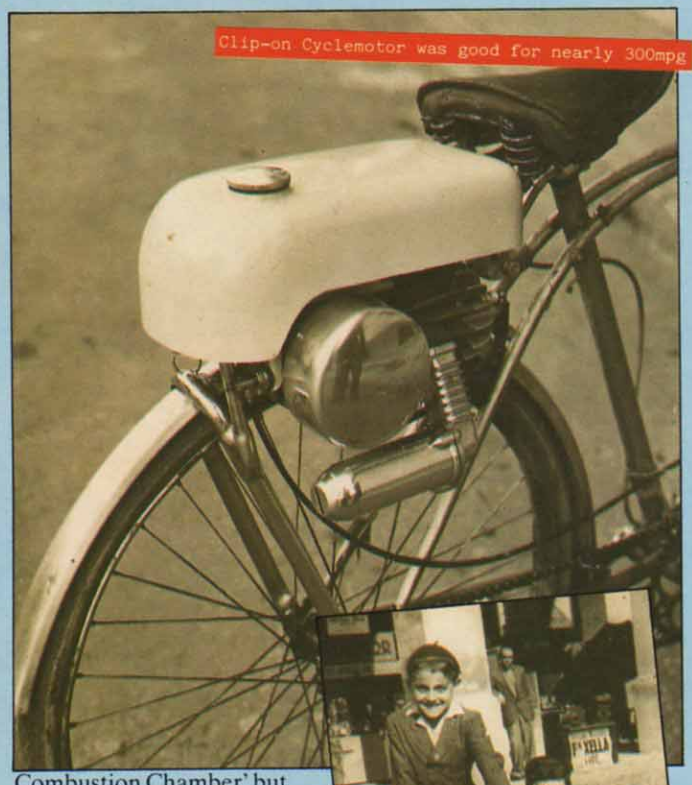
From the crest of this wave Piatti, now in England, designed a similarly frugal and simple engine for Raleigh before moving briefly to Belgium to design a complete scooter. If the pictures I saw are anything to go by, this freak had adjustable everything and styling that even a mod would have thought risqué.

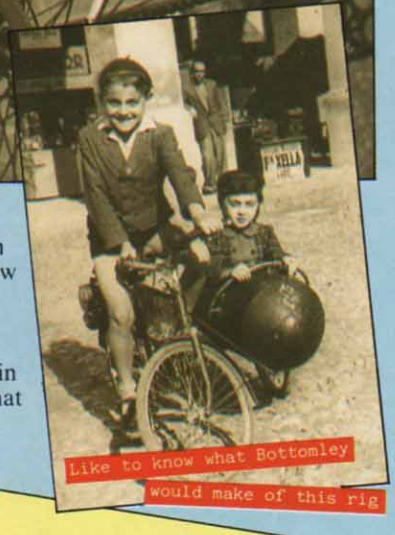
Due to the unfortunate (for Piatti) decline in the scooter market at this time, he came back to settle in England during the '50s, where he continued his work on two-strokes both privately and as a consultant for AJS and Matchless at AMC in Plumstead. This work gave rise to several patented ideas, but "the most wonderful" he recalls as being the 'bazooka' for AMC — basically a variable-length exhaust pipe for a two-stroke, years before the Japs got into ATAC and other devices with much the same purpose.

"It was very clever. It showed how the return pressure wave (created by the exhaust) returned the fresh mixture flowing down the pipe and added it to the fresh gases coming up the transfer ports. Therefore, the two-stroke is supercharged at a certain rpm determined by the length of the pipe." In other words the man was on the verge of understanding exhaust resonance long before MZ perfected it on their GP bikes, let alone before the Japs nicked it.

But supercharged or not, Piatti decided that the growing quest for power and efficiency meant that the two-stroke's days were numbered. From then on he concentrated on four-stroke cylinder head design. Alternating between his farmhouse workshop on the outskirts of Milan and a spacious Victorian house-cum-office in London, his work on four-valve heads led him to develop, in conjunction with Suzuki's Sadao Shirasagi, the TSCC design which has graced so many Suzukis over the past decade.

The idea — actually patented as the 'Twin Spin Combustion Chamber' but rechristened 'Twin Swirl' by Suzuki who wanted their own name on the design — first saw the light of day back in the early '70s: "I was always inclined to four valves per cylinder, but at one moment in the development I realised that they had a different type of combustion. It was then that I decided that, as everybody wanted lower consumption and better performance, I would design the TSCC."


Clip-on Cyclemotor was good for nearly 300mpg

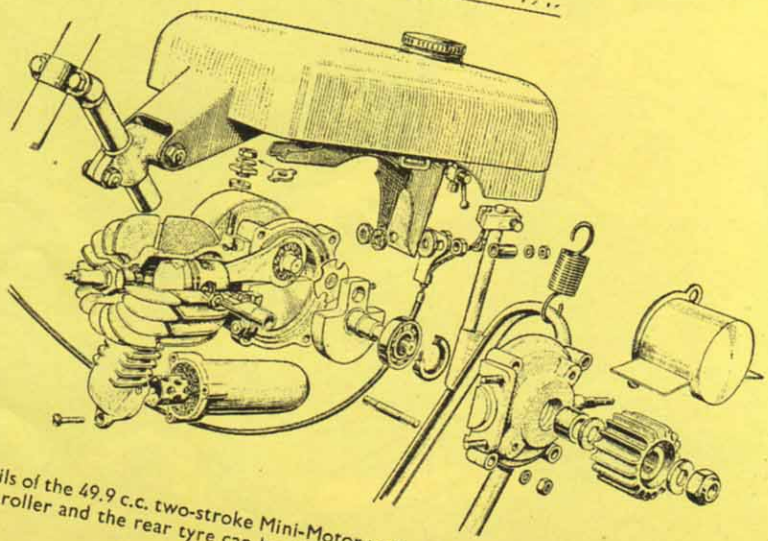

Like to know what Bottomley would make of this rig

He saw the advantages as being in several areas. "First of all it is easy and cheap to produce. A four-cylinder head takes only 20 seconds to be TSCC-machined. Other manufacturers cast their heads, which is a very long process. TSCC is immediate. Two rotating 'orange'-shaped cutters just kiss the surface of the blank head, and it is done. They are all the same to within 1000th of a millimetre — so it is economical."

The main advantage of Piatti's TSCC divided chambers is in high combustion efficiency combined with ease of manufacture and servicing. Compare TSCC's elegant simplicity with the radial can of RFVC worms Honda thought necessary to persuade the XBR500 to breathe and burn efficiently.

Rather than swirling the mixture around a vertical axis — a motion which tends to centrifuge the fuel away from a centrally positioned plug — TSCC promotes swirl around the engine's horizontal axis (like a two-stroke), which moves the fuel past the spark. The plug is in turn thrust deeper into the action by its central location in the ridge between the two chambers. The result is rapid combustion and fast flame front travel which permit very weak mixtures and short ignition advances without sacrificing any of the engine's torque and general civility.

Even though Piatti reckons that the increase in efficiency using TSCC is probably only three or four per cent, research carried out by Yamaha on the ▶


Details of the 49.9 c.c. two-stroke Mini-Motor unit. The drive between the serrated roller and the rear tyre can be disengaged by means of a Bowden

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FZ750 engine a few years later concluded that the optimum shape for a combustion chamber was a bi-convex lens-shaped arrangement remarkably similar to his TSCC design. Given the massive difference in budgets of the two concerns, this also underlines Piatti's technical vision and understanding.

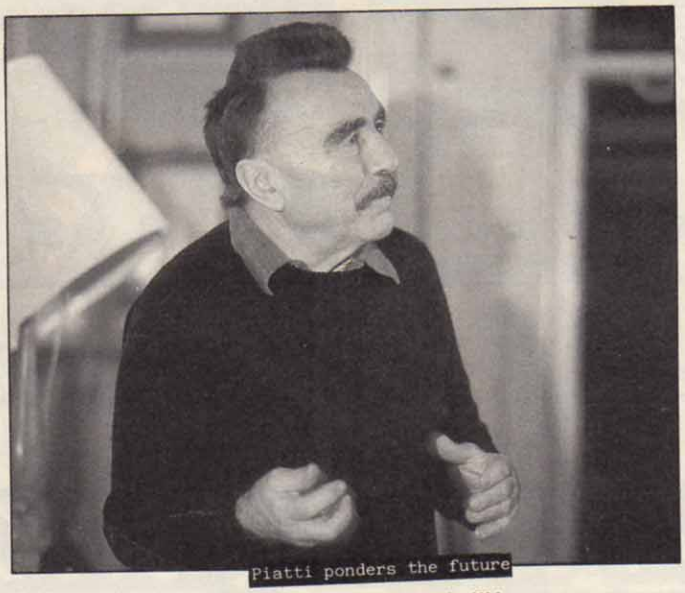
In fact the man's obsession with combustion efficiency even extends to his smoking habits. Eyeing my rapidly disappearing snout and Rizlas with an air of disdain, he leapt out of the chair (with surprising agility for a man of his advanced but uncertain age) to hand me his idea of the perfect gasper — French Caporal tobacco and JOB 'Sup-Air' papers. "The tobacco is pure, not full of dynamite, and the papers have many tiny holes to allow complete combustion." I can't say I smoked any quicker on the results, but the idea has a certain charm.

Piatti has nothing but praise for the Japanese as collaborators. "Suzuki are a wonderful company to work with — very honest. They're positive. They don't hesitate. They make their mistakes very quickly. I don't think they're working any harder than a company in the West that's interested in what they're doing — Cosworth, for example. But what I have found is that the quality of management is superior. In the West there's a lot of nepotism in companies. The Managing Director here will take his son-in-law, nephew or whatever and give him a good start in the company. In Japan they don't do this, they look for someone with a proven track record."

Did he think that the Japanese were imitators or innovators? "They are both, as we all are. The Japanese had to invent everything again, as they started so much later. Initially they had to copy, like any other country coming late into the industrial age. They use a lot of information in common use, ideas on which the patent laws have expired, but they do innovate too."

Asked for his influences and heroes, he doesn't hesitate. "My hero was Marc Birkigt, a Swiss who was working on four-valve technology whilst I was studying in Paris." Thrusting a photocopy from a weighty tome entitled 'Automotive Design: Great Designers and Their Work' under my nose, Piatti asks me to read up on Birkigt myself as "I try not to concern myself with the past, there's so much in the future." Birkigt, it turned out later, was the father of the modern competition engine — 16 valves, hemispherical combustion chambers, dual ignition and all. As I read, the spry Italian continued: "Similarly, Keith Duckworth (of Cosworth fame) is my hero because I have learnt so much from him. Maybe him from me too, I don't know."

Picking up on the British angle, what particular advantage or skills were typical of our engineers? "The English have a fantastic advantage. Many of the good engineers from the continent have a lot of theoretical background but lose their practical side by following theory too much. Here it is different. Keith Duckworth is a wonderful example of what I mean. He is a man who can follow theory but will also have a very practical outlook. He'll be more pragmatic. To be more matter of fact is something I have learnt from the British."



Piatti ponders the future

Why, then, does he think engineers are so little regarded in the UK? "They have ruined a lot of companies by experimenting too much, or doing too much novelty engineering — although this happened not just in England, but all over the world. There was an era of the engineer running companies: Henry Royce with Rolls-Royce, Brunel with his railways, even Watt with his steam engines. Now we have come to the era of the accountant. Because the engineers spent too much money and didn't give enough return to the shareholders, the accountants came in and became the bosses.

"Now I can see a reversal, whereby the engineers are becoming the directors once again, albeit reluctantly." Reluctantly? "Yes, Shirasagi (co-developer of TSCC) told me that he'll become a manager one day and won't be able to do research because he'll have to think of the overall picture with all its problems and administration. So, good engineers tend to shy away from being general managers.

"What I could see in the British motorcycle industry, when I was a consultant engineer down at AMC in Plumstead, was that they wanted to give a certain return to the shareholders every year. As a consequence they wouldn't take any risks — because to take risks means to spend some money now and perhaps, if you're lucky, you will get a return in five years' time. Even if it would be a very good return then, the shareholders would not swallow it."

Did he think the British were too shortsighted? "No, it was the structure of the industry at that time. For the Japanese, engineering is still a novelty. They've been making mechanical things for only 50 years, while the British have been doing so for over 200. Perhaps the British have become interested in other things — like playing tennis probably [at which we're also useless]. No, but seriously, other things like atomic energy, aircraft and the electronic industry — so there's been a lack of interest because potentially great engineers have been lured away to other fields where they have been promised more of a future. I would say that the problem is that there is a lack of courage in Britain, not only by the engineers, but the shareholders too."

Piatti believes there is a lot of future in engines, but, I wondered out loud, which way does he see them going? "Towards the piston engine!" he answered, laughing at the irony of his statement. What about the Wankel? "No, I first saw the Wankel engine in 1957, before it was disclosed, and I decided I was against it because it had a very bad combustion shape by nature and I didn't like it. I don't think it has a lot of future."

Okay, so we're all going to sell our Norton shares tomorrow, but what's so brilliant about the humble piston engine? Did he see the four-valve head as being the ultimate in engine design? "I think it is the best I know myself because I'm thinking also of the production costs involved. When I first came to England 40 years ago, I was told that 'an engineer is a man who could do for a shilling what any fool could do for one shilling and sixpence' — and this is true.

"If there was no limit to the expense, you could go to very complicated designs and make them work." What, like Honda's oval pistons? "Hmmm, no. This design is not very effective. Normally the round shape, which is both the easiest to manufacture and produce, is the one which will maintain its shape best during function when hot. Therefore it is the most efficient. Oval is OK for a one-off but in the long term, I think it is not very satisfactory.

"I see the normal piston engine as being here to stay, in one form or another, until the next millenium at least, as we are always going to need cheap, movable sources of power because we all like to fly and ride motorbikes and I haven't seen any real alternatives yet."

The same, it seems fair to say, could be said about engineers like Signor Piatti. ■

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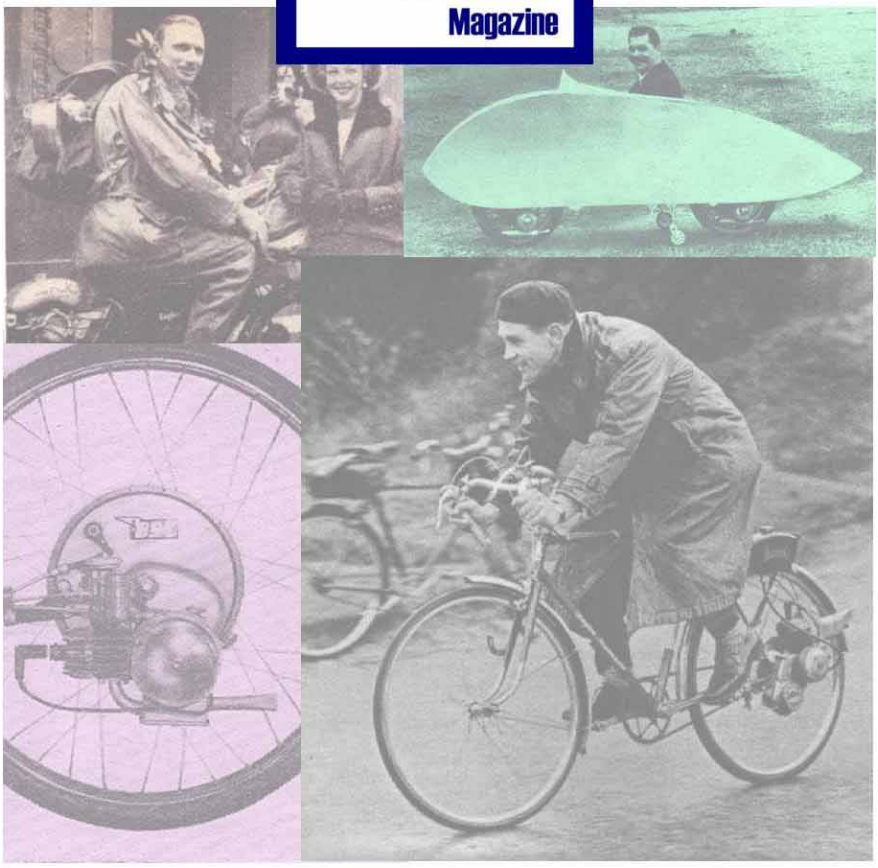

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