SCOTT NEWSLETTER

News from the South West

Yes, we know itÕs been a long time coming but we hope youÕll enjoy the latestScott Newsletter. YouÕll see a few differences between this issue and the lastÉ just settling to a format.

I have been working on a range of projects in the time between this issue and the last, including the continuation of my new workshop and the slow but steady work on the Silk Scott racer project. The pace of progress is sometimes frustrating but at least itÕs all moving in the right direction.

Thank you to everyone who sent articles in; we really appreciate the contributions. More please!

ItÕs been an eventful last few months for Roger since he was involved in an accident at Cadwell park at the Þnal British Historic Racing Club meeting of the year. You can read his write up of the incident later in this issue.

So, a very Merry Christmas and a happy new year from us. We hope you enjoy the latest Scott Newsletter and weÕll get back to you in 2019.

Richard Moss

Roger at Cadwell in July for the Morini RiderÕs ClubÕs classic trackday

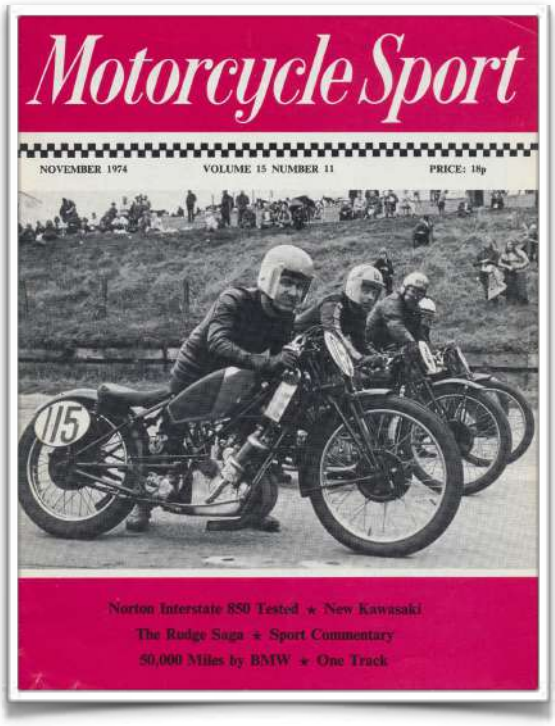
A blast from the past

Roger Moss

Amongst the 860 or so folks who asked to receive our free newsletter, is Mr Zachary Zniewski of USA. Zach, to the bes of my imperfect memory, does not have a Scott, but is intere in them and we are pleased to send our newsletter to anyon who has an interest in this unusual motorcycle. Zach and I exchange email messages from time to time and in one of th communications, he told me that he had bought a an old Bri motorcycle magazine which had my picture on the front cov He would be pleased to send it to me if I would like it. Yes please Zach, I like to keep such memorabilia. Toady in the comes a package from New Orleans with a copy of the muc missed magazine ÒMotorcycle SportÓ of November 1974.

A great atmospheric photo capturing the tension waiting for drop of the starters flag, long before lights and a start with d engines. As the flag fell, push like hell and jump to get your bum on the seat side saddle with enough weight to hold dov the rear wheel while you dropped the clutch just for long enc to spin and start the engine. Next pull the clutch out again

briefly with the throttle quite wide to let the revs build quickly to about 4250 rpm. While this is



going on, you have come off the saddle and with left leg planted on the LH footpeg, spring to flick your right leg over the bike. Simultaneously you are feeding in the clutch to drive in first of three gears. Weight on LH footpeg, bum not yet on sea Right leg arching over to land on gear shift, Declutch RH foot pushes lever to second, feed in clutch. You will be doing perhaps 50 mph in second befor your bum finally rest on the saddle.

In an instant later you select top (third) gear for a short burst before shifting down to first for the tight club hairpin at Cadwell Park. The great torque from low revs made the Scott the fastest starter on the grid as long as your technique was a polished series of actions similar to a professional gymnast. Soon after the start thereÕs the hairpin, where again, the ability of the Scott to pull hard from low revs without slipping the clutch was a considerable advantage over four strokes that had to slip theirÕs until the engine revs had risen to their power band. Done

well, the start with a Scott was like a rat up a drainpipe. You were gone and had the best line through the hairpin before the others could resp In those happy days, there would be at least fou Scotts in a grid of 24 riders. A rider who was successful at Brands Hatch even against moder riders was Chris Williams, who rode the Scott special belonging to Clive Waye.

I had the opportunity to ride this bike once and Chris Williams rode mine. It was the best handli bike I have ever ridden and you floated through corners like you were in a dream. By comparisc mine handled like a pig. Chris had started on th first row and I was at the back of the same grid. was soon up behind him wondering why he was going faster, so passed him and won easily. Wh came in, Clive Waye ran over excitedly, stop wa in hand, to announce that I had done a lap time within two tenths of a second of the best Chris Williams had ever done at Cadwell and that on r first ride. I told him that the bike was a dream tc ride and my grandmother could win on it. When Chris came in on my bike, I asked if he could giv me any tips to improve the handling. He said th was having to ride that bike much

too hard, but if they had my engine in their bike would clean up and that included modern bikes.

the second race Chris was back on CliveÕs bike I was back on mine. The clip shows us going

around the hairpin on the second lap. I alrea had a good lead, Chris Williams on Clive WayeÕs Scott in second place and the leadin four stroke third.

Happy Days

See the YouTube clip at:

youtube/wXAA_nbRP7w Youtube clip 1987

Scientific 2-stroke engine tuning

Bob Stapleford

In the early 70s some new friends turned out to b scooter racers, competing mainly at Llandow, Lydden Hill, Snetterton & Cadwell in the national scooter championships. Most of the racers used parts from well known Lambretta tuners, developed over years of trial and error. I was looking for something challenging for my HND final year project and tuning a 2-stroke engine using physics was perfect.

First I needed to read the technical regulations t establish what modifications where allowed. It is important always to read these literally and not t make any assumptions. Thus I was able to find a loophole in the section covering exhaust system Standard silencers have insufficient ground clearance for spirited cornering, so to allow mod to increase clearance the rules merely stated tha certain percentage, (I forget the exact figure, about 70%), must remain. That gave me carte blanche to build an expansion chamber and use the original silencer (70%) as a cover and mounting bracket only. It was only after I finished scooter racing that the rule was corrected by including a requirement to use the original silencer to carry the exhaust gasses.

Six months of technical paper, phd theses, SAE paper, thermodynamics and aerodynamics book and Queens University Belfast searches and hou of calculations later, I was ready to start on the actual engine. I deliberately ignored everything anyone else had ever done to tune a Lambretta engine.

The standard carburettor was a tiny thing, more suited to a lawnmower. The thermodynamics lecturer just happened to have a new Wal Phillip fuel injector of suitable size that I gratefully accepted. This carburettor has been tried by ma and abandoned by all but a few owing to the inability of most to set the air/fuel mixture from idle through to full throttle. I liked it because it ha a single jet, mixture strength was adjustable ove the full range using a single, complex, linkage a it didnÕt need a float bowl-just remember to turr the fuel tap when not being used!. The inlet port was a good shape and size so only required a polish. I wanted the inlet and exhaust to peak at same engine speed but, as I couldnÕt shorten t inlet length, (the frame tube interfered with this l on the single tube Scotts), so the timing had to b increased by removing 5mm from the piston skir which was also re-profiled to improve gas flow.

Transfer port shapes were fettled to reduce loss on entry, smooth the rough cast walls, increase cross section area, widen and raise the exit heig slightly.

Scott transfer ports puzzle me as I only have knowledge of loop scavenge engines. Why does top of the port have a downward direction? That seems wrong because, an upward direction will give better gas flow, hence better cylinder filling. donÕt for a moment think it can have any bearin the amount of fresh charge going down the exha Presumably Scott found it necessary for piston crown cooling. Does anyone have experience in this area?

The exhaust port was widened, with radiused corners, to the maximum dictated by piston ring support requirements. The port top was raised a little more than was done to the transfer ports. T top and side edges were given a slight radius to improve gas flow. The port/flange/exhaust pipe were carefully blended giving a step-less transiti from port to pipe.

Primary compression ratio. This is, of course, important but, changes that could reduce little e lubrication or increase pumping losses should b avoided. A well designed exhaust acts as a supercharger, effectively increasing the primary compression ratio.

Compression ratio should be as high as possible without detonation. On the 200cc Lambretta it is simple job to use a 125cc head, modified to clea

the piston giving a wide squish band and compa combustion chamber.

Exhaust - The length of the primary pipe from port to the start of the divergent cone is designe to delay the extraction effect of the divergent cor until most of the exhaust gasses have left the cylinder under its own pressure, the transfer por are still closed at this point. The divergent cone has by now generated a negative pressure pulse that reaches the port, extracting more of the exhaust gas and continuing after the transfer po open. This extractor affect keeps the pressure in the cylinder low, even as the piston is on its way back up the cylinder, assisting the inertia of the remaining fresh charge in keeping flow going from transfer ports to cylinder. By now the exhaust gas has passed the parallel section, reached the convergent cone and sent a strong positive pressure pulse that reaches the exhaus port as the transfer ports close. This positive pul pushes much of the fresh charge, that had been drawn into the exhaust pipe by the negative puls back into the cylinder. The divergent cone is always longer than the convergent cone as it ha to provide a longer pulse than the latter. Also, th shorter length of the convergent cone, to the sm diameter tailpipe, gives the higher pressure puls that is required to overcome the increasing pressure in the cylinder. I could find no useful information concerning the tailpipe so I just used the nearest spare piece of tube and hoped for th best. A shortage of dynamometer time prevented me from experimenting with different tailpipe lengths and diameters. (The exhaust was so lou on full chat that the College Principal banned me from running it during normal college hours!).

Construction of exhaust system Ð

The volume of the primary pipe, divergent cone, parallel pipe and convergent cone should be sufficient to accommodate the expanded gasses from the cylinder but, not too large or energy in the pulses will be reduced. The inside of the exhaust system should be smooth and definitely have no steps in it, nor corrugations. Internal welds should therefore, be ground flush. The primary pipe can be bent using as large a radius as possible, but keep it straight for a few inches before the divergent cone to ensure a good gas entry into the cone. The divergent cone, parallel pipe and convergent cone assembly should be kept straight. Any bends over a few degrees WILL reduce its effectiveness. Do not be fooled by production bikes that have the exhaust snaki all over the place Ð that is the marketing departr or stylist winning the battle against the exhaust designer (IÕve got the tee shirt!). The tailpipe doesnÕt seem to matter.

Finally, I do not like siamese pipes on a 2stroke twin. I know that the port timings donÕt overlap the junction is bound to have a negative effect.

Did it work?, I hear you ask. You bet your life it did! The most surprising result was the dramatic reduction in specific fuel consumption under full load as measured on the dynamometer. In road using a standard carburettor, when the standard exhaust was swapped for the expansion chamb much smaller main jet had to be used. That was opposite of what the ÒexpertsÓ had told me.

On the race track, if I ignore the odd seizure anc crash (my bad riding), it was very fast and great fun. To quote one future class champion ÒI was following *** (the current champion) (at Snetterton) when you flew past sitting bolt uprightÓ. In my defence, I couldnÕt crouch dow because my new leathers were still too tight!

The main problem I had was that the narrow, kn edge, power band required a close ratio gear bo that didnÕt exist. Below the power band, applyir more than about 1/3 throttle would result in the engine 4, or perhaps 6, stroking as the returning strong positive pressure, pulse came while the transfer ports were still open. A mixture of high pressure exhaust gas and fresh charge would b forced down the transfer ports into the crankcas Then, when the inlet port opened, it would all be blown out of the carburettor

I trust this is of interest to some. I deliberately le out all the maths and reference to the speed of sound to keep it understandable, hopefully.

Fighting Through

Ted Parkin

Sweden

Shadows from the sun! Showing thousands of mosquitoes waiting for us on the tent walls! It is 4.30am. I look at the hordes of insects massed c the tent and watch as their probosci stick through the weave.

"I don't like the look of this!" says Liz. I didn't realise she was awake!

I ask if she has any ideaÕs. She looks around th tent, peeks through the netting getting stung for her pains, and comes up with a cunning plan. "Why don't we get dressed, put all the riding gear on including under helmets and gloves to protect ourselves. Sort all the camping gear into a pile and when we shoot outside you pack the tent slinging it in the sidecar while I get the remaining stu! and throw it on the top. That way we can use the wind caused by the bike to keep the mozzies away. Then we can stop at the side of the road where there are less of them, re"pack the gear and at the same time eat breakfast!"

Sounded good to me!

This tent is 4ft high, it is 5ft wide so as you will probably appreciate, two people getting full riding gear on was quite an hilarious undertaking! Feet in each others faces, elbows in eyes, mouth and stomach were not an unusual occurrence. Eventually, we are togged up ready to go.

It was like an attack by the SAS as we burst from the tent, birds scattering before us as I pulled the tent pegs out. Liz throwing the cooker, sleeping bags, cooking gear into the chair. The ridge poles wrenched out of the ground, the material of the tent being rolled up and stu!ed aboard. I look down, the rear tyre is ßat. The mosquitoes see their chance and attack with gusto! The slaughter was incredible! As we slash and beat our way to the foot pump. I frantically blast air into the tyre, praying that it holds. It stays inßated, Liz takes a ßying leap as I start the engine and the wind whips the mozzies away! Only 20 bites between us. Acceptable losses!

We run for the safety of the town. Stop. Mosquitoes attack. No good!

Therefore we head o! South. We might as well move in the correct direction After about 10 miles we deem it safe to stop and repack the gear, forget it! Within 5minutes we are surrounded and beat a hasty retreat. I come up with a solution. What mozzies like is water and no wind. We will ride until we are well away from both. The town of Storuman approaches and I see an opportunity to achieve all our aims. We halt in the centre of the town, actually it is a shopping mall, and repack the bike. A few early morning commuters look at us in some disbelief and are shocked to see me get out the cooker, proceeding to cook breakfast on a wall at the side of a fountain. We use a strategically positioned bench to lay out the plates, bread and co!ee pot. Lovely! No mosquitoes! Repacked, we look at our mosquito bites, buy some tubes of repellent and make tracks South. Strangely the rear tyre stays inßated! Perhaps a little jape from an over"amorous campsite owner? We are alrea well past the Arctic Circle which is now a

dim but good memory. Funny how the mind only remembers the achievement and not the pain and e!ort which went into getting there. I have more interesting things to think of than reminiscing about past victories. The road South is as demanding as

Dovrefvell. Winter damaged roads, pot holes and long stretches of unmade track all combine to focus my mind. I remember a trip back from Gibraltar on a Boeing 727. We were crammed in with a regiment of Army boys, rowdy, loud but enjoying themselves! The air hostesses had bee forewarned and were all wearing their safety knickers as they swished gracefully between the aisles deftly avoiding the groping, grasping hand of the soldiery. I was seated next to a small, dapper private of about 40yrs old. He, unlike his buddies was quiet as he studied a world atlas with an intense expression. His Þnger traced the route from Gibraltar to the South Pole! I was

intrigued and asked if he was intending to go there. "Oh no!" he said he was just returning! Here was a story which cost me a couple of single malt whiskies, worth every penny!

Danny was from Derbyshire, a private at 40 yrs old because he was more interested in using the travel opportunities available throughout the services than getting promotion. He cleared o! to remote corners of the world at every possible opportunity using the indulgence system available to all serving military personnel. It works like this. Wherever you wish to go there is, usually, a military aircraft going there. All one has to do is Þnd the Loading O#cer and ask if there are any spare seats. Nine times out of ten there is no problem if you don't mind travelling in some discomfort. , Danny had always had an a#nity for cold places and had been just about everywhere it was possible to get. Beaches held no interest, the attraction was the remoteness and di#culty of reaching inaccessible corners of the world. He told incredible stories of night landings in Kathmandu in raging tropical storms. The

Hercules being lifted up by invisible hands as the wind screamed up the Himalaya. Of being thrown bodily sideways inside the aircraft as wind sheer gripped them. Of very smelly trousers after one particularly violent crossing of the McKinley Sea north of Greenland on his way to the North Pole. Apparently this is a relatively easy place to get to, "If you've got t' contacts like!" Danny did! Patagonia was his favourite place of late and he had spent a few weeks there last summer. Unfortunately, these remote places meant that on occasion he was somewhat late in getting back to his unit thereby forfeiting any chance of promotion. I asked about his South Pole trip and he told me he was quite a bit late this time and was rather nervous about his reception back at the Regiment. "How late are you?" I asked.

"Six weeks!" was the reply. Was he worried? "Well not really!" as his Colonel liked to see his chaps usi their initiative to get into and out of remote places. Mind you this time their patience may have been stretched to breaking point..

Another Whisky.

He had hopped a ßight from Brize Norton in Oxfordshire to Ascension Island in the South Atlantic. Been thrown o! the ßight and taken a ship to the Falkland Islands. Here he talked a yacht into dropping him at Punta Arenas in Chile. From there he took a British Antarctic Survey ßight to their base on the Antarctic mainland. They were snowed in for three days before he had a chance to get a lift to on of the outposts. There the blizzards hit and everything ground to a halt for a further two weeks. In all he got to within 200 miles of the South Pole before he called it a day. As he Þnished his third Whisky he made such a matter of fact statement that you just had to believe him. He had learnt enough Inuit over his Northern travels to have a reasonable conversation and he looked at me and said, "I were going to give it a go on t'dog sleds, I were so close, but after I chatted t'Eskimo's they advised me not to. I thought I should take notice what they said cause they were t' locals like!"

Incredible!

Blizzards struck shortly afterwards grounding everything for 3 weeks hence his late arrival at his unit! We said good"bye at Luton Airport. Him to his fate and me to my job. Our fate was to bump and lurch through the lakes of Norway towards Ostersund. We were cutting diagonally through the country and were rather tired after our early morning start so, as it was now around 4 in the afternoon, when a set of luxurious log cabins presented themselves for hire at a reasonable rate we hesitate

not one second to take advantage of the civilisation o!ered.

We unloaded the cooking gear, Liz cooked dinner as I replaced odd bits and pieces which had fallen o! during the day or had stopped working. Washing up I glimpsed Liz walking straight into the shower fully clothed and washed, Þrstly, her outer garments and then herself. Neither of us had sni!ed a full body wash for over a week and were by now somewhat ripe! I followed, wallowing in the sheer luxury of having running, hot water.

We tried a walk but the mosquitoes where again out in full swing. A tactical retreat.was the order of the day as we retired to the safety and unaccustomed exotic night life in the bar. Drink is a problem in most Scandinavian countries. That is why prices are absolutely sky high in a vain attempt to discourage drinking. This seems doomed to failure to me as people always Þnd a way around the regulations. I was o!ered a strange colourless liquid in a beer bottle. Had a sni! and smelt 110$ proof alcohol! Where it came from I do not know and didn't ask. Neither did I have a drink. There are better ways to achieve oblivion than stewing your brains in an unknown brew! Achieving oblivion is real easy! Get up at 4.30am!

Next..Rattvik. Midsummer's Day!

Resonant exhaust systems

Bob Mather

First a rough guide on how a resonant system should work, should being the important word.

The cylinder Þres, the piston moves down and opens the exhaust port. The exhaust gases rush out and down the exhaust pipe. When they reach the cone where the diameter increases%di!user cone& into the body of the expansion box some of this high pressure positive wave turns into a negative wave and go back up the pipe, sucks out any exhaust left plus the fresh charge that has come up the transfer passage plus the fresh charge in the crankcase and this fresh charge ends up in the exhaust pip more charge than the piston would pump up. Meanwhile some of the original positive wave carries on until it reaches the cone at the back end of the expansion box%ba'e cone& and the wave bounces back through the expansion box still positive, up the exhaust pipe pushing any fresh charge it meets back into the cylinder just before the rising piston shuts o! the exhaust port so super charging the cylinder.

The exhaust comes slowly out a small outlet %stinger& at the back so maintaining a pressure the system which makes it work better.

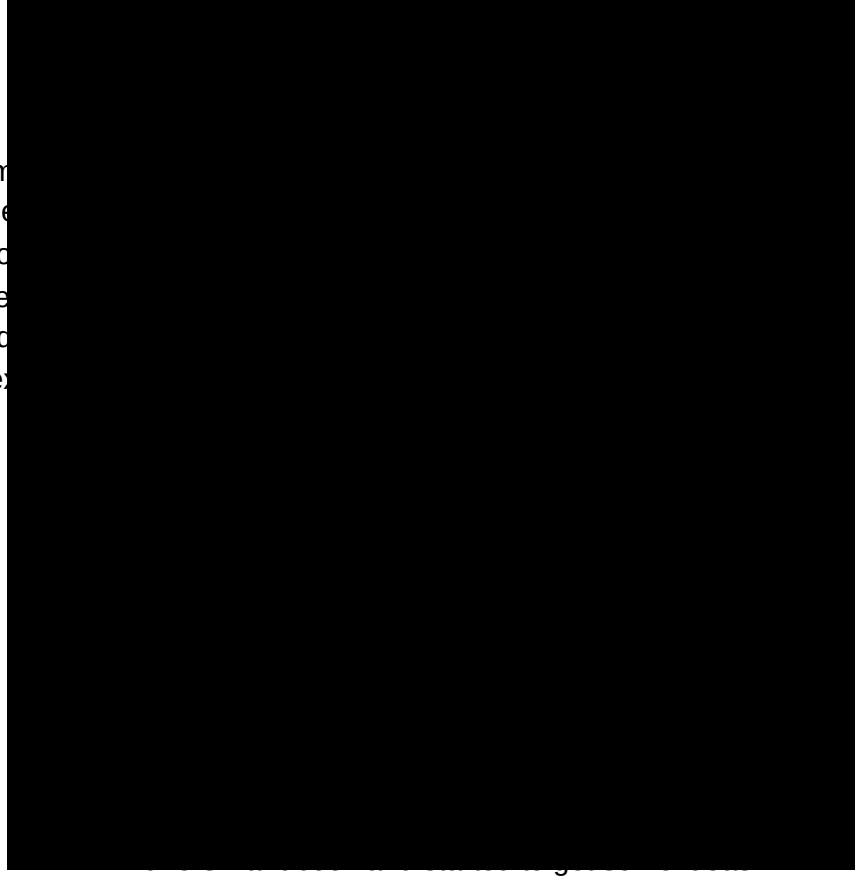
All this happens in a tiny fraction of a second.

I have always been interested in increasing engine performance, the Þrst thing I did regarding exhaust systems was weld a 3/4" was on the end of the exhaust on a 225cc Villiers engined James Colonel.

My mates laughed, but it went better.

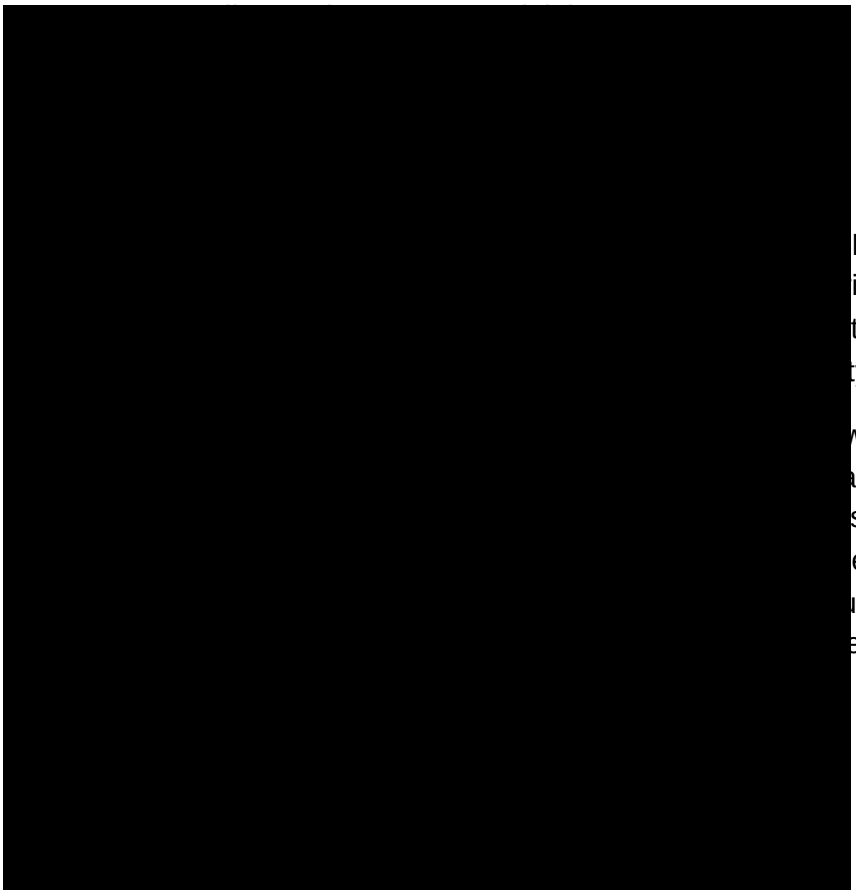
In 1997 I bought a 500cc %FY crank case& sing down tube blind head Flying Squirrel DeLuxe. After a while while riding hard up a steep hill I heard a rattle from the engine and decided it must be the pistons and on stripping the engine found oval gudgeon pin holes in the pistons. This was Þxed and I decided to give the engine the works, so cut out the rear cylinder liners, ported the pistons, blanked o! the rear inlet ports, modiÞed the inlet tract, blocked o! the annular inlet rings, cut out an inlet port bridge each side with a short stub to support the piston rings at BDC, 1/16" o! the piston skirts on the inlet side, 25cc stu!er block in each crankcase, packed

between the pistons and little ends, 14m
plugs and got rid of the front long engine
and helicoiled the crankcase to take sho
16mm bolts. All ports and passages line
all sharp edges on the gas approach sid
ports rounded o! except the top of the ex
port. The Pilgrim Pump plungers on the
side clipped to improve oil feed.



but was somewhat in what I built and how it looked as the bike is on Historic Registration. Had to all look original, no tuning of the engine allowed. A club o#cer checked the bikes and

This all made a much livelier bike, but I realised a better exhaust system was the way to go to get really good results. I was in the dark with no information at that stage so it was suck it and see. Not having a brake to measure power output I used two local hills as a Þxed Þgure. One is straight and steep the other up



like my ever growing 'silencer'. I told him iginal silencer was too noisy. He never t as it eventually came ßush with the yre, couldn't be any longer.

was some sort of expansion box as they lled. I turned up a short lead cone ser& reused % see photo&to go from the exhaust pipe to 3" stainless steel lorry st pipe for the body with a removable nd disc and the ba'e cone, stinger and