# YOWL

THE MAGAZINE OF THE

Scott OWNERS CLUB

JULY, 1959.

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# SCOTT OWNERS' CLUB

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| Registrar - - - | G. Stevens,<br>48, Carnsdale Road,<br>Moreton, Wirral, Cheshire. |
| Editor - - - | A. K. King,<br>10 Ellisfield Road,<br>Leigh Park, Havant, Hants. |

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**MEMBERSHIP FEES (Annual)**

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| Full Member (Scott owners only) - - - - | £1 |
| Associate Members - - - | 2/6d. (no magazine)<br>£1 (magazine supplied) |

## NOTICE

**The first Annual General Meeting of the Scott Owners' Club will be held at the Clarence Hotel, Whitehall, London, S.W.1. on Saturday, 11th July, 1959, at 7.30 p.m.**

## FIXTURE LIST

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| Sunday, June 28th. | Support Banbury Run. |
| Saturday, July 11th. | A.G.M. |
| Saturday, July 11th. | 12 p.m. Mystery Night Run. |
| Saturday, July 15th. | London Club Night. The Chequers Inn. Two miles south Redbourne on A.5. |
| Saturday, August 8th. | London Club Night. 'Orange Tree,' Totteridge. |
| Sunday, August 23rd. | Run to Lee-on-Solent. Start Epsom Clock Tower, 10 a.m. |
| Saturday, Sept. 5th. | Brighton Speed Trials. |
| Sunday, Sept. 6th. | CLUB NATIONAL RALLY, at Stratford-on-Avon. |
| Saturday, Sept. 12th. | London Club Night. The Anglers, Walton-on-Thames. |

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## THE ELEMENTS OF LUBRICATION. (cont'd.)

There is no use supposing that if the oil is not good enough to do its job properly then quantity will make amends for lack of quality; it won't. Unfortunately with the standard Pilgrim pump, it is virtually impossible to control the flow for all operating speeds and leave the setting at that. If town running occurs frequently, then full use should be made of the gears because, with a high quality oil, high revs will do no harm at all, in fact, the higher temperatures and higher gas flow speeds will serve to keep the motor cleaner and drier inside. This is a point of particular interest to those who suffer from plug whiskering. The basic cause of this is oil collecting on the plugs while they are operating below their designed temperature, and then carbonising on them when the speed is increased. Any specks of dirt or loose particules of metal will hasten the whiskering process. Consistent hard driving whiskers fewer plugs than does mixed driving. As a matter of interest, it should be borne in mind that oil in the combustion chamber serves no useful purpose whatsoever.

I sincerely hope that those of you who have followed this right through will have a better understanding of the complexity of oil, and will be able to see your way to better lubrication, higher performances, longer life, and happier Scotting.

## FROM ME TO YOU.

by Norris Johnson.

The Annual General Meeting is to be held at the Clarence Hotel on the 11th July, 1959, in the same room that we held our foundation Meetings. Resolutions, and nominations for the various Executive Committee Offices together with names of proposers and seconders, should be sent to reach me not later than the 24th June, 1959.

Membership is now 96 and undoubtedly we shall soon have the 100 necessary to affiliate to the A.C.U. an a non-territorial basis; whether we shall have the money remains to be seen as the affiliation fees have been increased from 1/- to 2/- per member and we are faced with an additional unexpected expenditure of £5.0.0. Up til now we have managed to run the Club without printing our own money, and we intend to keep it that way, even if it does cramp our style a little at times.

It will not be possible to run a Night Trial in July under A.C.U. permit, so we are substituting with a Mystery Night Run, which should prove very interesting. The run will terminate at breakfast time and it may be possible to have an early morning dip.

I think it is very kind and encouraging of Jim Sheldon to offer a "Scott of the Year" Pot; we shall be holding a concours at the Club Rally at Stratford-on-Avon on the 6th September, and I hope Jim will be able to assist with the judging. Incidently, to answer another point raised by Jim Sheldon, Rule 4 restricts membership of the Club to persons owning a "Scott" motorcycle at the time of paying their subscription, so that it appears to cover Cyc-Autos, and I think could be stretched to cover Scott Sociables.

So far no runner has appeared for the post of Competition Secretary. We now have enough members to stage one good trial annually,and our President has kindly donated to the Club a replica of the original Scott Trial Cup—to my mind a trophy to be coveted. I hope that when the A.G.M. comes round there will be á ruuner for this post as the present small Committee are fully extended and cannot cover his duties. If a Comp. Sec. can be found I would also like to hand over the responsibility for all fixtures; overloading leads to inefficiency and I feel that someone else could probably do a better job with the fixtures, as well as easing my burden.

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## FUN ON THE RUNS

I have on loan from enthusiast MacAlister, of Rainham, Essex, a handy 8 mm cine-camera. It is hoped to make colour films of Scotting to be shown during Club Evenings. One suggestion is that, any member interested, whilst on Club Runs, can be included in the shooting by subscribing towards the cost of the film. The price will work out at about ten seconds for a shilling. This may sound a bit steep, but if you work it out, you will see that you can go completely round the bend for 9d., or break your neck for 2/6.

See you through the viewfinder.

Lofty Avis. (Social Sec.)

## EDITORIAL

How the time flies. The A.G.M. is upon us, the Rally is already in the fixture list, and another year bows my sere and greying head.

To me this has been a year of mixed achievement. A resounding cheer is called for in appreciation of the efforts of our Secretary, and a derogatory raspberry to those members who have supported nothing; or may be I'm a little unkind. We may not yet have the staggering response so typical of the scooter clubs, nor yet the monumental membership of some one make motor cycle clubs, but we're coming on. Ninety six members in the first year of our being, plus the most elegant badge of its kind, plus a Club Magazine that is not just a duplicated sheet, plus a Register, plus the beginnings of an information service unmatched by any other club I've heard of. With the worlds most marvellous motor cycle as our spur we, together, can make this the most successful club in the country.

Doubtless many of you have ideas on how this, our magazine, could be improved. Although you will not write I expect you'll be willing to talk, so when we meet at the A.G M. let me have your views, ideas and general criticism so that I can endeavour to bring the magazine up to the standard you would like.

Happy Scotting,
A. K. King.

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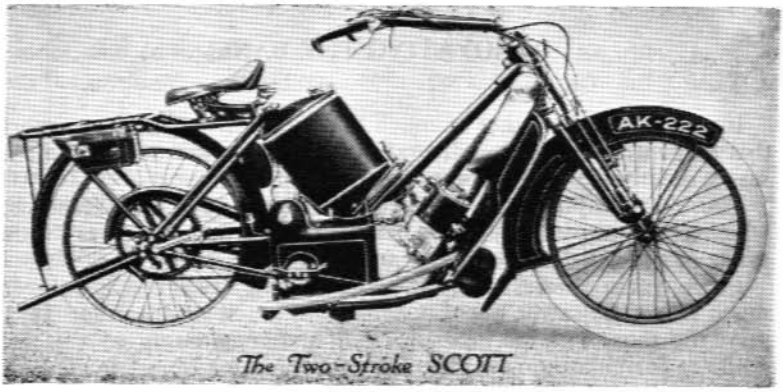
## RENOVATING THE BANK. (cont'd)

Time was sweet and there never seemed to be enough of it. As the years passed quickly by, the spirit grew ever stronger in creating a longing to chase after that very elusive horizon, which never seems to get any closer. In an attempt to get the best value out of time, which by now had considerably increased it's value as one of life's treasures, soon turned my thoughts towards that cunning device in automation, a motor cycle. The laughter and excitement which followed my early purchases were mingled liberally with such trifling matters as, sweat and tears, coupled in turn to a fair amount in loss of weight. So much then had cycling done for me in the past, that it seemed only natural, my seeking its virtues again. The results to date have been extreamly gratifying. Pedalling to and from work, in addition to the other numerous bits and pieces, which when put together adds up to a pretty handsome weekly mileage, is a big saving financially. This apart, I stand to score heavily again as a result of the sport never being in danger of becoming a stalemate. Many more miles are added to the week-end runs, and every inch of it is made the more enjoyable by being kept in tip-top condition; both in mind and body.

Alfred Scott has certainly given us the best when he afforded us the pleasure of sampling his concepton of a pipe dream. May the day never dawn when I might be tempted to say, 'I have had enough.' As one of Alfred's ancient pundits I am full of praise for Matt. Holder, and his faith which has been so ably expressed in the wonderful job as we know it today.

*(concluded on page 16.)*



*The Two-Stroke SCOTT*

## SOME GENERAL NOTES ON THE SCOTT TWO-SPEED GEAR.

by Tom Ward.

My experience of this gear is based on the fact that my firm at one time had over 500 Scott Riders on it's books, and we overhauled hundreds of these gears, which must have done a combined mileage of many millions of miles. They stood up to that remarkably well, but naturally we came across a few recurring troubles. I will try to give a list of these:—

HUBS SCORED ON BALL TRACKS.

Our cure for this was at first the bushing of the drum with a plain phosphor bronze bush. Then we went on to needle rollers as per Hemmings. but finally we found the most satisfactory method was to broach the $\frac{3}{16}$" holes in the brass ball cages into perfect squares and then fit $\frac{3}{16}$" Hoffman steel rollers. This made a 100% satisfactory job. Of course, it was necessary to replace the worn drum and hub if the wear was more than very slight.

THRUST RACES BADLY WORN.

This nearly always coincided with excessive thrust loading due to the thrust rollers being too big to enter the gradual taper portion of the expanding ring gap. When pushed home the rollers should just top the rise at the curved entrance to the gap. After topping this rise the going is easy and there is no excessive thrust set up in the bearings.

EXPANDING RING DRAG.

Just once in a very long while we used to come upon this trouble. A ring had, for some reason, opened out slightly until it acted as a permanent brake when it should have been quite free. The braking caused overheating until the ring became blued and braked harder than ever with great loss of power when in the other gear. If you suspect this trouble at any time feel at the gear after pulling up, or pull the rear wheel round in neutral.

CUP AND CONE WORN DUE TO EXCESSIVE THRUST ON THAT SIDE.

Expanding ring gap to narrow for thrust rollers to 'top the rise.' Remedy is to try different rings until you find one just right. Always see that the cups have a groove at back for oil to circulate to the hub bearings. Otherwise they never get any oil.

## RENOVATING THE BANK

by Bruce Youlton.

In one way and another so much has been written about the sport that to someone like myself the fear of duplication can become a severe deterrent when it comes to putting pen to paper.

Touring, Camping, pulling machines apart in search of Gremlins, whether they are in occupation or not, are but some of a very wide range of articles that constantly appear in print.

In the main the results are very satisfying. From such sources much is learned, while possibly equally as much is forgotten. They serve too those with the necessary skill and imagination, as a useful guide to formulating new ideas, all with the same object in view, of making the next trip out even more enjoyable than the last.

Having spent quite a few years now in the saddle, or walking along beside it, and where the beads of sweat have had no respect for even the best of rain goggles, one may well ask what I have to show for it.

It could indeed have been a most interesting question had I been afforded the luxury of a cine-camera to record my adventuresome spirit, as well as the machines, ranging from fifty shillings worth of scrap, to brand new mounts costing several times this amount. This apart I have learnt a lot, and what is more I know too that there is a lot more to be learnt.

Actually on show, I have an album of stills, a bank book clearly giving evidence of withdrawals against deposits in the ratio of something like 4:1. Housed in the shed at the back is my pride and joy, a 1935 Scott.

Occupying the same apartment is a fixed wheel sports pedal cycle.

The presence of the cycle propelled by pistons and con-rods in the shape of feet and legs is, for those who may be interested, born of an idea. It all happened like this. A couple of years ago, following a further withdrawal from the bank, I had an idea that I couldn't do the same thing again. Opening my bank book, I was somewhat consoled by the fact that, at least, I wasn't suffering from any form of imagination. Applying the simple rule of addition and subtraction to both columns, I found that they cancelled each other out. Not being as dim as all that it didn't take me long to realise that all that was left me now was my job, and the pretty favourable income deriving from it.

Grounded, I looked for an escape route. The best way to get out of a tight corner in many cases is to take stock of yourself, and if the assessment is right, stand your ground with an object firmly established upon your mind and work out the answer.

Determined upon the object, which as far as I was concerned, was to put matters right with my savings account and then get back to motorcycling as soon as possible, prompted me to invest in a bicycle. Now that I think of it, it was cycling that provided me with that super feeling of independence. It also sowed the seeds of desire for adventure.

*(cont'd. on page 4.)*

## THE ELEMENTS OF LUBRICATION

by Roger Cooper.

In studying the particular aspect of lubrication which applies to a Scott Engine, we must examine the oil and how it is designed to achieve what we expect of it. There should be no question about the fact that only the best quality is good enough, but many people are tempted to try something a little cheaper on account of the undeniably poor oil consumption of a Scott. Uneconomical though the total loss system might appear to be, its one redeeming feature is the constant supply or cool, clean oil to all working parts.

How many riders know what a vast amount of research is being continually made to perfect the engine oil for motor vehicles? How many realise how rare straight oil is? A straight mineral oil cannot combat the corrosive effects of the acid formed by combustion, but a blended oil can. The main chemical ingrediants or additives in a modern engine oil are detergents and anti-oxidants with, in certain cases, a trace of rust inhibitor and, in multi-grade oils, a viscosity index improver.

What is a Viscosity index? It is a very important characteristic of the oil we intend to use. All oils thin out when heated, but some thin out more than others for a given change in temperature. It is therefore no test of an oil that it looks thick enough when poured into the tank. The flatter the viscosity curve, as plotted on a graph, the better the oil will stand up to the arduous high temperature conditions—hence the addition of improvers in multi-grade oils, to produce a less marked change in viscosity with change in temperature.

When selecting a base oil for automotive use, the Viscosity Index is a major consideration, but, also, the additives, detergent, anti-oxidant, etc. must be added in proportions which take advantage of the oil's natural qualities. The very chemical nature of the oil itself governs the use, and type of additives, and careful blending is required to provide a lubricant which is chemically stable under all anticipated operating conditions. The thought of a detergent, a non-lubricating chemical, circulating with the rest of the oil in an engine tends to discourage people from using a detergent oil. Some have visions of a soap powder, or metal polish, scouring away at the metal to keep it clean. Others imagine that all the dirt and sludge will be flushed out and circulated, doing untold damage. There is no connection between the detergent in a motor oil and that in a wash tub.

What does a detergent do? A detergent-dispersant, to give it the full name, is a chemical solvent which prevents the formation of gums, lacquers and sludges in the engine. It controls the carbon build-up on the pistons, cylinder heads, and particularly, exhaust ports, and helps to neutralise the acids of combustion which are so damaging to the cylinders. There is no evidence to suggest that detergents remove existing deposits, rather they allow them to wear

away mechanically whilst preventing further formations. The particular application of this is on the sides of the pistons and cylinders, and in the ring grooves. It is here, also, and in the oil mist in the crankcase, that the greatest oxidation of oil occurs.

Oil doubles its rate of oxidation for every eighteen degrees Fahrenheit rise in temperature, and the insoluble products thus formed, deposit themselves in the most inconvenient places, under the piston crown, thus restricting vital cooling, leading to distortion and seizure, the increase in temperature thus created giving rise to even more oxidation; in oil ways, blocking the supply and leading to more seizures, and in the sump where, with dirt drawn in from the atmosphere and water from all the many sources, it combines to form an excellent grinding paste.

At this stage I would like to point out to the petroil fans the seriouseffects of fuel contamination. It is said that the oil condenses out of the petroil mixture, or that the petrol vapourises out of the oil when the mixture passes into the crankcase. True, it does, to a limited degree, but there are always fractions in a motor spirit which are insufficiently volatile to do so, and they remain in the oil, impairing it's efficiency by dilution if by nothing else. Even in ordinary lubrication systems there is always the risk of fuel contamination, through faulty rings and cylinders, but even more so on a two-stroke, by virtue of it's crankcase induction.

The lubrication of the cylinders is of vital importance, not only to these cylinders, but to the rest of the engine too. In addition, the cylinder of any engine, either steam, or internal combustion, is extremely difficult to lubricate efficiently. The demands placed upon the oil are numerous, exacting, and to some extent, contradictory. Oil is required to perform its duties at inordinately high temperatures, to withstand extreme pressures of both rings and pistons against the cylinder, whilst still maintaining an unbroken film for these to slide over. It must seal the rings to prevent gas leakage during compression and power strokes. It must not atomise readily into the combustion space, should have no tendency to ignite, and at the same time keep the ring lands and grooves deposit free. Ironically, these requirements must all be fullfilled at once in conditions which combine to reduce the oil's capacity for dealing with them adequately. Hence the need for the careful research and careful blending mentioned earlier. The importance of the proper lubrication of the cylinders must neve be underestimated. There is no need to decarbonise religiously every 5,000 miles, nor should there be any need to rebore before 75,000 to 100,000 miles have been completed, if due attention is paid to lubrication.

Attention must also be paid to correct carburettion. Scotts have never been economical and it is foolish to make them so. Too rich a mixture will thin the oil in the crankcase and also flush the vital oil film from the top of the bores, but too weak a mixture will cause spit-back, giving rise to combustion in the crankcase and will

create serious overheating, leading to distortion of pistons and bores, especially in the exhaust port region, often the cause of an inexplicable seizure. Because cylinder lubrication is so vital, engine oil is designed to cater primarily for that need, but the bearings are not forgotten, even though they take second place. The oil is a compromise, and the bearings will have an easier life if the cylinders are well maintained.

With the exception of the little ends, the Scott engine bearings are of the anti-friction type. They are so called because the rolling friction of roller bearings is considerably less than the sliding friction of a comparable plain bearing. When we think of a roller bearing we imagine two perfectly inelastic surfaces, making only line contact with each other; but in practice, the inelastic surface, however desireable, cannot be produced, therefore the contact line becomes a contact rectangle as both roller and race distort slightly under load. Thus, when a steel roller is rolling over a steel plate, under load, it distorts itself, and the plate, to form a bow wave on the plate and a similar bulge on the trailing edge of the roller. The greater load, the greater the deformation and the resultant rolling resistance. Temperature fluctuations also affect the deformation; the higher the temperature, the more elastic the steel becomes, and the more deformed the plate and roller are. This is not a complete analysis of rolling frictions, but is given to enable the reader to have an appreciation of the conditions obtaining at a given moment while the engine is running. By their very nature these bearings cannot give unlimited service. The constant expansion and contraction of the bow wave causes surface fatigue. Thus, provided a high quality oil is in use, the pitting, scoring, and scuffing found in Scott big ends is not due to lubrication failure, but to the way the machine is driven. If the load is trebled, life is reduced to one twenty-seventh. The oil in these bearings serves to cool them, lubricate the ends of the rollers as they rub against the cage, to flush out any dirt and metal particles, and to protect the bearing surfaces from corrosion.

The foregoing paragraphs give an outline of what we expect of an oil in service in the engine. Primarily, it must lubricate effectively all the working surfaces, but, in addition, it must help to keep the motor clean by preventing the formation of deposits. It must act as a heat transfer medium, keeping the engine at as even a temperature as possible. It must be chemically stable at high temperatures, and at the same time fully capable of protecting the working parts from the corrosive action of the acids of combustion.

These requirements apply to a Scott equally as well as to any other engine, but it is a mistake to think that it is more efficient to have plenty of oil pouring into the motor. There is nothing better than 'just right' and an excess of oil will not only go to waste, but will actually begin to form deposits in the combustion chamber, by burning.

*(concluded on page 2.)*

## A 4-cyl. TWO-STROKE THREE-WHEELER.

(Reprinted from the MOTOR CYCLING of October 21, 1936. With permission.)

Although somebody may have, tucked away somewhere, another vehicle which can answer to the description, I think I am safe in saying that a machine in which I have recently been for a trip is Britains only four cylinder two-stroke three-wheeler.

That makes you look up, doesn't it, you three-wheeler fans and two-stroke enthusiasts? And I can honestly say that the experience made me wonder why the valveless engine, in it's multi form, has not gained a bigger footing among three-wheelers.

The model which I drove, and which I will now describe is, in the main, a 1934 Super Sports Morgan, and I was given fascillities for inspecting it by Mr. J. Granville Grenfell, M.I.B.E., the well known racing tuner and engineer, of Brooklands Aerodrome, who had fitted its engines. These latter are two ordinary, reconditioned Super-Squirrel Scott units, each having a capacity of 596 c.c. They are, of course, water cooled, and are mounted in the usual place for a Morgan engine.

The two crankcases are fitted back to back and are supported by the standard Morgan lower engine bolts, aided by a pair of special bolts, higher up. The normal upper engine bearers, naturally, were removed before the Scott units were fitted. This arrangement lent itself admirably to the 'plot', for the cylinders, lying well to each side of the radiator, gave the air excellent access to this important component without making the Morgan look at all unorthodox or unsightly, and without interfering with the steering.

So far, so good. But what about the drive?

There they had a brace of tip-top motors, each giving off, on the bench, something like thirty willing horses apiece. The big question was how to link them up and persuade them to drive the three-wheeler. That problem occupied the days and nights of *chez* Grenfell, *père*, *mère* and *fils* (their tuning business, I might mention, is a distinctly family affair), for a long time. But eventually they cried 'Eureka' or something like that, and produced the scheme. It is a very good scheme and, although it may look complicated, it works extremely well and has given no trouble in practice.

The engines were made to run in opposite directions. This cancels out practically all vibration and, of course, torque reaction, and involves the use of two Mark X Renold chains, two countershafts besides the main driving shaft, and half-a-dozen sprockets. The nearside engine's job is to drive the central shaft; this shaft is supported, at each end, in the main engine plates by two large diameter ball bearings from an Austin Seven crankshaft and carries two of the sprockets; the offside engine drives a chain which runs under the second sprocket on the central shaft and over the sprocket on the upper countershaft. Then the chain dives down to an idler sprocket on the lower countershaft, runs round it, meets a Weller

tensioner, and so finds its way back to the engine. Another chain drives the magneto—a converted twin spark instrument off a 1922 racing Fiat—from the upper countershaft.

All the shafts run in heavy ball bearings and when the spaces between the sides and bottoms of the crankcases are closed by the front engine plate, and the upper and lower shields, the whole job runs in an oilbath. Carburation is by a pair of Amal instruments, the controls of which are cunningly synchronised by home made junction boxes. The drive from the central shaft is conveyed to the rear wheel via the standard Morgan clutch and transmission.

Engine lubrication presents no difficulty. The leads to the cylinder walls have been disconnected and sealed off and the usual main oil feeds have been neatly passed through the idle engine lugs on each outer side of crankcases. Each engine has its own double Pilgrim pump and the whole job has been most neatly carried out. The cylinders fire diagonaly.

My impression of this unusual Morgan was, from the first, a good one. The workmanship and assembly of each part denoted much loving care and I was not surprised to learn that such a vehicle would cost about £200 to produce complete. That of course is rather a lot of money, but my subsequent experiences with the machine led me to think that an out and out enthusiast who had 'the ready' would find that he had obtained his money's worth if he bought such a three-wheeler.

The engines were stone cold when I took the wheel and, although the electric starter was fitted and working, Mr. Grenfell decided against asking it to turn a couple of gummy crankshafts; as the starting handle had not yet been devised a rally of racing mechanics from the various Brooklands workshops in the vicinity was organised and so we were pushed off.

It took a certain amount of time for me to find the spot with the throttle and air controls, and the pushers were almost at their last gasp before I hit on the right combination. Then the engines gave a concerted cough...The pushing squad redoubled their efforts and for their pains were left lying flat on their tummies in a cloud of blue smoke as we shot off. Most people know what the acceleration of a Scott engine is like, but think what two can do?

The Scotts had new 'innards' and care was the keynote. 'No high revving please', were my directions, so I snapped into second gave and tooled quietly along on the road out of the aerodrome. Quietly is an apt description for, although I travelled fairly quickly in second gear, those engines merely purred. Many folk think that a four cylinders were unmistakably such. Yet the charm of the Morgan was that the power flowed so smoothly and was so abundant. In top gear, the machine just swam along—no mechanical noise, very, very little exhaust noise and flexibility to the nth. degree. It was three-wheeling par excellence, a ride in a dream machine.

Soon I stopped and felt the radiator and cylinder blocks. To my surprise, these were barely warm. Evidently the cooling left no room for doubt. And during the next few minutes the Morgan showed me a little of what she could do. Lots of riders dream of being able to pass a rival at 70 m.p.h.—and then change up. Well, that is what you can do with this Morgan, and in perfect safety, for the model holds the road like a leech.

I did not try the Morgan-Scott for maximum speed, because, although you can give a new watercooled engine 'the gun' in short bursts without risk, naturally a three-wheeler requires a fair distance in which to reach it's fastest gait and it would not have been fair to have jeopardised this lovely piece of work. At about half throttle I had all the speed I would be likely to want except in exceptional circumstances, and when I allowed the lever to creep past that position the 'urge' in those engines was simply terrific. How can I describe what it felt like? Perhaps the nearest appoach is the sensation experienced when a pal—a pilot at a South Coast airport—took me up for the first time and dived his aeroplane with the power on. The Morgan gave me something of that feeling of untapped speed lying in wait.

The Morgan would, nevertheless, potter along comfortably behind the slowest old family saloon that ever took the road. Naturally, below a certain r.p.m. the two-stroke engines were inclined to four stroke, but even then the power produced was remarkably smooth.

In due time I drove back to the Grenfell establishment reluctantly to hand back a three-wheeler that I would dearly have liked to have owned. It is my lot, during the course of earning my daily bread, to try out many three-wheelers: some are standard productions which I know almost for a certainty will be pleasant vehicles. Others are home bred devices laboriously built by enthusiastic amateurs. But the Grenfell-Morgan-Scott falls into neither category. It is a highly non-standard machine as you may have gathered, but it is put together with the skill and care that only an expert engineer can devote to the job.

And now I learn that Mr. Grenfell is thinking about 'blowing' this Morgan.

Phew!

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## DOPEY DEFINITION

by TOADOME

When you direct the hub of your front wheel in one direction, and the rim steers in a totally different direction, this is known as 'Hodgson's Choice'.

Our heartfelt symathies to Jack, who this time wasn't all right, but performed the Dartford Loop, and got himself plastered.

## "DEM DRY DRY CHAINS"

by Theoreticus.

Anyone who has ridden a Scott with a good motor, carburetion and ignition just right, and fitted with a brand new set of chains, perfectly adjusted, could not fail to enthuse upon it's absolute silken smoothness and it's purring, innocent desire to please. But how many Scotts on the road display even a fraction of this ultimate in perfection? Not many in the experience of the writer, and probably the first thing to mar the idyllic state once it has been achieved, is the clashing of tortured chains after the first fifty miles of fistfulls. The ride back from Brighton after the Pioneer Run was halted for over an hour to allow the assistance rendered by Magbutton Mike of the Pease Bros. Eporium to a Scott Owner who had suffered his magneto chain completely broken in two. The sight of this tattered, rusty string of agony being fed patiently back onto the sprockets by Mike's rouge red fingers has prompted the writer to scribe this screed on the subject in YOWL.

### CHAIN STRUCTURE.

The way to successfully solving any problem lies best through an understanding of the principles involved, so a paragraph or two on chain structure, wear, and lubrication must come first. A simple way to see how a roller chain is made up is to fully dismantle a complete inner and outer link set with a rivet extractor. Then try and understand the following description.

Each swivelling joint is built up upon the pin whose ends appear, lightly riveted, through the outer link plates. Around this pin is the bush which on most chain is reduced in diameter at it's ends where it fits into the inner plates. Because of these shouldered ends, the inner plates cannot gradually work inwards and bind the roller which is fitted over the bush and should be free to rotate upon it. In addition, the ends of the bushes are usually peened in some way or other to prevent the inner link plates working their way outward and jamming against the outer link plates, and making the joints go stiff.

### CHAIN ACION.

As the chain circuits the revolving sprockets, each joint is bent once and straightened once at each sprocket; in a simple two shaft arrangement this means four actions per circuit of the chain at each pivot. Where sprockets have only a few teeth, the bending is through quite a large angle, which means hard wear, but since even the magneto drive on a Scott has at least twenty teeth, the transmissions should suffer only a slow rate of wear. Normally the greatest wear occurs on the ends of the taut run of the chain since the loading on the slack run is only due to the weight of the chain and the centrifugal throw outward. If the chain is slack, however, or has a few bad links, it oscillates in the slack run and each joint is bent many times extra. This leads to excessive wear and noise. When a chain and sprocket are new, the rollers drop neatly

between the sprocket teeth and as the driving sprocket revolves each tooth picks up a roller, which rotates slightly as it rolls into the hollow in front of the tooth. If the inner link section is on the sprocket and the outer section just off of it, the pin and bush take the load as the joint pivots. If the outer is on and the inner just off the sprocket, the roller being supported by the tooth supports in turn the bush inside it and relieves to some extent the pressure between bush and pin as the joint bends. At first sight this would appear to mean that alternate joints get more wear than their neighbours, but it must be remembered that, at the other end of the chain run, the situation is reversed. All parts of a chain, where rubbing takes place suffer some where, but the most significant point is at the pivot. The pins develop flats and wear into the bushes on the pressure sufaces, and the main result is an overhall elongation of the chain. This first shows up as slackness, which, if not taken up by adjustment to the shaft positions, leads to clashing and backlash in the drive. Bang goes the silky smoothness. After many such adjustments the chain has to have a link removed, the shaft being taken forward again. It is, at about this point that the second phenomenom becomes noticeable. The chain no longer hugs the sprocket, but tends to ride up the teeth on the slack run. The pitch of chain and sprockets are no longer the same, and rollers strike well up the teeth. Extra rubbing also occurs as a roller escapes from each tooth of the driven sprocket on the taut run. This means extra wear on the sprockets and, since these are usually expensive, it is false economy to fit half links to extend the useful life of chains where the sprockets are in good condition. Owing to the drive being predominantly in one direction, this wear occurs more on one face of the teeth than on the other and leads eventually to a hook-like form. If a new chain is fitted to sprockets approaching this condition, the rollers are not supported by the teeth as the joints pivot and this leads to unnecessary wear on the new chain.

## CAUSES OF CHAIN DETERIORATION.

Where a chain transmission runs in an enclosed oilbath with clean oil,it is extremely long lived & reliable. Few practical oilbaths meet these conditions, particularly where crankcase breathers discharge the acid blow by gases from a worn top half into the chain enclosure. Where a chain runs exposed it suffers from rusting in the pivots. This rust is abrasive and once rusting starts the joint wears rapidly, and unless the rust is disolved out, oiling alone will not eliminate wear in joints so affected. If a group of worn links are on a sprocket, their pitch is compressed back to normal and the chain appears tight, but when these bad links are in either chain run, the chain goes slack. Whilst in the slack run these links oscillate and suffer further detioration. When in the taut run the opposing links in the slack run likewise suffer extra wear and the outcome is the development of the familiar two 'tight spots'. Once started the process develops by itself. Road grit is another cause of wear for, when

mixed with oil, it makes an excellent lapping compound. Chain wear from this cause is mainly external, but the worst sufferers are the sprockets. Even good chains will wear their way into the the spaces between the teeth, the sprockets then become short in pitch, hardened sprockets suffering almost as badly as mild ones.

LUBRICATION.

The four common means of lubricating chains are; (1) immersion, usually in an oilbath; (2) periodic cleaning and impregnation with a semi-solid lubricant; (3) feeding the chain with, or running it in, an oily vapour; (4) drip feed of oil.

The first is that usually employed for primary chains, some auxilliary drives, and final drives on luxury machines in the era when all the latest things on modern machines were thought out. The second method is the best a careful rider can do for his rear drive chain on most machines, even to this day. It is not much use however, unless backed up by a weekly application of the oil can, and even then more wear occurs due to corrosion than the work done. Number three is often relied upon for magneto, dynamo or camshaft drives. Some machines use vapour from the crankcase to wet the final drive chain, and an early Velocette two-stroke used a feed from one silencer to the primary chain. On a Scott machine, none of these first three are easy or sufficiently reliable and many machines run their entire life span revelling in the luxury of a squirt round with an oil can when the owner has time. The drips of reddened oil on the ground after the treatment is a tribute to its efficiency. The answer here lies in the old adage, 'a little and often' and the only reliable method is an automatic feed. This is most conveniently arranged by taking a gravity feed from the oil tank through a metering tap down to the chain. 1949 and 1950 Scotts had a very neat arrangement under the separate oil tank, but the oil mearly dropped on the primary chain on top of the clutch. If left on with the engine stationery it ran into the clutch and wrote off the linings, but at the same time, with the engine running the oil was immediately slung off without penetrating to the pivots where it was vitally needed. Very reminiscent of a well-known O.H.C. single which for many years was made with what seemed to be high pressure external lubrication of the cambox, and drip feed to the cylinder fins.

But, joking aside, there is only one place to oil, and that is on the edges of the link plates on top of the lower chain run. In this way the oil is thrown radially outward as the chain circuits to the next sprocket and is forced between the link plates into the pivots. Plenty will persist inside and outside the roller and on the sprockets if Ted Murphy's reccomended four drops per minute are used. At speed, one drop will oil half a dozen links, and on an average, each pivot gets oiled every few minutes. The chain oiler is turned on or off at the same time as the petrol and with this treatment chains will always look like new and the primary chain needing adjustment every 1,500 miles only. A special double

*(continued on page 16)*

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## 'DEM DRY DRY CHAINS' (cont'd.)

feeder is desirable, but perfectly good results can be obtained by oiling one edge. Once the oil is inside it will spread across the full width almost instantly. The best point to apply the oil is just before the chain goes onto the driven sprocket, so that the drops are not dissipated, or shaken off, before the centrifugal forces get to work at the sprocket. At this point, also, the chain does not vibrate, even when the drive is slack. The feeder, therefore, may be brought close to it with accompanying greater certainty of putting the oil where it is wanted. Applications of this principle to the lubrication of Scott chains, and how to get rid of the used oil, will be dealt with in the next issue of YOWL.

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## RENOVATING THE BANK (cont'd.)

Yesterday my '35 Scott went in for exchange against a 1931 model fitted with a 1948 engine. It would be impossible for me to describe the machine here, but I can let you into a secret; in appearance and performance it is absolutely tops.

# The SCOTT MOTOR CYCLE CO.

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*MAKERS OF TWIN TWO-STROKES SINCE 1902*

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