—Their Name i

FEW features of motor cycle design have gained such ready—almost instant — acceptance as "Teledraulic" front forks; probably still fewer registered trade names have passed so quickly into motor cyclists' vocabulary. What exactly are "Teledraulic" forks? How do they work? Many have asked these questions. Although the Army has had the forks in use for nearly two years, and "Torrens" has had some 10,000 miles' experience with them, the answers have had to wait. The reason was simply this: the need for covering the various unique features by patents.

Now the veil can be lifted. First, however, a few words about the forks' "performance." Cornering, road-holding, steering in general—on all these counts the forks set a standard and, at the same time, provide a degree of riding comfort that is altogether exceptional. There are no adjustments to be made; there is nothing that is adjustable—not even dampers to suit differing road conditions, the forks seeing to this side of matters automatically. Gone are such things as fork links, to develop side play and require adjustment. There are no grease nipples for attention; the forks attend to their own lubrication. And while the instruction booklet states that the oil level should be checked every 3,000 miles, the facts are, in our experience, that there is no alteration in level and no leakage. Perhaps not least, the forks are extremely easy to clean.

There are other attributes. The forks are immensely strong. They are considerably more rigid in every direction than their opposite number, the girder fork. There is nothing dancing up and down just below the rider's line of sight. The front tyre wears unusually evenly. There is no brazing in the forks. Any part can be replaced by the owner merely by use of spanners and a screwdriver. A fork tube unit can be removed from a crashed machine and a new one fitted in its place in 12 minutes. This is with two men working on the machine, and covers removal and replacement of the front wheel.

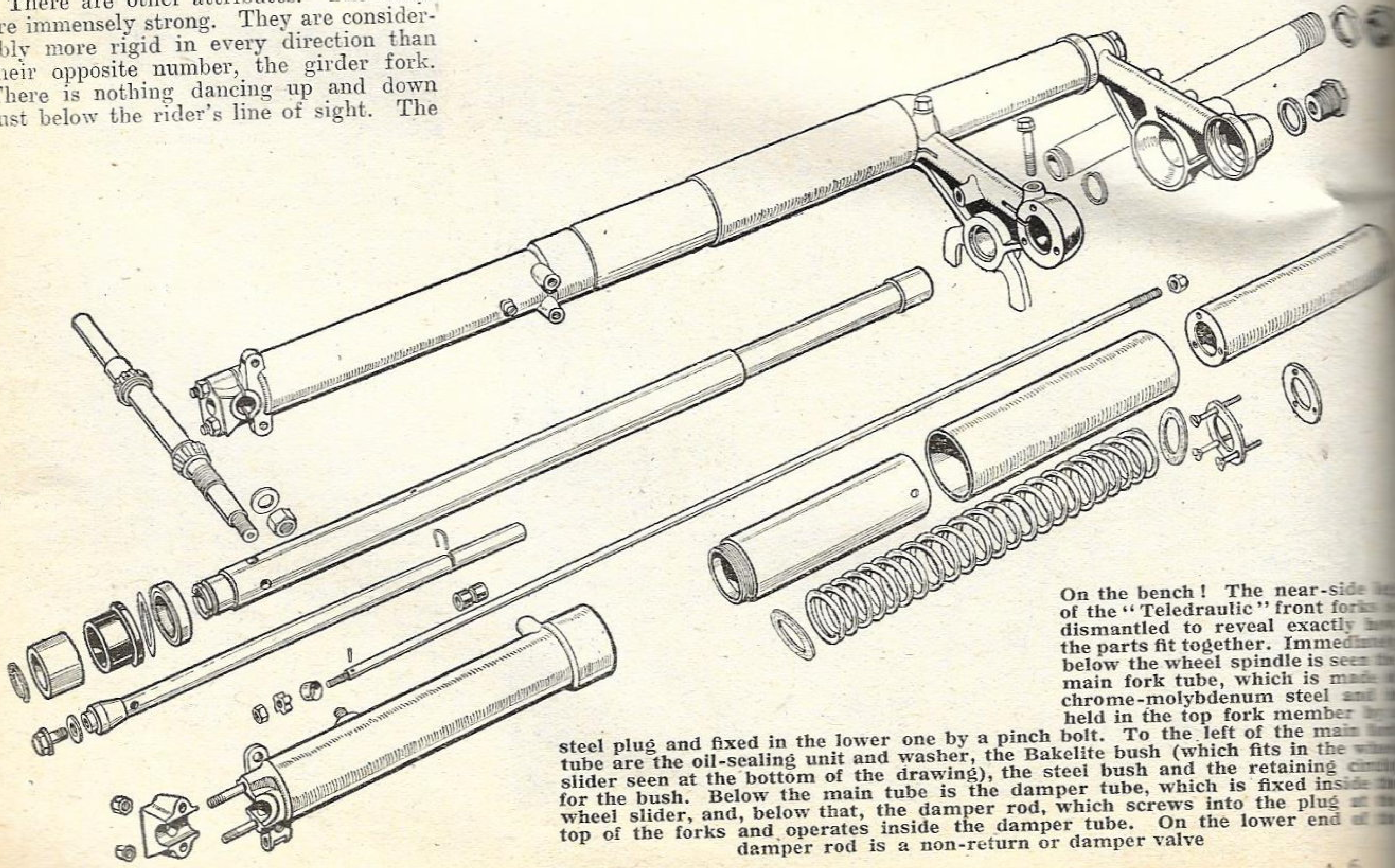
Assuming the rest of the machine is "right"—not forgetting, of course, the steering head bearings—the steering and general handling are a revelation. "Torrens'" experience is that even at 80 and 85 m.p.h., and no steering damper in operation, for he has discarded it, the steering of his machine is finger-light, yet absolutely positive. His comment is: "Mutt into nigh unto expert!"

Question of Cost

What are the so-called snags? Replacement of parts in the event of a crash has been mentioned. So far as getting home on damaged forks is concerned, there is not exactly a lot of difference between a pair of "Teledraulics" that are "solid" and a pair of girder forks in a like state. There is, however, the question of cost. The "Teledraulic" front forks are essentially a de luxe fitting and no one is likely to expect a de luxe feature at the price of an ordinary one. The facts are that these forks cost approximately 40 per cent. more to manufacture than the equivalent girder forks. At present-day figures ... amount to be added to the cost of ... motor cycle would be the better part ... £2.

As those who have examined the ... closely will know, the forks, externally ... give an impression of marked simpl... They are not quite so simple as ... look! Pressing up and down on ... handlebars, too, does not give much ... a clue to their action. The parts ... sees are merely covers, except the ... alloy fork sliders that carry the ... To note the movement of the forks ... necessary to watch one of the sl... On the road the movement of the f... substantially free and undamped ... the normal position. The springs ... incidentally, are so light that they ... be deflected quite readily by hand ... sure on each end and, were they ... ployed without the hydraulic da... would merely close up solid on the ... striking a pothole. Thus, the forks ... and fall even when the road irreg... is slight.

Where the damping is called into ... play there is the progressive ... which is desirable. The light oil— ... hydraulic medium—is forced throu... sets of holes, which gives a standard ... of damping that increases with the ... and also in the form of a column ... annular space, this providing an in... in damping with displacement apart ... speed. Where the shock is very ... towards the end of the fork move...



On the bench! The near-side ... of the "Teledraulic" front fo... dismantled to reveal exactly ... the parts fit together. Immedi... below the wheel spindle is see... main fork tube, which is ma... chrome-molybdenum steel ... held in the top fork member ... steel plug and fixed in the lower one by a pinch bolt. To the left of the main ... tube are the oil-sealing unit and washer, the Bakelite bush (which fits in the ... slider seen at the bottom of the drawing), the steel bush and the retaining ... for the bush. Below the main tube is the damper tube, which is fixed ins... wheel slider, and, below that, the damper rod, which screws into the plug ... top of the forks and operates inside the damper tube. On the lower end ... damper rod is a non-return or damper valve

"Teledraulic" —

A Detailed Description, with Exclusive Illustrations, of the Matchless Hydraulically Controlled Telescopic Front Forks

Further progressive and extremely rapid damping occurs by means of a taper plug that enters the mouth of a tube and provides a cut-off. This last also has the advantage that the forks do not "come up solid." These points will be clearer when the construction of the forks is grasped.

The total movement of the forks possible under extreme conditions is no less than 7⅛in. This can be said to be divisible into 3in. upward (i.e., under shock) and 4⅛in. on the rebound, which is also hydraulically controlled. A feature apt to surprise the user who jacks up the machine via the crankcase for the first time is that the front wheel "falls" and can do so to a point at which the lower ends of the springs are exposed.

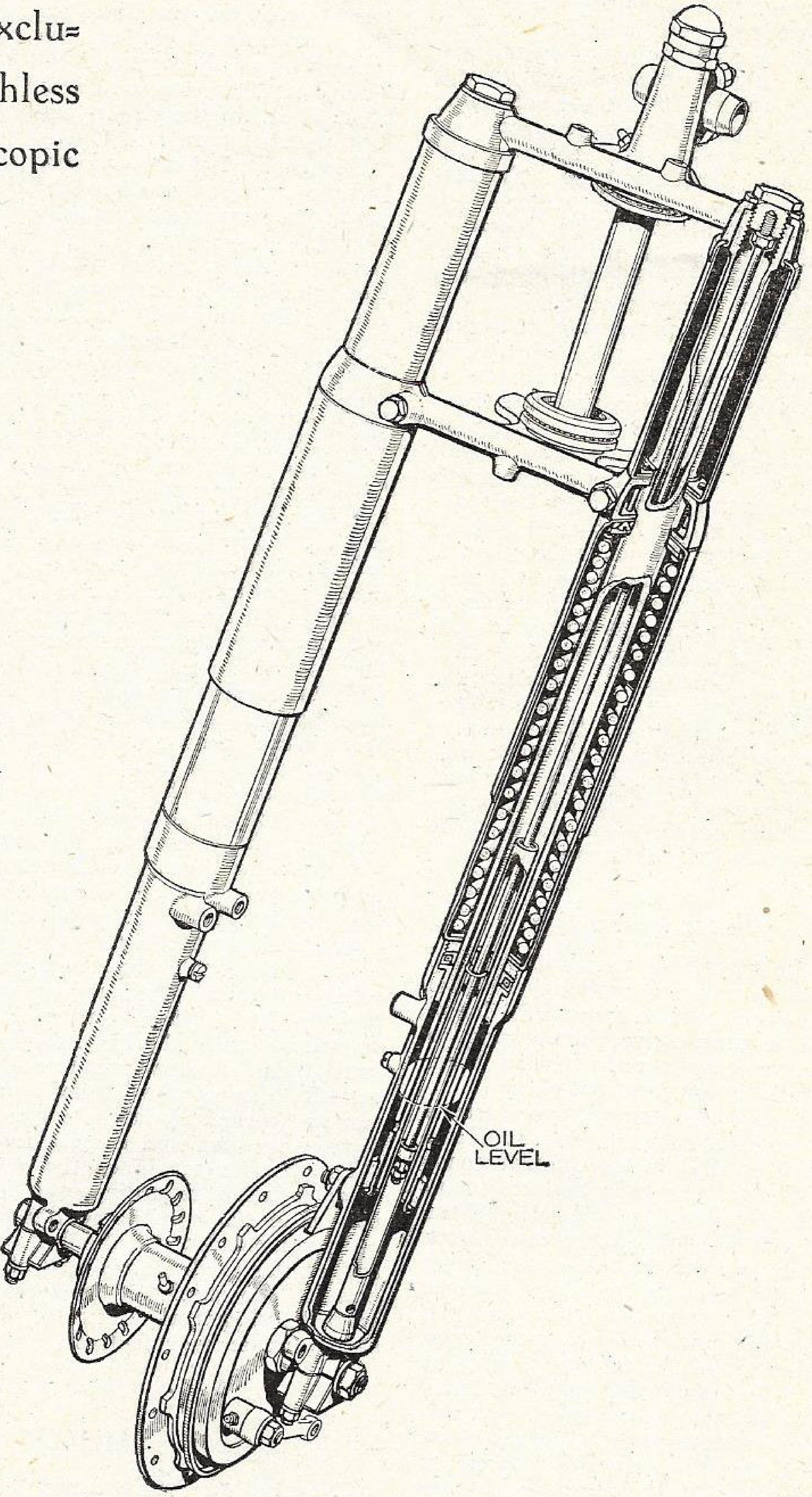
Construction of the Forks

Now for details of the forks' construction. Each "leg," it will be seen, has a main tube. These main fork tubes provide the forks' great strength. They are almost exactly 2ft. long; they are 1⅛in. external diameter, butted so that they are 8-gauge at the upper ends and 10-gauge at the lower ends, and made of chrome-molybdenum steel. They are fixed to the handlebar-lug member of the forks by large screwed plugs or anchor bolts, and to the lower, fork-crown member by pinch bolts—one per leg. There is one fork spring per leg (no rebound spring is employed), and this is fitted around the main fork tube and lies between the fork-crown member and the light-alloy slider that carries the wheel. Two bushes are provided for the slider. There is a steel bush with a square-section retaining circlip at the bottom of the main tube and, mounted near the upper end of the slider, a Bakelite bush. Both these bushes are 1in. long.

Immediately above the Bakelite bush there are, first, an oil-retaining washer, and, secondly, a "Superseal" oil seal assembly, which needs to be fitted with the "cup" inverted. Except for the "bearing-cap" fixing of the wheel spindle to each slider and the telescopic cover tubes, this completes the purely mechanical side. The cap into which the top cover tube fits is swaged on to the handlebar-lug member, and, therefore, not detachable. Three long screws fix the cover tubes to the lower or fork-crown member, while the bottom—the internal—plug is screwed into the slider.

Constructionally, the hydraulic damping is simple. Attached to the underside of the screwed plug or anchor bolt is a long steel rod, called the damper rod, running down the middle of the main fork tube. This protrudes downwards into the damper tube, which is affixed to the lower end of the slider by a single screw hidden in a recess above the wheel spindle. At the bottom of this damper tube there is a plug which, in addition to forming the fixing medium, has a tapered exterior. This is the taper plug that, at extreme fork movement, acts as a rapidly operating cut-off valve, as was mentioned earlier. At maximum fork deflection it is merely a clearance fit inside the main fork tube.

Near the upper end of the damper tube there is an internal sleeve, attached by means of a hairpin-like spring clip. The damper rod slides within this sleeve and leaves a restricted annular-shaped passage. At the bottom end of the rod there is a



A partly sectioned view of the forks, revealing the relative positions of the various parts shown in the special "exploded" drawing on the left. The main fork spring, it will be noticed from the sectioned leg, is not fixed at either the top or bottom. The screw on the inside of each leg is an oil-level plug; it is specially arranged on the inside so that there shall be no likelihood of it sustaining damage. The slider that carries the wheel is of light alloy, finished internally by reamer

Their Name is "Teledraulic"—

very simple type of non-return valve, consisting of a little steel cup, with a stop pin inside the cup, and a star-shaped brass member, which forms the seating for the steel cup when the valve is closed, and is held in place by a nut on the end of the rod. Two orifices or holes, it will be noticed, are provided at the bottom of the damper tube, and there is a series of four near the bottom of the main fork tube—just above the steel bush. The set-screw on the inside of each slider is an oil-level plug; it is fitted in that position not merely because of the question of neatness, but because this eliminates the possibility of it being knocked off.

The diagrams reveal the path of the oil more clearly than any words. That showing the action under shock covers extreme shock, for it will be seen that the taper plug at the lower end of the damper tube has entered the slightly recessed end of the main fork tube. As the slider moves upwards under the impact from the road, some of the oil in the bottom of the leg is forced into the damper tube via the holes near its lower end and past the non-return or damper valve, which opens in this direction, to the space between the damper tube and damper rod that lies above. In addition, oil is forced up the annular space between the damper tube and the main fork tube. Some of this passes through the holes in the main fork tube to the space between the steel and Bakelite bushes. It is the increase in the column of oil in the annular space which provides the increased damping with displacement.

On the Rebound

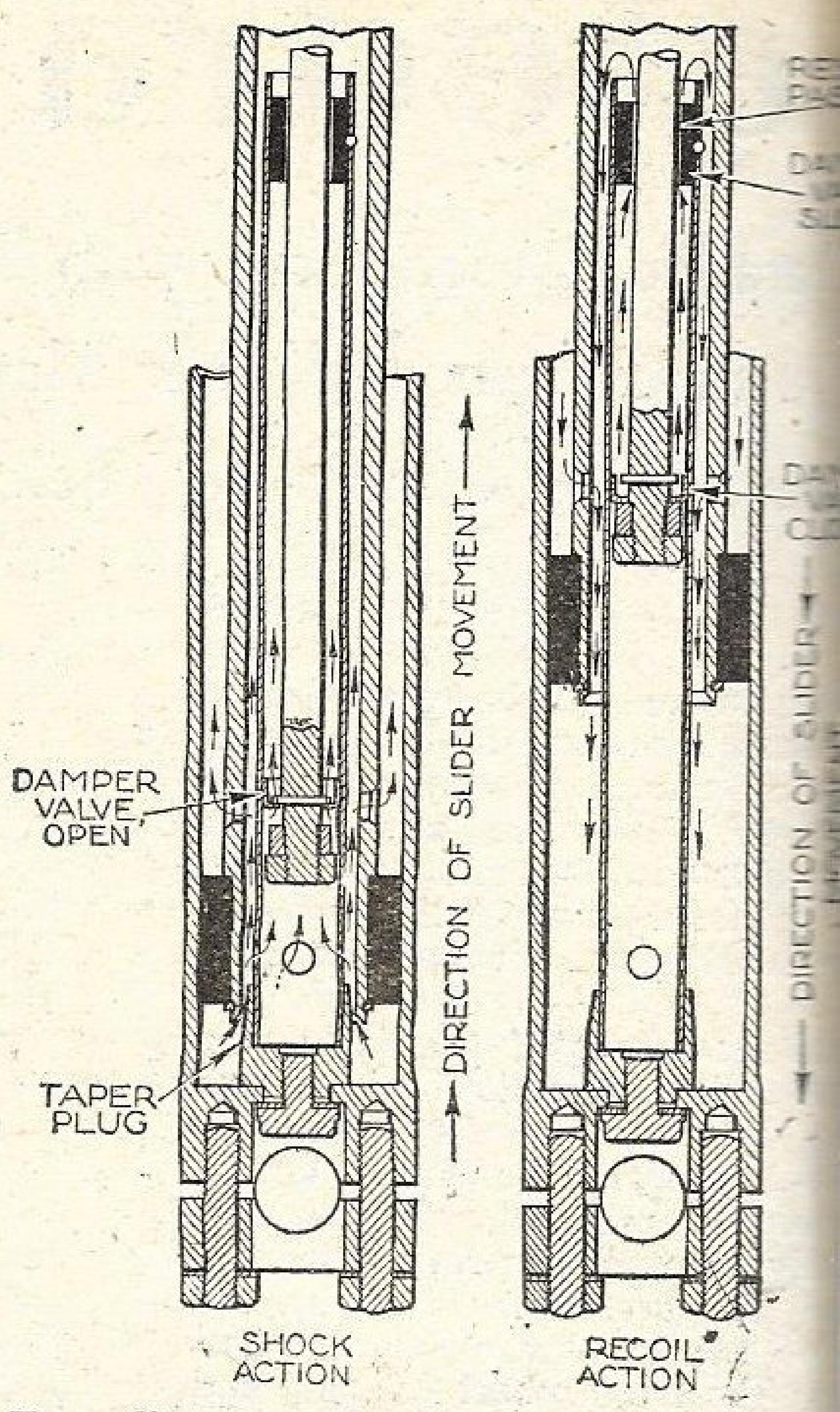
When the taper plug comes into action the flow of oil becomes smaller the farther the plug enters the main tube. The damping effect is progressive, but, owing to the taper, very rapid, until, finally, there is practically a complete cut-off.

There is now oil above the non-return or damper valve, between the slider and the main tube, and in the annular space between the damper tube and the main tube. On the recoil the oil between the steel and Bakelite bushes is pumped back through the holes in the main tube, down the space between the main and damper tubes and back into the bottom of the slider. That is quite straightforward, and so is the return of the column of oil that is in the same annular space. The third lot of oil—that above the non-return valve—has the circuitous path. The valve has closed, and the oil is trapped between it and the sleeve near the upper end of the damper tube. The oil is, therefore, forced through the restricted passage that lies between the sleeve and the damper rod, spills over the top of the damper tube and returns down the outside of the damper tube to join the remainder. Thus the whole of the rebound is absorbed hydraulically, and the need for employing either buffer springs or the main springs in tension as well as compression is successfully overcome.

So much for the layout of the forks and the way they operate. Many will wonder what the saving is in unsprung weight. The total unsprung weight with the G3/L Matchless supplied to the Army is 34 lb. 15 oz., of which 27 lb. 8 oz. is the wheel complete. The former figure includes the mudguard, which is unsprung. Thus the figure for the unsprung parts of the forks, plus the guard, is 7 lb. 7 oz. This compares with 16 lb. 1¼ oz. for the girder-type fork (plus guard) that the "Teledraulic" fork replaces. In other words, there is a saving in unsprung weight of just over 8½ lb.—roughly 25 per cent. of the previous total. The variation in trail with the "Teledraulic" forks, over the total movement, is only 1/16in., and in wheelbase, 3⅞in. With the girder fork these figures were 3 1/16in. and 1⅝in. respectively. (Note the trail—the important figures.) The movement with the latter fork was 2⅜in. up (against 3in.) and 1in. down (against 4¼in.).

Two points users need to watch are, first, that the wheel is central between the forks, and, secondly, that by mistake they do not overfill the legs with oil, and thus spoil the fork action. Refitting the front wheel need not be discussed, since the one or two special points are fully covered in the instruction book. If, however, the front hub is dismantled at any time, care must be taken over the position of the nut on the inner side of the brake cover-plate; if it is screwed either too far along the spindle or not far enough, the wheel will be off-set in the forks. The nut is in the correct position when the washer that fits on the outside of this nut—inside the brake drum—is 1/16in. proud relative to the outside edge of the brake drum. This can be checked by laying a straight-edge across the drum and using a rule.

For Service machines the present recommendation regarding the oil to be used is M 120. In the civilian world the oil recommended is Mobiloil "Arctic," and similar grades in the case of the other brands. To check the level the machine must be supported vertically, say, by a steady under each footrest, and with its



Two diagrams showing the movement o[f] damping fluid. In the left-hand drawing th[e] are shown nearing their extreme movement [under] a shock load. The right-hand diagram [shows] the action on rebound

weight on both wheels. Then th[e] plugs at the top of the forks [are un]screwed. These plugs should [be pulled] upwards as far as possible an[d moved] up and down several times. As th[e damper] rods are attached to these pl[ugs there] is a pumping action, which s[hould be] made as violent as possible wit[h the] force of a possibly damaging na[ture. Allow] two minutes to allow the eject[ed oil to] flow down to the main supply, [then the] level screws may be removed for [checking] purposes. If the level is correc[t oil will] just ooze out. If no oil appea[rs pour] about two tablespoonfuls (one fl[uid oz.]) down each main fork tube. Re[peat the] process for checking and let an[y surplus] oil drain away before replacing [the level] screws and the hexagonal plugs. [For Ser]vice machines the correct total [quantity] per leg is 6½ fluid oz.

HOME GUARD D.R. TRAINING

Exercise on Army Lines Organised by Allan Jefferies in the Bradford [District]

OVER eighty Home Guard despatch riders of the Bradford, Shipley and Saltaire district took part in a field day organised by the well-known expert rider, Allan Jefferies. The event was arranged purely for training purposes. Map reading and local knowledge were tested during the first stage, in which riders were sent to various points in the district. Although the majority reached their destinations quickly, some failed.

During part of the subsequent run in formation to Baildon Moor, respirators were worn. Later, Allan Jefferies demonstrated cross-country riding me[thods on] the same plan as the Army demon[strations] in which he takes part. The ca[pabilities] of the despatch riders who atte[mpted to] follow suit were very mixed.

This was the first large-scale [exercise] of its kind in the district, and it a[ttracted] much notice. Apart from its s[ervice to] the specialised training of despat[ch riders,] the exercise gave the general pu[blic an] idea of a little-known branch o[f Home] Guard work, although it must be a[dmitted] that the spectators tended occasi[onally to] hinder the proceedings.