How Army Motor Cycles

By
ARTHUR BOURNE,
Editor of
"The Motor Cycle"

A test of frame and forks! The new 263 lb. 350 c.c. vertical twin Triumph leaping over the summit of a 1 in 2.43 slope. The motor cyclist standing between the two officers, notebook in hand, is the Editor of "The Motor Cycle"

"THEY have been approved." The speaker, a Ministry of Supply Senior Experimental Officer, was referring to the three motor cycles in front of us. What does the word "approved" denote when applied to a new type of motor cycle? Come with me and watch exactly how potential Army machines are tried, tested, proved, and finally, approved.

It is a very dirty morning, one not only for wac rs, but collar buckled right up if I am to look presentable on arrival at the present headquarters of the Mechanization Experimental Establishment. The run calls for no comment; the interest lies in what happened after it.

Ready waiting are the machines and the riders—Army men, brilliant riders, many of whose names are well known to trials and scramble enthusiasts by reason of their successes in civilian and Army events. First, however, an introduction to the manner of testing. The new model, perhaps a machine selected by the Ministry of Supply as likely to make a suitable Army machine or one submitted by an approved manufacturer, is handed over to the Mechanization Experimental Establishment—the M.E.E.—for its acceptance tests. These are no mere one-day affairs, or even six days. They comprise, as a first step, tests of no less than ten thousand miles. And this is not just Land's End to John o' Groats and back, with the dose repeated half a dozen times. The running is divided up into road and cross-country work. For every three miles on the road there is one mile across country—battering the machine across country so that if there is any weakness structurally it will be revealed now and not when the machine is in use by the Service.

The ten thousand miles is divided into a first and second 5,000, and the going and, as far as possible, all the conditions are exactly the same on each 5,000, so that it may be checked whether the racketing about is causing any deterioration in performance.

First, the machine is run-in for five hundred miles irrespective of whether the maker has done any running-in or not. Then come tests which will be repeated at the end of the ten thousand miles. These include tests of average speed on the road and across country, timed hill-climbs and a 100-mile petrol consumption test carried out at an average of 30 m.p.h. Average speed on the road is taken on a round trip of a hundred miles over roads which I know well, and can be said to be good, reasonably fast main-road going. The cross-country fifty miles is over a circuit $2\frac{1}{2}$ miles long which involves continuous hard plugging—a circuit on which a heavy machine can take some handling.

This, of course, is not by any means the sole rough stuff—far from it! As will be seen from what follows later, and from the photographs, rocks, deep sand, gravel and gradient are among the machine's hazards. And every day the performance is logged. Each time the machine

are Tested

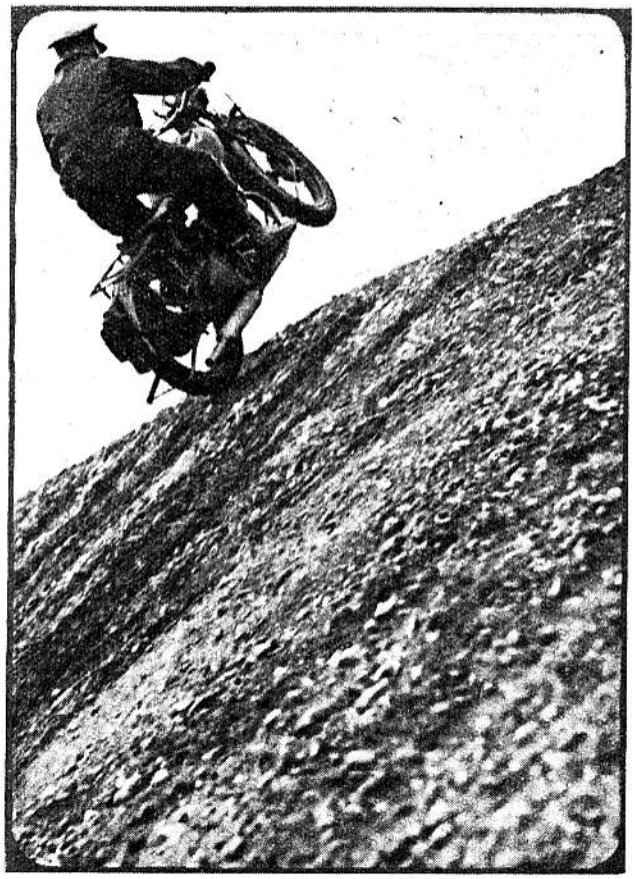
A Day Out with Members of the Mechanization Experimental Establishment and Three of the New Army Lightweights—a 350 c.c. Vertical-twin Triumph, a 250 c.c. Matchless and a 350 c.c. B.S.A.

Riding along a stream provides a test by water and, since the stream is dotted with large rocks and lumps of tree trunk, also tests of ease of handling and ground clearance. The machine is the new, specially light 250 c.c. overhead-valve Matchless

goes out, what is called a "Work Ticket" is made out. There is little of a "ticket" about it, for it consists of a large sheet of paper with printed headings on each side. On this goes down the time at which the motor cycle leaves, the time it returns, speedometer readings, amount of fuel and oil added, particulars of any special tests carried out, what adjustments, if any, are made to the machine, details of any defects that have developed, and so on.

Later all the information gleaned is set out in a mighty log book. Turn over the pages and one finds, first, the specification of the machine under test compiled by the M.E.E., then the facts and figures about it which the maker forwards when submitting the machine, next a sheet showing exactly what tests the M.E.E. is to carry out, fourthly particulars of every adjustment and repair with copies of those manufacturers' headaches, "Defect Reports," fifthly a daily petrol and oil consumption chart with mileage and the hours the engine has been run. Other data in this extraordinarily comprehensive log are facts and figures covering hill-climbing and average speeds in the various tests. Next come details of the stringent final examination in which the machine is stripped to the last nut and bolt and every part examined and measured for wear. This is followed by the manufacturer's own comments, for he is invited to send down representatives to examine the bits and make their own report. Sometimes these latter reports tally with those of the M.E.E.; sometimes they don't! Anyhow, their report goes in the dossier, too. And, lastly, there is the "Experimental Report." This does not mince matters. If something is wrong, as in one case a saddle, down is the forthright statement:—"In the opinion of the M.E.E. this item is unsuitable." Perhaps the least popular articles are footrests. As one man remarked plaintively, manufacturers don't seem to appreciate that a cross-country rider spends as much time on the rests as he does on the saddle—in fact, rather more—and footrests *don't* like it.

Even this does not complete matters. When a machine has been approved there is a "production model" test. This is of the machine in its final form, that in which it is entering production. It is shorter—only 5,000 miles—



A current model 350 c.c. side-valve Triumph shows that, even from a standing start, it can romp up Red Road to such good purpose that it leaps high over the summit

but instead of comprising three miles on the road for every one across country there are 2,500 road miles and 2,500 in the "rough." The day we are here there are machines undergoing the production model test.

The Army has decided to go in for lighter machines. Full details of the new motor cycles must, however, wait until they start to be issued to the Service. Taking in alphabetical order those machines under test on the day of my visit we have: a 350 c.c. overhead-valve B.S.A., weighing, with cast-iron cylinder and head, 301lb. (this machine had just arrived and was being run-in); a 250 c.c.

How Army Motor Cycles Are Tested—

overhead-valve Matchless with a weight of 282lb., and a 350 c.c. vertical-twin Triumph, weighing, with cast-iron cylinders and head, 263lb. There is also a 350 c.c. side-valve Royal Enfield of 276lb., which has been stripped for its all-embracing examination and measurement of wear, and which, like all the foregoing, has also been approved for production and therefore use by the Army. The weights, by the way, include petrol, oil *and* tools.

All these extremely interesting machines have been developed in response to requests for suitable Army motor cycles weighing 70 to 100lb. less than the existing standard W.D. models—machines which are therefore easier to handle and, when necessary, manhandle. The weight to which designers had to work was 250-276lb., according to size of machine. This was before the light-alloy position became difficult. Now cast-iron must replace the light alloy used for various parts, and an appropriate increase in weight has been allowed.

Much of the weight saving has been achieved by design. One of the biggest savings, however, has been on the electrical side. Gone is the battery (a standard battery weighs about 10lb.); the lighting is direct by a small, light, alternating-current generator, and the head lamp is of the type fitted to lightweight two-strokes.

Some idea of the loose nature of the "gravel" surface of the 1 in 2·43 climb at Miles Hill can be gained from this picture. The machines are timed from a standing start at the foot. Note how the M.E.E. rider stands high on his footrests—a habit with the M.E.E. staff, perhaps because of trials or, maybe, the type of riding position to be found on modern production machines

Two machines, it will have been gathered, are actually undergoing the full tests—the 350 c.c. Triumph twin and the 250 c.c. Matchless; to these is added, for the sake of comparison, a machine at present in Service use, a 350 c.c. side-valve Triumph.

And now, having gained an insight into the methods of testing and having inspected the machines, we will make the trek to the first of the various points, that at which the timed road climbs are carried out. I must add that, while standard tests are laid down covering various types of Army vehicle, the hazards the motor cycles have to face are in many cases peculiar to themselves because of their habit of laughing aside what, with another type of vehicle, would be a test that was very severe indeed.

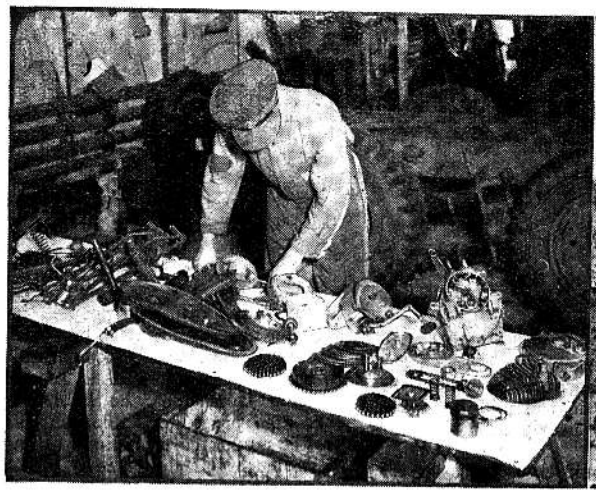
Among the many tests are climbs of Boulder Alley with its high, and frequently slimy, rock steps. To protect the riders on their day-after-day trips each is provided with a Barbour "International" suit

However, the first test is one applicable to many vehicles, except that it has been found highly desirable that the motor cycles tackle it from a standing and *not* a flying start. It consists of a more-or-less main-road hill with an excellent tarmac surface and some curves that definitely require knowing. Marked out by posts is a stretch of 515 yards with an average gradient of 1 in 10.45. Here, by means of synchronised watches, the times are taken of each machine—in the gears. The best figures are used, not averages of the various runs, because much can depend upon whether the rider has employed his gear box to maximum advantage.

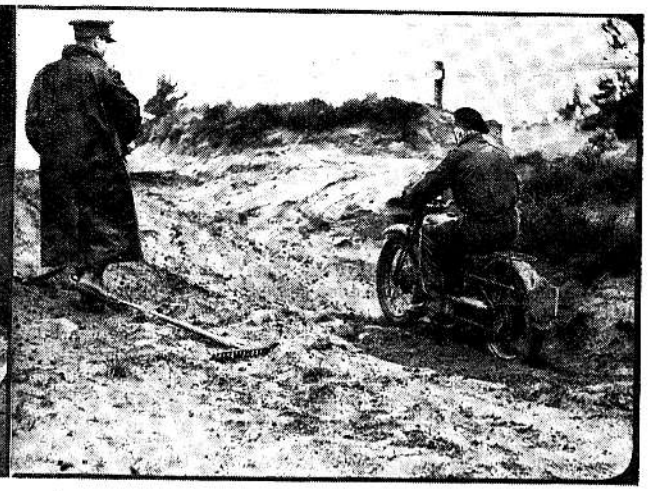
Twice as Steep as Porlock!

Another purely speed test is carried out on the level. In this case the machines are tested for acceleration by being timed over a quarter of a mile.

All this is straightforward, just like those average speed on-the-road and across-country tests mentioned earlier. What about hill-climbing? Into the saddle we get again (yes, it is still raining!) until at length we fetch up at a point well known to trials enthusiasts—"Miles Gravel Slopes," or, as motor cyclists have been apt to call them, "Those tank-testing hills at Miles Hill." They have been included in Army trials, and a spicy little course I fixed up for the M.C.C. Team Trial a few years ago. Two of the various slopes are used by the M.E.E. for their standard tests. You see in one of the pictures the twin Triumph leaping high as it shoots over the summit of one of them. This is a very rough gravel slope with a gradient of no less than 1 in 2.43—yes, 1 in 2.43, which means about twice



Parts of a machine—the new lightweight 350 c.c. side-valve Royal Enfield—laid out for inspection. The examination which is carried out at the end of the gruelling 10,000-mile test involves the machine being dismantled right to the last nut and bolt; all wear is reported on and, where possible, measured



"Sandy Nullahs" are used for restarting tests. As a rule the sand is loose and deep, with the result that a machine needs quite a lot of power to get under way. On this day of rain, however, it was necessary to use a shovel and rake to make the surface anything like "suitable"

as steep as the worst part of Porlock! This is timed, not with a flying start, but from a standing start at the foot.

From hill No. 4 the scene changes to "Concrete A," a little farther along. This has a gradient of no less than 1 in 2.25 and is made up of concrete slabs not unlike those of the Brooklands test hill, but is very much steeper. What happens here is that the machines have to *restart* on the 1 in 2.25 gradient! What a test of clutches—yes, and shades of my restarting test on Beggars' Roost described last week!

On Wet, Slippery Concrete

To-day the surface of the concrete is wet; it is slippery. The Triumph twin manages it well with a plunge or two; the old-type side-valve three-fifty Triumph only just, and the very light two-fifty Matchless quite reasonably well except for a lot of wheelspin when the clutch is let in with the throttle wide open. Truly the tests are severe—I need hardly worry as to what I set the next machine I try out in the series, "What the Army Rides"!

Next on the list is "Sandy Nullahs." Here is deep sand (or it would be deep were it not for this heavy rain) and the test comprises a series of restarts on a short but steep upgrade, one much steeper than that alongside, which is used for other types of wheeled vehicle. More tests of clutches!

What else is there reasonably close at hand which we can see? Red Road? Good!

The famous "Camberley" hill is not tackled in the manner of the Bayswater Scramble or that of the Southern Scott Scrambles of days gone by; there is no rushing at the hill from the foot or even turning on to it from "Easy Red Road." Some will recall an isolated silver birch on the left-hand side at the start of the very steep gradient. This is where the machines have to begin their timed climbs, and this is where the Editor of *The Motor Cycle* found that he owed a couple of very good riders a packet of Players apiece. The two-fifty Matchless and the 350 c.c. side-valve Triumph, in spite of starting right on the gradient, got up with ease! The vertical-twin Triumph did *not* enter into the matter (the rider had not heard the remark, "It looks as if from there you will have a job to make it," and in any case was *not* included). It simply hurtled up and with yet another leap at a summit to towse the frame and forks.

Lunch was now indicated. Already we had gained a very good idea of the tests, but there were two things we had not seen. "What do you do about testing the models in watersplashes?" I asked. "And what about rocks?" The answer to the latter part was that the pet was Boulder Alley; it revealed whether the ground clearance was adequate and whether, if the answer was "Barely!" there was any part of the machine definitely vulnerable. As for splashes, well, there was a certain stream along the bed of which motor cycles could be ridden if they were easy to handle and if they were not subject to "derangement" by water.

Right! Might the party go there after lunch? They did, and there was the hill of rocks, Boulder Alley. You can see the stream from the photograph—the tree stumps, the baulk of timber across the mouth, the big stones here and there. You cannot, however, see the depth of water that is liable to be a feature; the day was unhelpful.

Rock Steps of Boulder Alley

As for Boulder Alley, with its rock steps, a camera may not lie, but it cannot reveal slime, nor does it always show just how high the rocks are. As a test of handling, under the conditions that prevailed, it was excellent, as well as providing a practical—as opposed to theoretical—test of ground clearance.

And so the day ended except for the two invited journalists. For them it was yet another case of adding to their knowledge and experience. Both were and are members of the Army Motor Cycling Control Board; each handed his motor cycle over to a member of the M.E.E. staff and took it in turns to ride the new Army lightweights back to the present M.E.E. headquarters. Of impressions, comments, praise and criticism—all these must wait. I can say this on behalf of both of us: we were impressed, and we were also very impressed by the nature of and way the tests are carried out. I am not saying that any test will find out all the points, for there is a maxim that a manufacturer can test a new model in every conceivable way and still the public will find something wrong, but if only the Mechanization Experimental Establishment's way is that of manufacturers in regard to their post-war machines few of us will grumble. . . .