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**Cycle**

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**TRIO OF BRITISH TRACKS**



BMW MOUNTED GERMAN MOTORCYCLE POLICE OFFICERS

**SPEED TUNING THE TRIUMPH**

How An Expert Speed  
Tuner Does It!

# SPEED TUNING Triumph

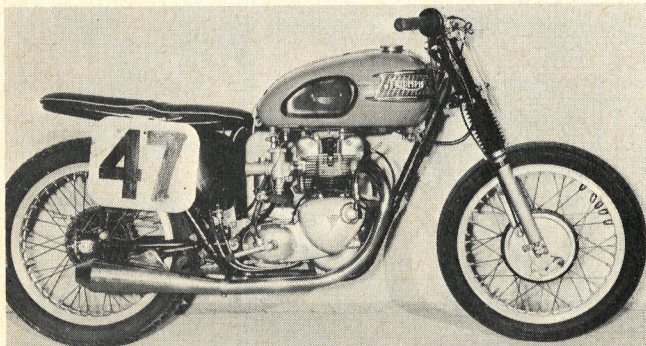
THERE HAS BEEN SO MUCH INTEREST IN THE SUCCESSFUL TRIUMPH SPEED TUNING EFFORTS OF CLIFF GUILD THAT THE FOLLOWING QUESTION-AND-ANSWER SESSION BETWEEN CYCLE PUBLISHER CLYMER AND CLIFF SHOULD BE OF VALUE TO TRIUMPH OWNERS.



Cliff Guild — a versatile chap. For some years Cliff Guild has been Shop Foreman for The Triumph Corporation, Towson, Baltimore, Md. He is one man who practices what he preaches as a rider, racer and mechanic. He is an all-around tuner of Triumph machines and still enters his lightweight in many events when time permits. He is a devoted Enduro rider and has finished most of the big woods runs in which he entered. He rides his street Tiger from Baltimore to Daytona every year just for the enjoyment. We hope some of the questions Clymer asked Cliff will prove of interest to Triumph riders, enthusiasts and mechanics, as well as others.

CLYMER: Cliff, the readers of "Cycle" would like the inside story of how you get so much out of your little Triumph Tiger Racers. Let's see, you've built bikes that have made it home in the 200 Mile Daytona Event with two seconds and one first . . . Is that right?

CLIFF: That's true, Mr. Clymer, but what Gary Nixon accomplished at Daytona this year (finishing second with a modified 1964 Triumph T100S/R road motorcycle) is astonishing in many ways and I think we'd better reach back into history a few years and give your readers some background material. First, we should recall that the short stroke, Unit Construction 500cc Triumph Speed Twin introduced in 1959 was an unusually smooth engine that seemed to have plenty of potential for racing conversion work. This "All-New" Speed Twin was light and handled well with a top speed near the 100 mile mark. Our job was to find a way to increase its performance by about 25%. We put a relatively unknown amateur rider, Ralph Tysor, on our first experimental job in 1959 and Ralph surprised everyone on the old Daytona Beach course by setting the fastest amateur time trial of 120.8 mph through the traps.



Converted job — the original 1959 5T/A Speed Twin in racing form. Further refinements might include a special one gallon oil tank and the addition of a fairing.

This speed was bettered by only one bike; expert rider, Brad Andres' big Harley. We knew right then that Triumph had designed a great motorcycle and a natural for tuning to compete in A.M.A. Class "C" Events.

This promise of race-winning potential was fulfilled when Don Burnett, riding a 1960 — T100 Model, won the Daytona 200 Mile National Road Race in 1962 after leading most of the way. Don also placed second in 1961, the first year that the 200 Mile event was run at the International Speedway. It was my task, and an enjoyable one, to prepare his bike for both of these races. Last year, (1963) a brand new Triumph T100S/R prepared by our dealer, John Melniczuk of Salem, New Jersey and ridden by popular Larry Williamson of Peoria, Illinois finished second in the Daytona 200 Mile National Championship. In preparing Larry's machine John followed all of our suggestions that had proved successful the two previous years.

CLYMER: Say, that's quite a record for consistent performance and reliability! One win and three times in second place out of four starts!

CLIFF: Yes, we're proud of our Daytona successes. Especially since Daytona is the longest and fastest A.M.A. Race and demands the MOST in horsepower and reliability.

CLYMER: I am sure the Triumph Factory has never considered their Standard Speed Twin or Sports Model — Tiger 100 machines as Road Racing Models.

CLIFF: Although it is true that these Triumphs were not originally designed and built for racing, it is surprising how much extra power and performance can be obtained by minor modifications. This, combined with excellent reliability, can produce a potential winner, under the A.M.A. Class "C" Rules.

CLYMER: What improvements have been made, say, in comparing Gary Nixon's 1964 Tiger 100 Road Racer with Tysor's 1959 Speed Twin conversion?

CLIFF: We have concentrated on improving the reliability of the engine unit, while at the same time increasing the



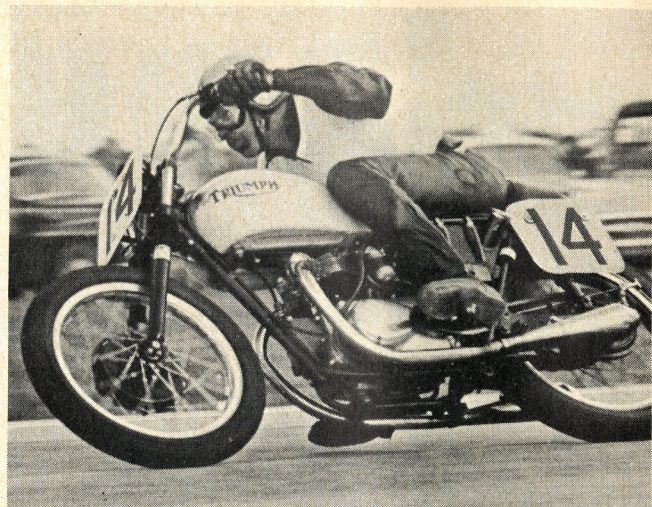
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changed. Our racing valves are made of a more expensive, nickel-chrome, high strength alloy and the inlet is  $\frac{1}{8}$ " larger than standard. The size of the exhaust valve, however, is not changed. Naturally, this over-size inlet valve requires a modification to the cylinder head and we do this work for our dealers on an exchange basis. As we get on with this interview, you will note that the cylinder head conversion is the major change to gain more power. Incidentally, the success of this development actually dates back to 1960. At that time, we developed a special nickel-chrome alloy valve seat insert that we install in the standard cylinder head to provide the largest possible seats for the over-size inlet valves.

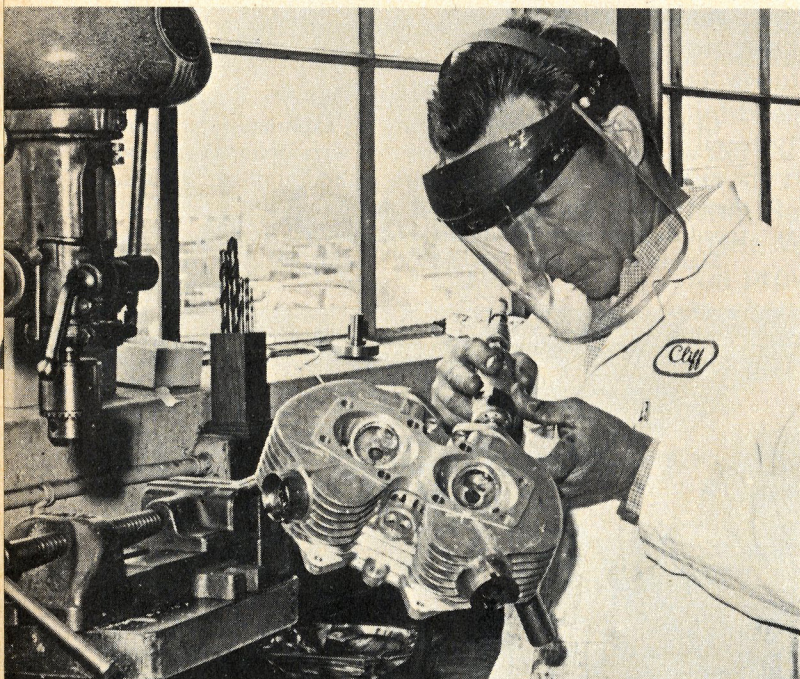
CLYMER: How about carburetors? Do you fit the biggest you can jam under the tank?

CLIFF: No. Our experience has convinced us that two

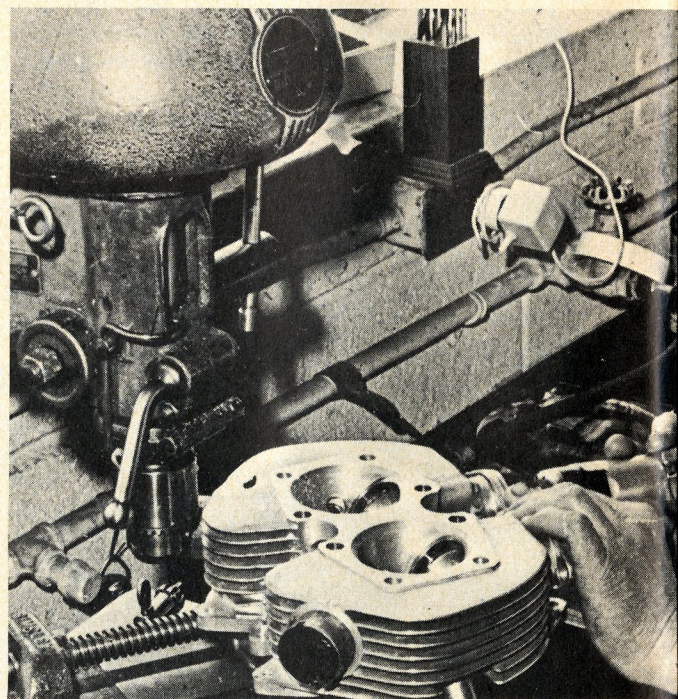
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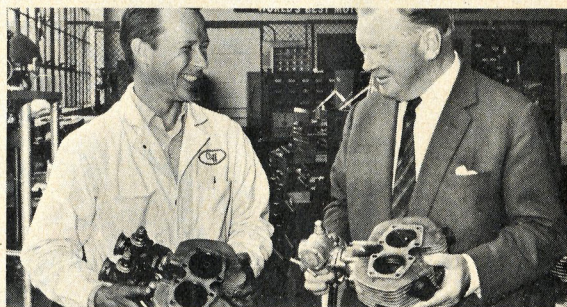
Burnett at speed: Don Burnett flying low into a second spot in the 1961 Daytona 200. In 1962 Don won the 200-Mile National Championship.



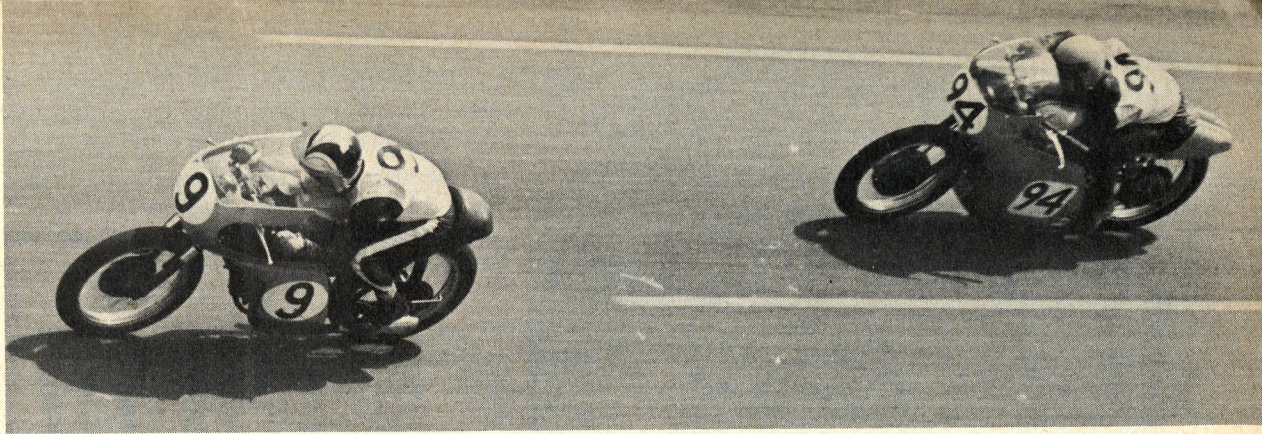
Doing a little relieving — Cliff Guild uses a high speed Die Grinder to open up the intake ports to the prescribed  $1\frac{1}{8}$ " diameter. The Triumph Corporation offers to rework Tiger 100 cylinder heads as part of its many services to dealers.



Installing over-size valve seats. Cliff Guild is modifying a batch of T100 cylinder heads that are offered to Triumph dealers on an exchange basis. Note the twin carburetor adaptors and special boring bar used for valve seat installation.

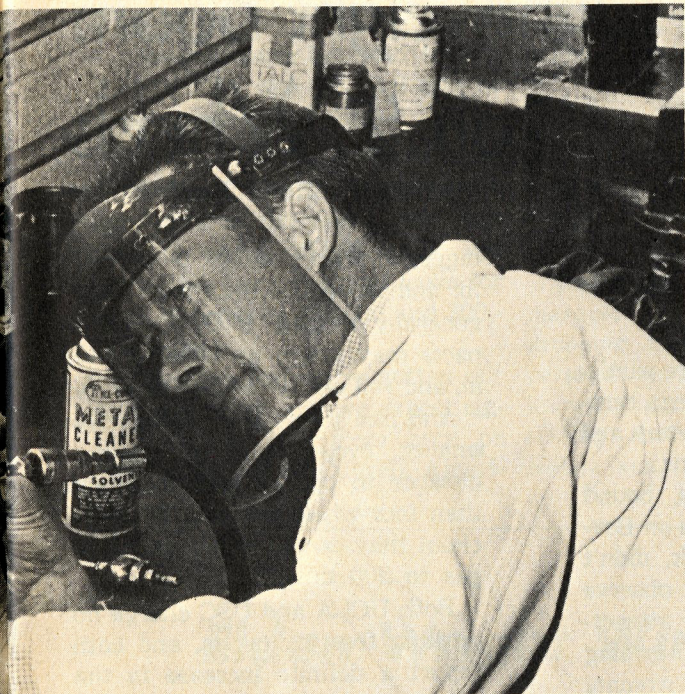


The big difference. Triumph Engineer Edward Turner is very familiar with the fact that master mechanics will try to improve on his stock products; he did his share with other makes when he was a young enthusiast. Here he holds a stock Tiger 100 cylinder head, with single carb and standard valves, and smiles at Cliff Guild's modified head with its larger intakes and double pots. The place is Triumph-Baltimore's fine headquarters, where Cliff is the Shop Foreman.

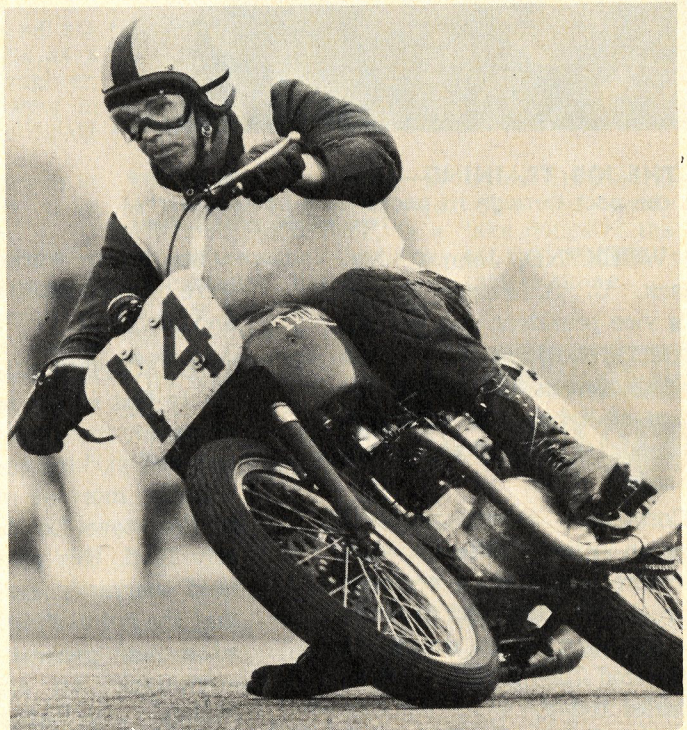


Gary Nixon leads George Roeder in the early part of the race. 1964 Daytona Beach 200-Mile National Championship.

## SPEED TUNING THE TRIUMPH

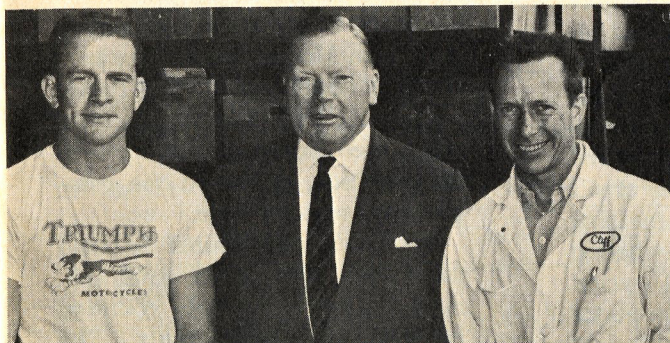


Cliff Guild — a versatile Shop Foreman

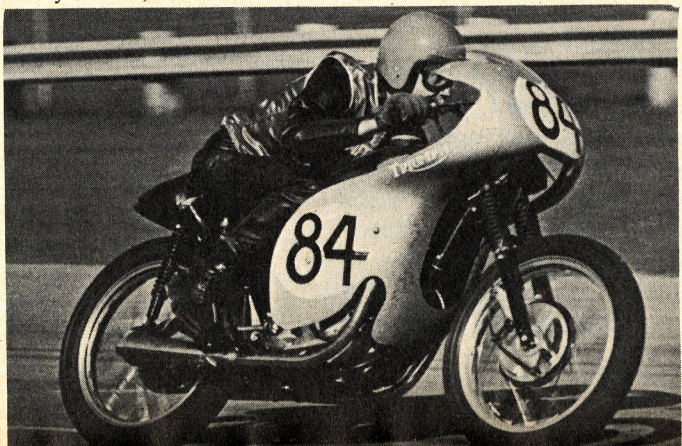


An impressive job — Don Burnett heeled over on his 1962 Daytona winner, the same job that gave him a second spot in the previous Daytona in 1961. — Bill Newrock photo.

Flying Tiger: Larry Williamson, placing second in last year's Daytona 200 (1963), riding a Tiger 100 prepared by New Jersey dealer, John Melniczuk.



Three Tiger enthusiasts — Gary Nixon, Triumph's Edward Turner and Clifford Guild. The stack of cylinder heads are awaiting rework.



Type #29 Amal carburetors of 1½" bore size give best all-round performance. We have tried many kinds of carburetors and although some racing types may give a slight power advantage at the top end, our successful combination gives excellent acceleration without sacrificing top speed or reliability. When we developed our exchange program for racing parts, as shown in our Tri-Cor Accessory Catalog, we tried to bear in mind that racing is an expensive game under any circumstances and the price of special parts and modifications should be reasonable. For example: a pair of Type #29 carburetors and a racing remote float bowl costs a good deal less than a pair of racing carburetors. Our exchange price to convert a standard cylinder head to take these twin carburetors and big valves is only about \$20.00. This includes the fitting of the special inlet valve seats as well as the cost of the seats and the carburetor adaptors. Further hand work like porting and polishing costs another \$20.00, but many dealers prefer to save this cost and also have the pleasure of doing the final work on the ports, fitting bronze valve guides, etc.

CLYMER: What other modifications do you make? How about rocker arms and valve gear?

CLIFF: Standard rocker arms must be carefully inspected and polished. We look for possible flaws in the forgings, mislocated oil holes, and things like that. We always use stock parts until we have proved that a change is necessary.

Standard push rods, polished for strength, as well as standard Factory racing tappets are used. Our racing valve springs differ from original equipment type, however, as we use a single spring of special material. I believe it was originally developed for a racing Porsche application and when used with Triumph Factory racing cams and valve gear it has proved extremely reliable. Incidentally, we limit our maximum engine revs to 8,500 RPM.

CLYMER: What type of ignition do you use?

CLIFF: In the early days (from 1959 through 1962) we favored a "flywheel" magneto of our own design and a modified distributor made from Autolite parts originally used in the famous Indian Scout. For the past two years, however, we have used the standard Triumph "E.T. Ignition". This could be termed an "A.C. Magneto". The primary current is developed by a standard Lucas alternator of the type fitted to all 1963-64 Triumph T100S/C Models with direct ignition and lighting (no battery). A very important improvement in this ignition system was made by Triumph in 1963 when they introduced twin contact breaker points located in the timing cover with the C/B cam driven by the exhaust camshaft.

CLYMER: Do you mean you are using the standard A.C. alternator that is located in the primary chain case? Isn't there considerable risk of ignition failure due to extreme vibration, hot oil and metal particles in the primary case shorting out the windings of the stator coils?

CLIFF: Yes. This can be a problem and we have seen cases of failure in long distance racing events when a machine is running for several hours mostly at full throttle. Vibration can cause damage to the windings of the stator coils and a secondary problem involves short circuits in the windings caused by penetration of metal particles suspended in hot oil. A surprising amount of metal develops as the result of normal chain and sprocket wear under racing conditions. Fortunately, we have found the solution of this problem by completely encapsulating the stator windings in a tough epoxy plastic material. The dealer cost for this modification is about \$15.00, but it is well worth it as the completely molded unit is extremely reliable and eliminates the possibility of mechanical or electrical failure.

CLYMER: What about other important engine parts, pis-

tons, rods, lower ends?

CLIFF: These are all standard production components. We use stock Tiger pistons as fitted to all standard T100 Models. These pistons have a compression ratio of 9:1. Stock connecting rods and crankshaft assembly are used. Of course, all of these standard parts are carefully inspected and assembled with special attention to eliminate any unnecessary friction. We do not make a practice of polishing the crankshaft and flywheel, nor do we alter the flywheel from original Factory specification. We do, however, carefully check the crankshaft and flywheel assembly for static balance. When fitting the drive side main ball bearing it is important to make sure that there is no tightness due to "pre-load" condition.

Little things like primary chain alignment can win or lose a race. With our modified engine putting out approx ⅓ more power than the standard unit, we consider the primary chain to be highly stressed and we do everything possible to make sure that it is running under best possible conditions. This means carefully removing rough spots on the teeth of the engine sprocket. The sprocket is "glass-hard" and any burrs or high spots in the metal could damage the chain. During the past season, we have used the standard primary chain tensioner in our Road Racer. We believe this may be beneficial and it is interesting to note that the primary chain in Gary's bike after 200 miles of racing and 150 miles of practice still looked in beautiful shape with no unusual signs of wear.

CLYMER: With this increase in power and all of the gear shifting required in a long race like Daytona I am wondering how the standard clutch holds up, or is it a standard clutch?

CLIFF: Prior to 1963, the standard five plate Triumph clutch was considered a weak point under the most severe usage. In 1963, however, Triumph re-designed the clutch for all of their Twin Models. They also modified the cushion drive incorporated in the clutch center. The result was a smoother drive and more capacity by adding one more plate. In order to cope with the added power of our racing engine, we have made only two modifications to this latest clutch assembly. We use special, oil-tempered chrome silicon, clutch springs that are more resistant to heat fatigue than the standard springs. We also add a special "Extra-Driver" clutch plate which actually increases the friction surfaces from eleven in the standard clutch to thirteen in our racing conversion. Oh yes, I almost forgot, we also drill holes in the clutch sprocket housing to help ventilate the clutch plates. This year, we never replaced a part in Gary's clutch throughout practice week and although the plates showed evidence of extreme heat at the end of the race they were still in good condition. This is certainly significant when you consider the fact that we were pulling a gear ratio of 4.68 to 1. Gary shifted gears 18 times per lap, or a grand total of 1,620 shifts during practice and the race.

CLYMER: That sounds like a lot of "wear and tear" on the gears! I suppose when you convert a standard motorcycle to a road racer, many changes are made in the gearbox.

CLIFF: No, not really. In fact, the gearbox is untouched except to increase the tension of the selector cam plunger. In other words, we fit a stronger plunger spring to give a more positive location for the shifter cam. Of course, we do replace the standard ratio gears with close ratio type which are optional stock replacement parts. Prior to 1964 we fitted a layshaft right hand needle bearing. The 1964 Models have this feature incorporated as standard equipment, however, and it is no longer necessary to make this change.

CLYMER: Well, that's an indication that Triumph has benefitted by your racing experience. Do you believe this is true?

*Continued on Page 56*

# 500cc and 250cc

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Ducati with Tom Madak getting third on his Parilla.

Over 112 members of the AAMRR raced on some 137 machines in 9 separate events and no less than five practice sessions without a single accident of any kind! This safety record must be in some manner attributed to the Rider's School, a special instruction session introduced by the Association of American Motorcycle Road Racers. The first full school session took place on the Vineland race circuit the day before the actual race meet. Three seasoned experts in the art of road racing, Anthony Woodman, George Rockett and Maurice Candy gave instructions to over 30 aspiring champions. The "students" turned up in full leathers, helmets and some very professional looking race equipment. They were asked to form three separate groups whereupon each of the "teachers" took one group.

The "students" were taken around the circuit singly and in groups under the supervision of one of the Senior riders, they were given tips on cornering, choosing a groove, passing, "bump" starts etc. The groups were rotated, so that no two groups were on the course at the same time and each group had the benefit of learning from each of the three instructors.

The students were all carefully observed and after the instruction portion, during which they all rode, was over, they formed a roundtable discussion period at which time each riders form and performance was commented on. Students had ample time to ask questions and obtain some sound advice.

Only sad note was that over forty would-be participants, thinking that post entries would be accepted, were told that they could not race. Many were not members of the AAMRR, expressed a desire to join (which they did) and then proceeded to volunteer their help in the support of the AAMRR. Among the numerous spectators who made their way to the pits after the race were several well-known motorcycle personalities, dealers, representatives of motorcycle importers and the trade as well as some well known competition riders belonging to other clubs.

Next AAMRR event scheduled for the Vineland Race Circuit has been set for June 14th at which time a field of sidecar teams from both the USA and Canada will compete for both prize money and the beautiful Victory Trophy sponsored by one of the major oil companies.

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## Expert Speed Tuner *Continued from Page 24*

CLIFF: Oh yes. In fact, in 1960 we experienced several layshaft bushing failures in the race that was held on the Beach. As a direct result of this experience, the Factory replaced the bronze bushing on the left hand side of the layshaft with a needle bearing.

CLYMER: So far, things seem generally standard in the engine and gearbox, but what about the externals?

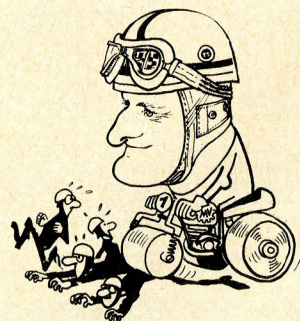
CLIFF: We must do everything possible to prevent oil from getting on the back tire. To accomplish this we make a rather simple, but very important change in the engine breathing system. The normal crankcase breather tube located just ahead of the gearbox sprocket is plugged and we drill two 1/4" holes connecting the crankcase breather valve to the primary case. The primary case is then vented to atmosphere through a large breather tube located at the top of the primary case. There is a constant circulation of air and oil from the engine base through the primary drive and any excess oil that accumulates in the primary case is transferred back into the engine via four 1/16" holes at the normal primary oil level. We also vent the gearbox to avoid any leakage caused by a pressure in the box due to the extreme heat encountered in a long distance race. With our Unit Construction Engine the gearbox casting is about the same temperature as the crankcase.

Regular Castrol oil is used throughout—not because we happen to distribute that brand, but because we have found that it does a first-rate job of lubricating our engine. Nixon, for example, used Regular Castrol SAE 30 oil for the 150 miles of running during practice week. For the 200 Mile Race, however, we changed to Regular Castrol SAE 40. The only use we have for the special vegetable base Racing Castrol R40 oil is in our gearbox. This special oil is designed to withstand the extreme pressures encountered with steel on steel bearings and makes a very good gear lubricant. Fortunately, with our Tiger engine design there is no chance of this R40 transferring from the gearbox into the primary case or the engine and contaminating the regular engine oil.

CLYMER: While on the subject of oil, how about the big oil tank under the seat?

CLIFF: It's a one gallon container of our own design, held in place by sponge rubber and four springs. We carry these tanks in stock. The only improvement we might make some day would be to increase the capacity and eliminate the need for checking oil during our Pit Stop.

### MIKE HAILWOOD AS THE FRENCHMEN SEE HIM



The above cartoon featuring Mike Hailwood appeared in the French Moto-Revue Magazine. Apparently, the French enthusiasts consider Mike quite a rough guy with his MV Steam Roller.