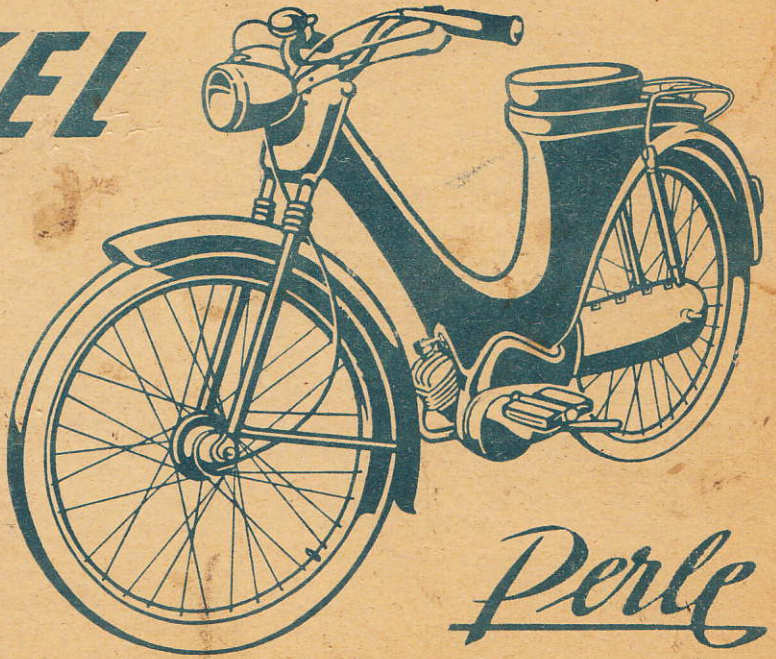
OWNER'S MANUAL

HEINKEL



Perle

A letter to the Driver:

We can, with a clear conscience, assure you that your "Perle" was designed by experts and built by efficient, specialised craftsmen from the very best materials. The Trade Press has described this genuine HEINKEL creation - perfected only after the severest trials over many thousands of miles' testing - as "a shining example of present-day freedom from maintenance", a statement with which even the so-called "first-time-driver" must agree in every respect.

In short, the HEINKEL people have done everything which is humanly possible so that you can enjoy the trouble-free pleasure of your "Perle" for a long time. However, this depends a little on you.

You need neither attend lectures at a Technical College nor attend a mechanics' course. It will be quite sufficient to read this little booklet and follow its simple instructions. In special circumstances, go confidently to see your HEINKEL Dealer, who, to a certain extent the local representative of our After-Sales Service Department, will be ready to give you a helping hand or a word of advice.

The "PERLE" will thank you for it and always make you justly proud of it.

Happy driving!

ERNST HEINKEL AKTIENGESELLSCHAFT

Important particulars.

Spares are obtainable only through HEINKEL Dealers.

If you have any trouble with your "Perle", always contact a HEINKEL Dealer; do not approach the HEINKEL Works direct, as it is always necessary to check details in such cases with the competent Dealer and unnecessarily delays attention to your requirements.

Please enter accurately and quote in all correspondence:

Chassis No.

Engine No.

Key No.

Technical data.

ENGINE

Engine Model	477 A-1
Cylinder	Light metal with hard-chromed piston track
Mode of operation	Two-stroke, reverse-scavenging
Output	1-1/2 h.p. at approx. 5000 r.p.m.
Number of cylinder	1
Cylinder bore	39 mm

Stroke	41.8 mm
Swept capacity	50 cc.
Compression ratio	1 : 6.5
Lubrication	Petrol lubrication
Ratio of mixture	1 : 25 (oil:fuel)

IGNITION

Type of ignition	Centrifugal Generator and magneto assembly 6 v, 3 w. (overseas 6 v, 17 w)
Make	Bosch LM-UPA 1/115/3L2
Maximum advanced ignition	2.4-2.5 mm before t.d.c. or 23-24° before t.d.c.
Gap between contact breaker points	0.3 - 0.4 mm
Spark plug	Beru 240/14 u 2S or 225/14 u 2S, or Bosch W 240 T11 or W 225 T11
Spark plug thread	M 14 x 1.25
Spark gap	0.4 - 0.5 mm

CARBURETTOR

Amal-Fischer carburettor	Type 10 DA 23
Carburettor passage	10 mm
Main jet	34
Timing jet	13-24
Air filter	"Knecht" wet filter

CLUTCH	Oil-bath multiple-disc clutch
Operation of clutch	By hand-lever on left handlebar
GEARBOX	Two-speed type
Operation of gears	By twist-grip on the left handlebar
RUNNING ON THE ENGINE	First stage 1:6.16 1st gear 1:15.25 2nd gear 1:8.05
Chain drive from gearbox to rear wheel	1:1.835
Total reduction	1st gear 1:28 2nd gear 1:14.75
BICYCLE OPERATION	
Bottom bracket stage	1:4.47
Total reduction	1st gear 0.98:1 2nd gear 1.87:1
Transmission ratio when kick start pedalling	1:27.6
POWER TRANSMISSION	
Engine-gearbox	Bevelled gears
Gearbox-rear wheel	Single roller chain, 1/2" x 3/16" 94 links with joint

CHASSIS

Frame	Cast light metal frame
Front wheel suspension	Telescoping suspension with oil lubrication
Rear wheel suspension	Fully-enclosed swing arm (chain oil bath immersed), spring legs
Handlebar	Handlebar unit with twist-grip gear shift
Brakes	Internally expanding brakes Drum diameter 82 mm, width 16 mm
Operation of brakes	Front brake by lever on right handlebar Rear brake operated by the pedals (Reverse pedal brake)
Stand	Single arm stand, hinged
Wheels	Interchangeable
Rims	Light metal rims 23 x 2.00
Tyres	23 x 2.00
Tyre pressure	Front 2 atmospheres Rear 2.25 atmospheres

DIMENSIONS

Overall length	1780 mm
Wheelbase	1145 mm
Maximum height	930 mm
Maximum width	700 mm
Height of seat	795 mm
Ground clearance	150 mm (pedal 90 mm)

WEIGHTS

Weight of vehicle alone	36 kg.
Admissible load	1 person only
Luggage	10 kg.

FUEL AND LUBRICANTS

Fuel	A proprietary brand of at least 70 octane
Engine oil	A proprietary two-stroke oil such as Mobil Mix TT
Proportion of mixture	25:1 (fuel:oil)
Fuel tank capacity	3.9 litres, of which approx. 0.3 litres forms a reserve
Oil in gearbox and swing arm	When full, 0.25 litres gear oil such as Mobiloil C80

FUEL CONSUMPTION

Standard consumption	1.3 litres per 100 km

LIGHTING

Headlamp	80 mm diam. glass
Bulb	6 v, 2,3 watt output (foreign markets 6 v, 15/15 watt Bilux)
Rear lamp bulb	6 v, 0.6 watt output (foreign markets 6 v, 2.3-2.7 watt)

SIGNAL	Bell (foreign markets) buzzer

In the interests of technical development, we reserve the right to make modifications.

PREPARING TO START -

- a heading which is almost too overpowering for the little which needs be done before starting up a "Perle".

The tyres must be pumped up to full pressure; this is "tested" not with gauges which break when dropped, but with the thumb, just as with a bicycle; surely, there is no need for us to go into details.

Do not budge until oil has been added to your fuel. Use only a well-known brand, such as "Mobil Mix TT", to the proportion 25:1, i.e. 25 parts fuel to 1 part oil. Open the fuel cock. Everything else comes under the heading...

....STARTING THE ENGINE

and this need give no cause for concern either, with the "Perle", for it is started from its stand - like a motorcycle, only much more easily. To do this

1. Set the gear shift twist-grip at "0" and, whilst the clutch is out, swing one of the pedals into the starting position.

2. Release the clutch lever; actuate the auxiliary starter (but only when the engine is cold!) via the remote control lever on the left handlebar.

3. Open up the twist-grip throttle roughly one-quarter, depress the raised pedal as you would a kick-starter, give a short squeeze to the decompression lever, and the engine, once it has fired, can be regulated to the proper speed by the throttle.

An important point to watch is that the lighting system must always be switched off whilst the engine is being started.

Any one-time cyclist who desires a taste of good old times, however, can start his "Perle" on the roughly 0.2 h.p. power of his leg muscles. Read the instructions given under "Driving away and changing gear".

DRIVING AWAY AND CHANGING GEAR

Once the engine has been effortlessly started, motorcycle fashion, it is child's play to move off. Merely

pull in the clutch lever as far as it will go .....
snap the twist grip gear shift into position 1 ....
then
slowly release the clutch lever, opening up the throttle gradually at the same time.

On the flat, it is possible after just a few feet to switch into second gear; this, too, is quickly and easily done.

1. Throttle down
   pull in the clutch lever as far as it will go .....
2. Set gear shift grip to position 2 .....
3. slowly release the clutch lever, accelerate and drive on!

If speed and power drop too sharply on an uphill stretch, there is absolutely no need for the "Perle" driver to get off or to start pedalling; he need only change down into 1st gear:

1. Throttle closed to 1/3, depress clutch lever .....
2. Twist gear shift grip to position 1 .....
3. Slowly release the clutch lever, opening up the throttle gradually at the same time. Make the gear change as quickly as possible, so that the travelling speed does not drop too much.

Starting on a hill gives the beginner a certain amount of trouble, because the vehicle, following the law of gravity, has a natural tendency to go backwards. He does not know whether to counteract this natural backward movement with both feet "direct", namely by bracing them on the ground, or by a foot or hand brake. Firstly apply the hand brake!

Keep the hand brake on until the engine has fired, the clutch has been taken off, the vehicle put into first gear and the left leg is free to support the wheel. Now, with the right foot on the pedal (as if intending to pedal forwards, not backwards!), stop the "Perle" from running backwards. The left hand can now slowly release the clutch lever, whilst the right gradually accelerates. The engine will thank you for a little help from the pedals at the outset, as the starting resistance on a hill is quite something.

Driving experience will show that steep downhill slopes should be taken in the same gear as would be used for driving up the same slope. The first gear, which provides an additional braking action on the engine, should therefore be used. As is the case with any two-stroke engine, the effect of this "additional braking" action of bottom gear is not such that the driver need not call on his front or rear wheel brakes. If the downhill slope is relatively long and the front and rear brakes are used alternately, no strain is placed on them and the driver is never in danger of reaching dangerous speeds unexpectedly.

As the engine of the "Perle" gets its lubrication solely from the oil contained in the fuel, it might well get too little lubricant on prolonged downhill slopes if the throttle is closed all the time. It is therefore recommended that in such cases the clutch be pulled in and the throttle briefly but strongly opened up, so that the engine is thoroughly lubricated.

Any former cyclist who still wishes to get some of the old sport out of his "Perle" can dispense with the comfortable kick-starter and get his moped going in crack-cyclist fashion by pedalling. This is how to do it:

> Open up throttle a little - pull clutch lever right in - put moped into second gear - start pedalling - slowly release clutch lever - briefly depress decompression lever at the same time and the "Perle" engine is "there".

If the engine is cold, the lever controlling the auxiliary starter should be manipulated.

Naturally, the "Perle" can also be ridden as an ordinary bicycle, i.e. entirely without the engine working. Thanks to the ideal position of the seat and the moped's easy running, pedalling without the engine is by no means the drudgery one might imagine. Just put the moped into second gear on the flat and into first on slopes and lock the clutch (see Fig. KD 36 on page 34).

STOPPING AND PARKING

is also very simple with the "Perle". So long as there is no emergency, speed can be reduced reasonably well before the stopping point; with the throttle closed, the vehicle can gradually come to a standstill, so that, to stop it, only the clutch need be pulled in, the twist grip gear shift switched to position "0" and the brakes applied. A slight pressure on the decompression lever will stop the engine. If this stop marks the end of the day for the moped, it would have been as well to shut off the fuel cock before stopping the engine, so that the "Perle" is not left for any length of time with fuel in the float chamber, otherwise the fuel evaporates leaving the oil on its own in the float chamber, and this can give trouble when the moped is next started.

The moped can now be parked or left leaning against a wall. In this respect, it must be remembered that the stand serves merely to park the moped and must be raised before the driver takes his seat, because this stand is intended to take the weight of the moped, but not that of its driver.

RUNNING IN

Never let anyone tell you otherwise - whether an engine later on proves to be a source only of untroubled joy to its owner or of repeated worry still depends largely on its running-in. It is true to say that piston seizure, so feared at the outset in new engines, is as good as impossible with the "Perle", because its light metal cylinder with its hard-chromes track and the flat piston are made from the same material. Both, therefore, have the same coefficient of expansion, which , expressed in plain language, means that as they heat up, both cylinder and piston "grow" with each other, and that the distance between them remains constant. However, a certain amount of caution is called for when running-in in view of the fact that the piston rings and gear wheels are not yet 'run-in'. It is wrong to demand too much of the engine for the first 300-400 kilometres, just as it is wrong to seize every opportunity (e. g. after a crossing) to show off the remarkable acceleration of the "Perle" or to vaunt its climbing capacity on uphill slopes (where possible with a heavy load). However, it is just as wrong to drive too cautiously, too long in first or to let the engine pull in top gear. The factory-new "Perle" engine has already completed a test run at the works and just needs to be finished off by the driver. Normal driving with an average load is the best way to achieve this.

Habitually late-sleepers, who have to hurry to work, should, for preferance, not use these rushed journeys to make up their running-in mileage, but should do so on leisurely week-end trips. However, there are other people who climb on their machines quite composedly in the morning, start up with the clutch yieldingly engaged, accelerate normally and reasonably into the gears and whose senses tell them that the engine is turning over nicely and when to change down. Such people can cheerfully forget the old rule

Don't run-in on the way to work!". The proviso is merely not too short a journey, on which the engine attains normal running temperature.

If running-in is put off for Sunday riding, then it is best to choose a route which has, as far as possible, "a bit of everything", i.e. straight stretches on the flat, gentle slopes and curves. Such conditions necessitate conscientious changing of gear, and this does both engine and gear mechanism good.

After about 150 kilometres have been clocked altogether, even a beginner will notice that the machine is gradually starting to "loosen up"; full throttle can now be applied for brief spells on the flat. Later on, these periods in full throttle can be more frequently repeated and also extended in duration. After some 300 to 400 kilometres, the life of the engine can start in full earnest.

TESTING FOR SAFETY IN TRAFFIC

is a particularly ticklish point. In the unfortunate event of a road accident involving severe material or even personal damage, the party whom the legal experts can accuse of "neglecting his vehicle as regards safety in traffic" will come off badly. He will also come off badly according to Road Traffic Regulations if, prior to commencing the journey on which the accident occurred, he failed to check that

1. The most important screws and nuts on steering, wheels, engine, frame and control levers are thoroughly tight;

2. the brakes are working perfectly;

3. the steering is smooth and easy;

4. the control levers are functioning properly;

5. the tyres are in order (tyre pressure and tread);

6. the lighting and signal units are working.

But fortunately, this is not such a discouraging business as it might be thought from a first glance.

The owner of a "Perle" receives from the HEINKEL Works a machine in which Items 1-6 were all 100 % in order. Keeping them in this condition requires no great expenditure of time or money, particularly since carefully-organized, genuine after-sales service is guaranteed through the various HEINKEL Service Stations. "The most important screws and nuts on steering, wheels, engine, frame and control levers" do not come loose suddenly. A conscientious garage attendant will, in most cases, notice any loosening when cleaning the machine or during the carrying out of other work and will put it right in good time and with no trouble by means of the tool kit supplied with the moped. That brakes, steering, control levers, tyres and, lastly, the regulation bell (overseas optional buzzer) are in order, can be checked on any trip "to the post-box."

The lighting, however, is altogether a different matter!

Before a short journey in the town, the moped driver can see at a glance whether his rear light, tail and pedal reflectors - these are regulation! - are masked by dirt or not. During the actual journey, he can - similarly

as required by the regulations - see by means of a so-called side functional check (which takes the form of a spot of light on the road beside the driver) whether "rear light is burning, without any substantial change in the position of the head or body being necessary".

Please, Dear HEINKEL Driver, make sure that there is nothing amiss with the lights on your "Perle", as

> "the lighting fitments must be in position and <u>in working order even by day</u>,
>
> and
>
> "Mopeds which are not fitted up as required by the regulations, in particular mopeds which are ridden in darkness despite failure of the lighting apparatus, can be seized by the police".

CLEANING, CARE AND MAINTENANCE

of a vehicle means less trouble the more beautiful it is and looks and the greater the attention paid by its creators to its construction. No wonder that "Perle" owners are always so especially quick to finish the necessary jobs..Those passionately fond of "Tinkering", however, are not very pleased about the absolute superfluity of maintenance of many parts of the "Perle", because they cannot find enough application for tools, grease guns, oil-cans, etc., on free Saturday afternoons.

Cleaning and Care.

Dirt does not easily adhere to the harmoniously smooth outer surface of the "Perle" frame. However, if, during a long ride in bad weather, any dirt should have collected on the other parts, loosen it with warm water, softened by the addition of a mild cleansing agent, and then rinse off. In an emergency, clear, cold tap-water will do it also. Under no circumstances, though, should a strong jet of water be used, since this forces particles of dirt through the bearing seals and water is no good either for the air filter or for the generator dynamo.

A good deal of dirt collects in the corners where the cooling fins join the cylinder, because this is so close to the road surface. If this dirt is allowed to remain there undisturbed, it can seriously affect the cooling and thus endanger the working of the cylinder. It should, therefore, be loosened with soft water and brushed out - though, naturally only when the engine is cold.

After this wash, the "Care" stage starts, from top to bottom. The foam rubber seat is cleaned with a fine washing agent and the frame with a suitable polish (such as Polifac with silicones). The engine should be washed with a petrol cleaner, paraffin or with Cehapon (follow the maker's instructions closely), and if there is still time, any driver particularly concerned with care of his "Perle" can also give the chromium-plated parts a thin coating of vaseline or similar grease.

Maintenance.

The "Perle" engine is positively lubricated by the addition of oil to the fuel, eliminating maintenance in its main sense.

After roughly 2000 kilometres' travelling, the three screws (KD 35) should be undone and the exhaust unit removed and dismantled. The inside of the silencer and the exhaust slit on the cylinder should be cleaned of any oil carbon residue with a hardwood scraper or a blunt metal object. Should the output from the engine and at the same time its "purr" deteriorate even before these 2000 kilometres are up, then the "de-coke" should be carried out correspondingly sooner.

The level of oil in the gearbox should be checked regularly (see details on Servicing schedule) and the gear oil changed, as the case may be. The first oil change at 500 kilometres is of particular importance! (Fig. 7)

To check the oil level, unscrew the oil-filler cap. If, when the machine is level, the oil does not come just up to the hole, then top up by necessary amount without delay (see illustration).

To change the oil (which should always be done whilst the engine is warm), remove the screw plugs from the filling hole and oil drain and allow all the old oil to run out completely. To make sure that every drop runs out of the swing arm also, lift the rear wheel off the ground. Afterwards, replace the plug in the oil drain, set the machine down on the level once again and fill up with new proprietary gear oil, such as "Mobiloil C 80", until the filling hole is reached to the point where the oil tends to drip out. When changing the oil for the first time, the gearbox should be rinsed out thoroughly with a rinsing oil such as "Mobilene Spülex".

After a few thousand gear-changes, it must not be forgotten that the gear cable will have stretched a little. On a brand-new "Perle", in

second gear, the cable sleeve can easily be turned with the fingers. If this sleeve can now be moved lengthwise, this slackness can be removed in the following way: with the engine at a standstill, set the twist grip gear shift to setting "0". Undo the locknut (1) (Fig. 9) on the twist grip and twist adjustor screw (2) sufficiently far to the right or left for the rear wheel to be able to turn without resistance or noise from the gear mechanism. Retighten locknut (1). Finished!

Extremely simple also is the Clutch adjustment, which might become necessary over relatively long intervals - perhaps due to stretching of the cable, perhaps due to normal wear of the lining. There should be about 2-3 millimetres' play (Fig. 9) on the clutch at the lever on the handlebar; if there is more, or even less play, the situation can be put right in a few moments, again by means of the locknut and adjustor screw. To drive without any play damages the friction bearings of the clutch. It is advisable for all these adjustments to be made at a HEINKEL Service Station.

The fuel installation starts at the place where the fuel enters the machine, i.e. at the filler opening on the fuel tank. It ends at the induction manifold, where the "ready" fuel-air mixture, erroneously termed "gas", leaves the carburettor. This fuel installation also gets along on a minimum of maintenance and need hardly bother the moped driver.

Nowadays, when hardly any more open cans but almost hygienically clean petrol points supply the fuel, there is no longer much prospect of particles of dirt getting into the tank in the normal way. Should they find their way in nonetheless, then they would also proceed merrily into the fuel pipe were the fuel cock not fitted with a filter. For safety's sake, a further, close-mesh filter

is fitted in front of the inlet to the carburettor (Fig. 11), and, in case of trouble, this must straight away be taken out and blown through. To do this, pull the fuel pipe off the float chamber, take out the tiny filter, blow through it from both sides and replace it (with the point upwards).

The jets are protected, therefore, twice over, but even so one of them might get stopped up, which, in practice, has the following effect:

from running as 'sweet as a nut', the "Perle" suddenly cuts out; then it might come to life again for a brief spell and then stop altogether.

In such cases, please be neither anxious nor angry and please don't call the writer of this little booklet too many bad names. Nor should you try, in your confusion, to use the kick-starter or even the pedals to help you to get going again, but take a screwdriver, undo the righthand part of the engine cover, undo the clamping screw on the carburettor pipe, twist the carburettor. On the bottom, there are two brightly polished brass screws, which, when screwed out, turn out to be the main and control jets (Parts 13 and 14, Fig. 11). Blow through both, replace them and fix the carburettor in its old position, and then continue on your way.

We almost overlooked one maintenance operation on which the perfect functioning and life of an engine depends to a considerable degree:

The air filter in front of the carburettor is intended to prevent particles of dust being carried into the engine with the outside air, becoming mixed with the oil there into a thoroughly "effective" abrasive paste between the piston and the cylinder wall and in the bearings.

However, the filter can only fulfil its vital rôle effectively if carefully cleaned fairly frequently, according to the weather and nature of the roads, but thoroughly - the more frequently the better. With the engine covers open, pull the rubber sleeve of the induction silencer back and take out the filter. Rinse it in washing-petrol and, when possible, blow it through with compressed air, steep it in thick engine oil (SAE 40), leave it flat for a few minutes, so that the oil can evenly penetrate the filter weave and then reinsert it.

Where the ignition is concerned, the beginner is, we find, not too keen on trying his hand; it is better, too, to leave to the HEINKEL expert the few maintenance jobs which are necessary. Every 2000 kilometres, he will steep the grease felt for the contact breaker cam in a hot-bearing grease and then check that the gap between the contact breaker contracts is still 0.4 mm. Furthermore, he will, with his expert eye, see that the ignition timer is still set, as prescribed, 2.4 to 2.5 mm before top dead centre of the piston. If necessary, he will shift the base-plate in the engine housing sufficiently to reset the ignition timing, which is so vital to performance and perfect running.

The wunderful suspension of the "Perle" need not be mentioned here under the heading "Maintenance", because none is needed either front or back. Each of the chambers in the telescopic front fork (Fig. 17), with their 80 mm long shock course, must contain 20 cc. of SAE 30 engine oil, such as "Mobiloil A". It will be quite enough if your HEINKEL Dealer checks this at the 3000 kilometre inspections.

The rear wheel suspension, as with many modern motor-cycles also, is assured by means of a swing arm with compression legs on either side, with a telescopic shock course which is quite adequate at 65 mm. The right swing arm takes the form of a chain case in which the chain runs - protected against dust and automatically lubricated. The chain tension should be checked as indicated on page 26 during the after-sales service inspections. It is possible to check it, though, through an inspection hole on the swing arm; the upper part of the chain must not sag. To adjust, undo the locknut and tighten the setscrew on the bottom part of the swing arm accordingly. As the HEINKEL Service Station always checks the lubrication of the spring legs after 3000 kilometres, the "Perle" driver need expect no trouble of any kind from this quarter. The 23 inch wheels of the "Perle" make for a favourable centre of gravity and keep down the unsprung masses. Both wheels are interchangeable and are secured in their bearings by knock-out type axles. The front wheel is removed in the following way:

1. Disconnect the speedometer drive by undoing the easily accessible milled nut (Fig. 16).

2. Extend the brake control cable a few millimetres by means of the locknut and adjuster screw and then disconnect at the hub.

3. Unscrew the axle nut on the right-hand side and, using some long, slender tool, pull the axle out to the left. Reverse the process when reassembling, making sure, however, that the projecting lug on the brake anchor plate slots into the recess on the left-hand fork arm (Fig. 17), as otherwise the wheel will block the first time the brake is applied and the rider might well fall.

Before removing the rear wheel, screw the setscrew of the rear wheel brake on the left-hand side of the swing arm arrangement, so that the control cable on the brake lever can easily be disconnected. Reverse the process when re-assembling.

Important: Fit the brake anchor plate so that the recess fits over the projecting lug on the swing arm (Fig. 17, 2).

BEARINGS AND BRAKES

The bearings in the front and rear wheel hubs will stay in perfect working order almost without qualification if at the 3000 kilometre inspections they are topped up with an anti-friction bearing grease (see Lubricating Plan).

The "Perle" driver will already be acquainted with the simple adjustment mechanism of the front brake from having studied Fig. 18. If the brake lining in the front or rear wheel hub has worn or if the Bowden control cable has stretched, then the right amount of play can be restored by adjusting the locknut and setscrew - a procedure which is by no means new to anyone who has read the preceding paragraphs (Figs. 18 and 19).

Glancing back through the various maintenance jobs listed, we see that we have not once mentioned the word "greasing nipple", which will amaze former motor-cyclists. The fact is that regular servicing of the HEINKEL "Perle" has been eliminated to such a degree that only ONE such nipple proved necessary. It is to be found on the speedometer drive on the front

wheel hub (Fig. 16), and if it were given an application of anti-friction bearing grease today, then one could quite safely forget all about it for another 50 hours' travelling (i.e. when the next thousand kilometres have been clocked) ....

For ages now, any properly compiled Manual has always finished up with a section on "LAYING UP YOUR VEHICLE".

A "Perle", on which tax is nil and insurance costs only a few coppers, and which, thanks to its outstanding qualities, will manage badly snowed-up roads without a fall, really need not be laid up, even in the severest winter. However, so that no long-standing habits need be broken, here are one or two tips on 'laying up'.:

Firstly, clean the moped thoroughly (see Cleaning and Care) and spray with a special anti-rust agent. Then, with the air filter removed and with the engine running at about half speed, spray into the engine with an atomiser about 15 cc. of anti-corrosion oil (Sova-Kote D 503), after which close the fuel cock and wait until the engine runs itself out. All the sensitive inner parts of the engine are now protected against corrosion. Treated in this way, your moped can now get its winter sleep - in a dry room, preferably hung up somehow, so that there is no weight on the pumped up tyres. When Spring comes, your "Perle" will then once again be ready, willing and able.

BREAKDOWNS

I. The engine will not start

1. Fuel tank empty	Fill up fuel tank
2. Fuel cock closed or set at reserve supply	Open fuel cock or switch to reserve
3. Fuel pipe clogged	Clear by blowing through
4. Jets clogged	Clear by blowing through
5. Auxiliary starter not used when engine cold	Press auxiliary starter
6. Ignition cable disconnected or loose	Fit or tighten ignition cable
7. Ignition cable is "shorting"	Fit a new ignition cable
8. Spark plug oily, sooty or electrode gap bridged	Clean spark plug, restore gap (0.5 mm)
9. Contact breaker contacts dirty or worn	Clean contacts, restore contact breaker gap (0.3-0.4 mm) or replace if necessary.

II. The engine starts, but stops when the throttle is opened:

1. The engine is too cold	Use auxiliary starter
2. Jet or fuel pipe clogged	Clean jet or fuel pipe
3. Ignition cable disconnected or loose	Fit or tighten ignition cable
4. Ignition cable "shorting"	Fit a new ignition cable
5. Spark plug oily, sooty or bridged	Clean plug, restore gap (0.5 mm)

6. Contact breaker contacts dirty or worn	Clean contacts, restore gap (0.3-0.4 mm) or replace

III. Engine misses or runs irregularly

1. Fuel is low	Fill up
2. Water in the carburettor	Clear the carburettor by blowing through it
3. Too much oil in the mixture	Fill up with fresh fuel mixture ratio 1:25
4. Ignition cable is "shorting"	Fit a new ignition cable
5. Contact breaker contacts dirty or worn	Clean contacts, restore contact breaker gap (0.3-0.4 mm) or replace
6. Air filter dirty	Clean air filter

IV. Engine power shows a drop

1. Ignition timing has shifted	Adjust ignition timing
2. Jet or fuel pipe clogged	Clean jet and fuel pipe
3. Engine and/or exhaust clogged by soot	Clean exhaust slit on the engine and also the exhaust unit
4. Carburettor not properly secure on the induction manifold (hence infiltration of undesired air)	Tighten carburettor
5. Clutch grinding	Adjust clutch
6. Brakes adjusted to have no play	Adjust brakes properly

V. Engine stops

1. Fuel tank empty	Fill up with fuel
2. Fuel cock closed or reserve position reached	Open fuel cock or switch to reserve
3. Fuel pipe clogged	Clear by blowing through
4. Spark plug defective	Replace spark plug
5. Ignition cable has dropped off	Fix ignition cable securely
6. Contact breaker lever is 'sticking'	Make lever movable

VI. Engine gets too hot

1. Engine ignition timing wrong	Adjust ignition timing (2.4-2.5 mm before top dead centre, or 23-24° before t.d.c.)
2. Insufficient lubricant	See that mixture ratio is 1:25
3. Fuel-air mixture too weak, or carburettor connection loose	Check jet setting, secure carburettor
4. Exhaust unit choked	Clean exhaust unit

VII. The lights will not work

1. Bulbs are loose or faulty	Tighten or replace bulbs
2. Cable connections loose	Secure cables
3. Bad earthing arrangement	See that a proper earth connection is established

HEINKEL SERVICING AND MAINTENANCE SCHEDULE

Operation	After-sales Inspection after 1st 450-550	2nd 950-1050	3rd 1950-2050	4th 2950-3050 km	Thereafter after intervals given hereunder km	miles
1. Trial run (run engine warm	x	x	x	x	1000	600
2. Change gear oil	x	x	check	x	2000	1200
3. Clean carburettor, pipes	x	x	x	x	1000	600
4. Clean air filter and steep in oil		x	x	x	as required	
5. Test spark plugs	x	x	x	x	as required	
6. Check ignition timing and contact breaker contacts		x	x	x	as required	
7. Grease lubricating felt			x		2000	1200
8. Test generator installation	x	x	x	x	1000	600
9. Clean exhaust unit			x		as required	
10. Test signalling installation	x	x	x	x	1000	600
11. Check clutch play	x	x	x	x	1000	600
12. Check gear shift adjustment	x	x	x	x	1000	600
13. Check for chain sag	x	x	x	x	as required	
14. Check fixing bolts	x	x	x	x	1000	600
15. Test brakes	x	x	x	x	1000	600
16. Oil pedal bearings			x		2000	1200
17. Check tyre pressure	x	x	x	x	as required	
18. Test steering	x	x	x	x	1000	600
19. Check front fork	x	x	x	x	1000	600

Operation	After-sales inspection after 1st 450-550	2nd 950-1050	3rd 1950-2050	4th 2950-3050 km	Thereafter after intervals given hereunder km	miles
20. Fill front fork with oil				x	3000	1800
21. Check spring legs	x	x	x	x	1000	600
22. Fill spring legs with oil				x	3000	1800
23. Lubricate speedometer drive		x	x	x	1000	600
24. Grease front and rear wheel hubs				x	3000	1800
25. Test run	x	x	x	x	1000	600

CONDITIONS OF GUARANTEE

1. The Supplier guarantee the first owner-user an extent of freedom from faults in the moped purchased, in terms of materials and workmanship, in keeping with the current standard of technical progress, for the period of 6 months from the day when the machine is handed to the first buyer and irrespective of the distance travelled during this period.

2. The guarantee extends, at Supplier's option, to repair of the moped or replacement of the parts sent in. The place where the repair is to be effected - to be decided by the Supplier - is to be chosen with an eye to the customer's interests. Parts for replacement must be sent to the Supplier carriage paid. In all cases, only those parts will be replaced which show evidence of faulty workmanship or defective materials. Replaced parts become the property of the Supplier.

3. The Supplier is under no obligation to bear the costs of dismantling, transport and reassembling incurred in a claim under guarantee.

4. In respect of ready-made parts not manufactured by the Supplier, the guarantee is restricted to the reassignment to the owner-user of any claims which the Supplier might be entitled to make vis-à-vis the manufacturer for the defect.

5. A claim for exchange or reimbursement of part of the purchase price will not be entertained unless the Supplier is unable to remove the fault.

It is not guaranteed that direct or indirect damage will be made good.

6. The guarantee becomes void if the moped purchased has been modified by third parties or by the fitting of parts originating from third parties and where the damage bears a causal relationship to such modification. Furthermore, the guarantee becomes void if the owner-user fails to follow the instructions issued by the Supplier for the handling of the moped (Owner's Manual) and in particular in the event of his failure to have the machine serviced by a HEINKEL Servicing Station as prescribed on the After-sales Inspection Chits.

7. The guarantee further becomes void if it should be found that the admissible total weight has been exceeded.

8. Natural wear and tear and damage which is attributable to negligent or improper treatment are excluded from the guarantee.

9. Claims under guarantee will not be entertained unless made, in writing, at a HEINKEL Servicing Station (NOT to the HEINKEL Works) immediately a fault is discovered.

10. No guarantee is given in respect of second-hand or used vehicles, such as those used at sporting events.

STEERING LOCK

On the steering column of your "PERLE", there is a hole to take the steering lock. When inserted, this can be opened or closed (unlocked or locked) by means of a key.

When withdrawing the key, make sure that it is either in the "Locked" or in the "Unlocked" position; if in any midway position, the lock will be withdrawn together with the key.

USE ORIGINAL HEINKEL SPARES EXCLUSIVELY!

1st After-sales Inspection was carried out on .....
when kilometer reading/miles reading was .....

.....
Stamp and signature of HEINKEL Dealer

- -

After-sales Service

COUPON No. 1
Valid after 450-550 kilometres

for
HEINKEL "PERLE"
Moped

.....	.....	.....
Chassis-No.	Engine No.	No.of km.run/miles run

Owner:

I hereby request you to carry out free of charge, at the above mileage, the adjustments and checking operations set out overleaf. Materials, such as gaskets, oil, etc. and repairs occasioned by reason of the inspection, please charge separately.

Date .....

.....
Signature of Holder

The HEINKEL Workshop of .....

name and address of workshop

carried out the following after-sales service between 450-550 km:

1. Trial run (run engine warm)
2. Change gear oil
3. Clean carburettor, pipes
4. Test spark plug
5. Test generator installation
6. Test signalling installation
7. Check clutch play
8. Check for chain sag
9. Check gear shift setting
10. Check fixing bolts
11. Test brakes
12. Check tyre pressure
13. Test steering
14. Check front fork
15. Check spring legs
16. Test run

2nd After-sales Inspection was carried out on .....
when kilometer reading/miles reading was .....

.....
Stamp and signature of HEINKEL Dealer

- -

After-sales Service

CHIT No. 2
Valid at 950 - 1050 kilometres

for
HEINKEL "PERLE" Moped

.....	.....	.....
Chassis-No.	Engine No.	No.of km.run/miles run

Owner:

I hereby commission you to carry out, against payment of ....., at the above mileage, the adjustments and checking operations set out overleaf. Materials such as gaskets, oil, etc. and repairs occasioned by reason of the inspection, please charge separately.

Date .....

.....
Signature of Holder

The HEINKEL Workshop of

.....
name and address of workshop

carried out the following after-sales service between 950-1050 km.

1. Trial run (run engine warm)
2. Change gear oil
3. Clean carburettor, pipes
4. Clean air filter and steep in oil
5. Test spark plug
6. Check ignition timing and contact breaker points.
7. Test generator installation
8. Test signalling installation
9. Check clutch play
10. Check gear shift adjustment
11. Check for chain sag
12. Check fixing bolts
13. Test brakes
14. Check tyre pressure
15. Test steering
16. Check front fork
17. Check spring legs
18. Lubricate speedometer drive
19. Test run.

3rd After-sales Inspection was carried out on .....
when kilometer reading/miles reading was .....

.....
Stamp and signature of HEINKEL Dealer

- -

After-sales Service
CHIT No. 3
Valid at 1950-2050 km. for
HEINKEL "PERLE" Moped

.....	.....	.....
Chassis-No.	Engine-No.	No.of km.run/miles run

Owner:

I hereby commission you to carry out, against payment of .....
at the above mileage, the adjustments and checking operations set out overleaf. Materials such as gaskets, oil, etc. and repairs occasioned by reason of the inspection, please charge separately.

Date .....

.....
Signature of Holder

The HEINKEL Workshop of

.....
name and address of workshop

carried out the following after-sales service between 1950 - 2 050 km.

1. Trial run (run engine warm)
2. Check gear oil
3. Clean carburettor, pipes
4. Clean air filter and steep in oil
5. Test spark plug
6. Check ignition timing and contact breaker points
7. Grease lubricating felt
8. Test generator installation
9. Clean exhaust unit
10. Test signalling installation
11. Check clutch play
12. Check gear shift adjustment
13. Check for chain sag
14. Check fixing bolts
15. Test brakes
16. Oil pedal bearings
17. Check tyre pressure
18. Test steering
19. Check front fork
20. Check spring legs
21. Lubricate speedometer drive
22. Test run

4th After-sales Inspection was carried out on .....
when kilometer reading/miles reading was .....

.....
Stamp and signature of HEINKEL Dealer

- -

After-sales Service

CHIT No. 4
Valid at 2950-3050 km. for

HEINKEL "PERLE" Moped

.....	.....	.....
Chassis-No.	Engine-No.	No.of km.run/miles run

Owner:

I hereby commission you to carry out, against payment of ....., at the above mileage, the adjustments and checking operations set out overleaf, Materials such as gaskets, oil etc. and repairs occasioned by reason of the inspection, please charge separately.

Date .....

.....
Signature of Holder

The HEINKEL Workshop of

.....
name and address of workshop

carried out the following after-sales service between 2950-3050 km.

1. Trial run (run engine warm)
2. Check gear oil
3. Clean carburettor, pipes
4. Clean air filter and steep in oil
5. Test spark plug
6. Check ignition timing and contact breaker points
7. Test generator installation
8. Test signalling installation
9. Check clutch play
10. Check gear shift adjustment
11. Check for chain sag
12. Check fixing bolts
13. Test brakes
14. Check tyre pressure
15. Test steering
16. Check front fork
17. Fill front fork chambers with oil
18. Check spring legs
19. Fill spring leg chambers with oil
20. Lubricate speedometer drive
21. Lubricate front and rear wheel hubs
22. Test run

TRANSLATION OF CAPTIONS EXPLAINING ILLUSTRATIONS

Inside front cover: The HEINKEL "Perle" (Pearl) - a real Thoroughbred - Suspension on both wheels, chain oil-bath immersed

Original Page : The HEINKEL "PERLE" during trials
Present-day perfection achieved through severest testing

Fig. 3, Fuel cock : z = closed
a = open, tank will empty except for 0.3 litres reserve
r = reserve

Fig. 4 : I. Gang = 1st gear
II. Gang = 2nd gear

zu = throttle down
auf = throttle open

Controls

1. Twist grip throttle
2. Front wheel brake lever
3. Decompression lever
4. Auxiliary starter
5. Clutch lever
6. Twist grip gear shift
7. Light switch
8. Bell
9. Steering lock

a = Lights switched off
b = Lights switched on
c = There should be 2-3 mm clutch play at the clutch lever
d = Front wheel hand brake should start to act when brake lever has completed 1/4 of its path.

Fig 6, exhaust unit : 1. Exhaust pipe
2. Clamping ring
3. Silencer insert
4. Washer
5. Cap nut

Fig. 7, Gearbox lubrication: 1. Oil filler screw
2. Oil drain screw
Ölstand = Oil level

Fig. 8, Right handlebar : 1. Lock nut
2. Adjuster screw for acceleration control cable.

Fig. 9, Left handlebar : 1. Lock nut
2. Adjuster screw for gear shift control
3. Lock nut
4. Adjuster screw for clutch adjustment
5. Clutch lock (when using moped as a bicycle)

Fig. 10 : Removing the saddle, giving access to the fuel tank

Fig. 11, Amal 10 DA 23 Carburettor : 1. Carburettor housing
2. Slide valve
3. Slide valve spring
4. Auxiliary starter piston with spring
5. Mixing chamber cover
6. Bowden control cable adjuster screw
7. Fuel Filter
8. Fillister head screw
9. Float chamber cover

10. Gasket
11. Float and float needle
12. Clamping ring with bolt
13. Main jet
14. Control jet

Fig. 12, Carburettor complete :
1. Induction silencer
2. Rubber sleeve
3. Air filter insert
4. Carburettor
5. Intake elbow

Fig. 13, Rubber sleeve removed : Air filter insert exposed
1. Induction silencer
2. Rubber sleeve
3. Air filter insert
4. Carburettor
5. Intake elbow

Fig. 14, Ignition (Magnet wheel removed) :
1. Contact breaker arm
2. Contact angle
3. Set screw (eccentric)
4. Ignition coil
5. Condenser
6. Lubricating felt
7. Generator coil

Fig. 15, Ignition	: Gap between contact breaker points
Fig. 16, Speedometer drive	: 1. Milled nut 2. Greasing nipple for speedometer drive 3. Axle nut
Fig. 17, Front wheel fork	: 1. Screw plug for filling or draining oil 2. Lug on brake anchor plate
Fig. 18, Adjusting the front wheel brake	: 1. Lock nut 2. Adjuster screw
Fig. 19, Adjusting the rear wheel brake	: 1. Lock nut 2. Adjuster screw
Fig. 20	: Spark gap
Fig. 21	: Testing the spark plug
Inside back cover	: HEINKEL TOURIST 175 cc Scooter 4-stroke, electric starter - popular everywhere - .