

# CALTHORPE MINOR

THE CAR THAT HAS MADE LIGHT CAR HISTORY.—*Vide Graphic.*



1916

MAKERS :

**THE CALTHORPE MOTOR CO. (1912) Ltd.**

Cherrywood Road, Bordesley Green, BIRMINGHAM

*Robt's note*

# CALTHORPE MINOR CARS

THE  
Calthorpe Motor Co. (1912) Ltd.  
BIRMINGHAM

*Works:* CHERRYWOOD ROAD

1916

CALTHORPE Cars  
have received  
Royal recognition—

Her Royal Highness  
Princess Louise and  
H.I.H. The Grand  
Duke Michael of  
Russia

having purchased these  
Cars.

*Telegrams* - - CHASSIS.

*Telephone* - 135 VICTORIA.

## THE CARE OF THE CAR.

THE engine lubrication is carried out by means of a plunger pump driven off the camshaft. This draws its supply through an easily removable filter and forces the oil through an indicator on the dash-board to the main bearings and to the troughs underneath the connecting rods.

The pump carries an adjustable bye-pass valve so that the pressure of oil may be varied.

It is a good plan in the case of a new engine to wash out the sump after about 500 miles and fill up with new oil to the level of the outlet plug. The gear box and bevel gear case should be kept not more than one-third full of thick gear oil, or a mixture of half oil and half grease, as excess of grease in these parts will result in leakage through the shaft glands. The hubs, steering box and shackles should be supplied with ordinary grease, and the following parts must be oiled every day:—

Starting shaft.	All brake connection joints.
Pedal shaft.	All pins on brake levers.
Hand-brake lever shaft.	Control levers.

It will be found advantageous to always lubricate after washing the car down, in order to expel any water that may have found its way into the bearings which are exposed.

LOOKS LIKE A CAR—RUNS LIKE A CAR.

## INTRODUCTION

GETTING satisfactory service from a car made to sell at a price at which a good car cannot be sold, is like winding up a watch with a motor spanner—it can't be done.

The Calthorpe Minor is not made to sell at a price. It is made to sell on merit. Price is a secondary—though an important—consideration. First to give the maximum efficiency, then to give the maximum value—that is the principle upon which the Calthorpe reputation has been upbuilt.

Many considerations enter into the motorist's choice of a light car—smartness, speed, power on hills, responsiveness, price and quality. Of all these, comparisons between various makes of cars may easily be made, except the last. Quality—sturdiness, the life of the vital parts, the strength to stand up to the worst conditions of motoring—these only reputation can help to judge. And no car selling within £50 of the Calthorpe Minor can show so fine a record as this wonderful little car for either quality or achievement.

Notwithstanding the great difficulties under which manufacturing is now carried on,

SILENT LIKE A CAR—AND IS A CAR.

## THE CALTHORPE MINOR—

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### INTRODUCTION—*continued.*

owing to the War and the unexampled pressure at our Works through our very large Government contracts, we have nevertheless succeeded in effecting a number of most important improvements in our 1916 models, of which the following are a few:—

The bore and stroke has been increased to 65 m/m and 95 m/m. The water pipes have been redesigned, and now give a much easier flow and a reduced lift from bottom of radiator to cylinder jacket. The radiator has been increased in size.

Two leather disc joints of an improved design are now fitted between clutch and gearbox, instead of one as formerly fitted.

Change speeds and brake levers have been considerably strengthened, and a reverse stop fitted on the gate. A much larger inspection cover is now fitted on the gearbox lid.

Foot pedals are now adjustable.

The brakes on the back axle have been made much larger, and will be lined with a brake lining. The brake actuating mechanism has been considerably improved, stronger rods and levers being fitted. The brakes are compensated, and can be adjusted by hand.

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## THE MINIATURE CAR-DE-LUXE.

## LOOKS LIKE A CAR—RUNS LIKE A CAR.

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### INTRODUCTION—*continued.*

The front hubs have been redesigned, journal type ball bearings being fitted instead of the cups and cones as formerly.

The body-work in the new models is even more luxurious and better finished than in the 1915 models, which have been so universally admired. The coupe is roomier and of smarter design. The two-seater has the fish-tail rounded toolbox of the 1915 Grand Duke Michael model. The four-seater is considerably more roomy and comfortable. All cars have a complete stream-line body, beginning with the radiator and ending at the scuttle dash.

Altogether, the 1916 Calthorpe Minor marks a most appreciable advance in light car construction, and is assured of more than maintaining its place in the front rank of light cars. We may, we are sure, count upon the kind indulgence of the public in any unavoidable delay in the execution of private orders on account of the very heavy Government contracts, which must, of course, receive preference; but our customers may be certain that, by working night shifts and adopting every possible measure to accelerate manufacture, that delay will be reduced to a minimum.

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## SILENT LIKE A CAR—AND IS A CAR

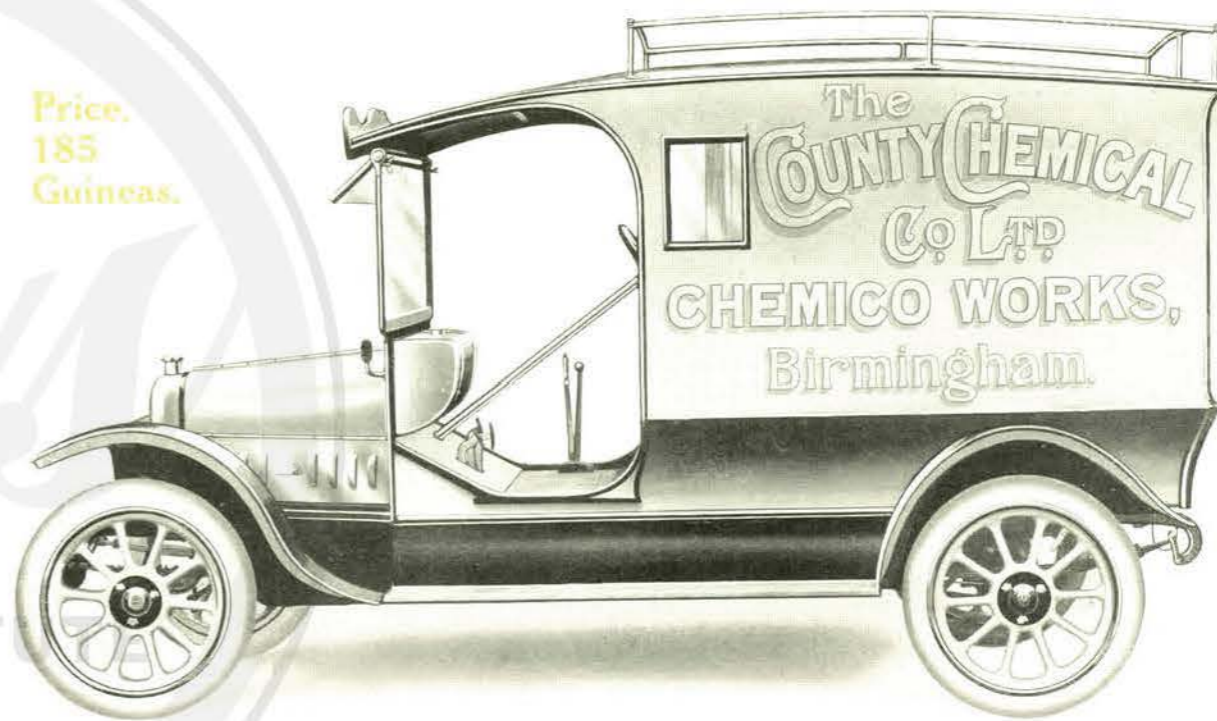
Price,  
185  
Guineas.



CALTHORPE MINOR  
DELIVERY VAN.

6

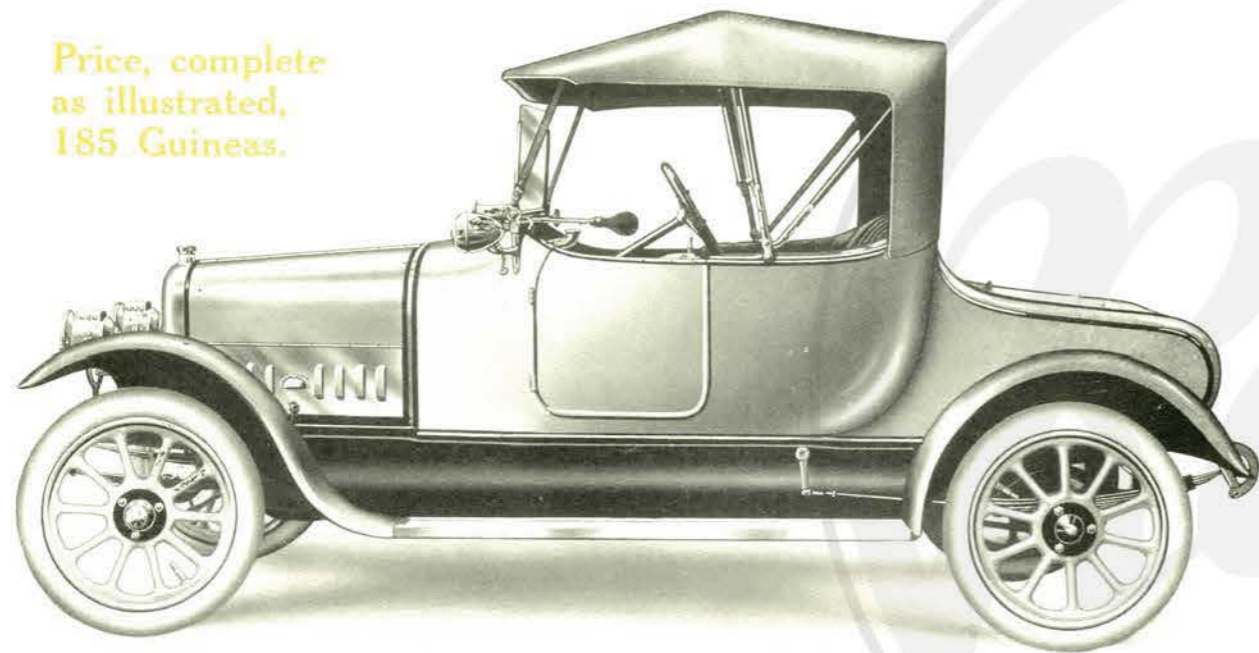
Price,  
185  
Guineas.



® CALTHORPE MINOR DELIVERY VAN.

7

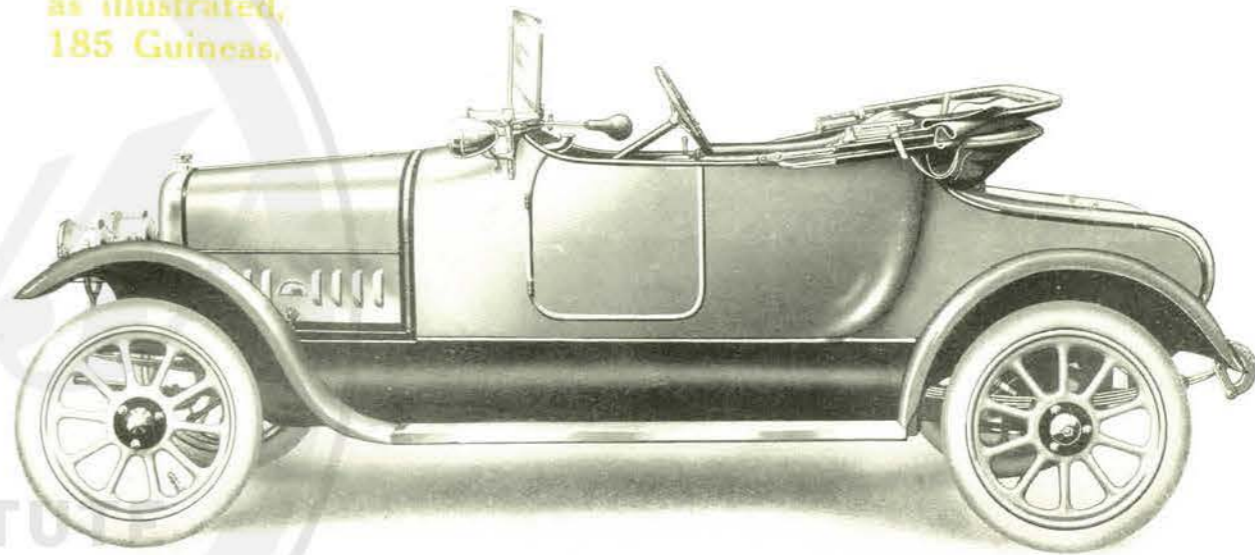
Price, complete  
as illustrated,  
185 Guineas.



CALTHORPE MINOR STANDARD TWO-SEATER.

8

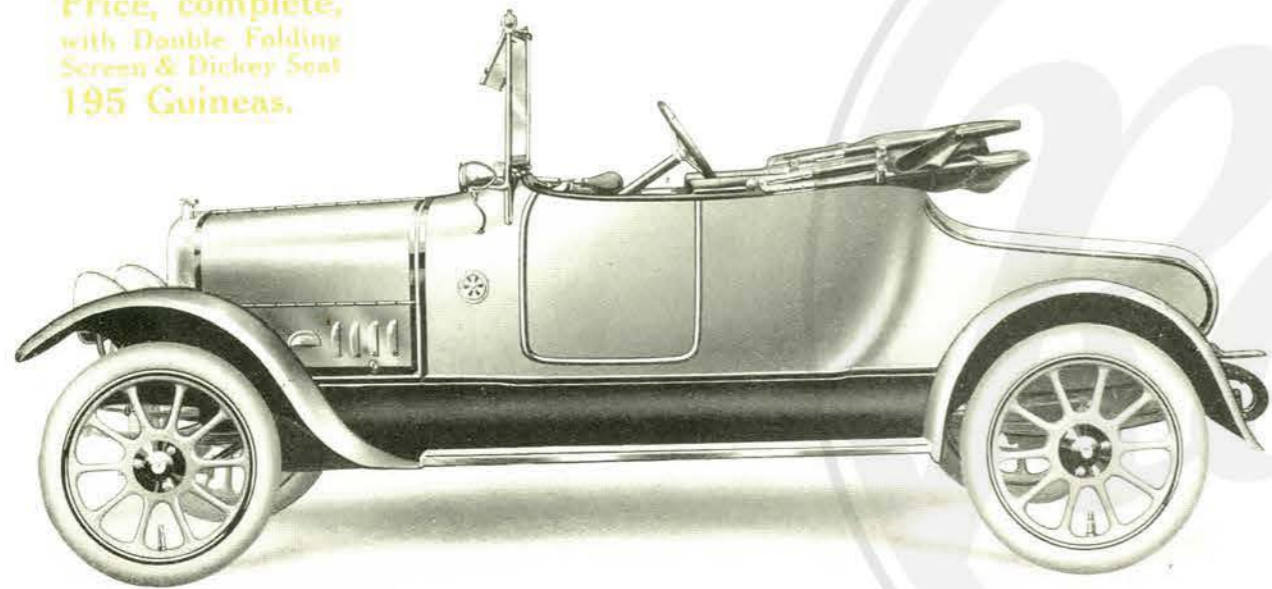
Price, complete  
as illustrated,  
185 Guineas.



CALTHORPE MINOR STANDARD TWO-SEATER.

9

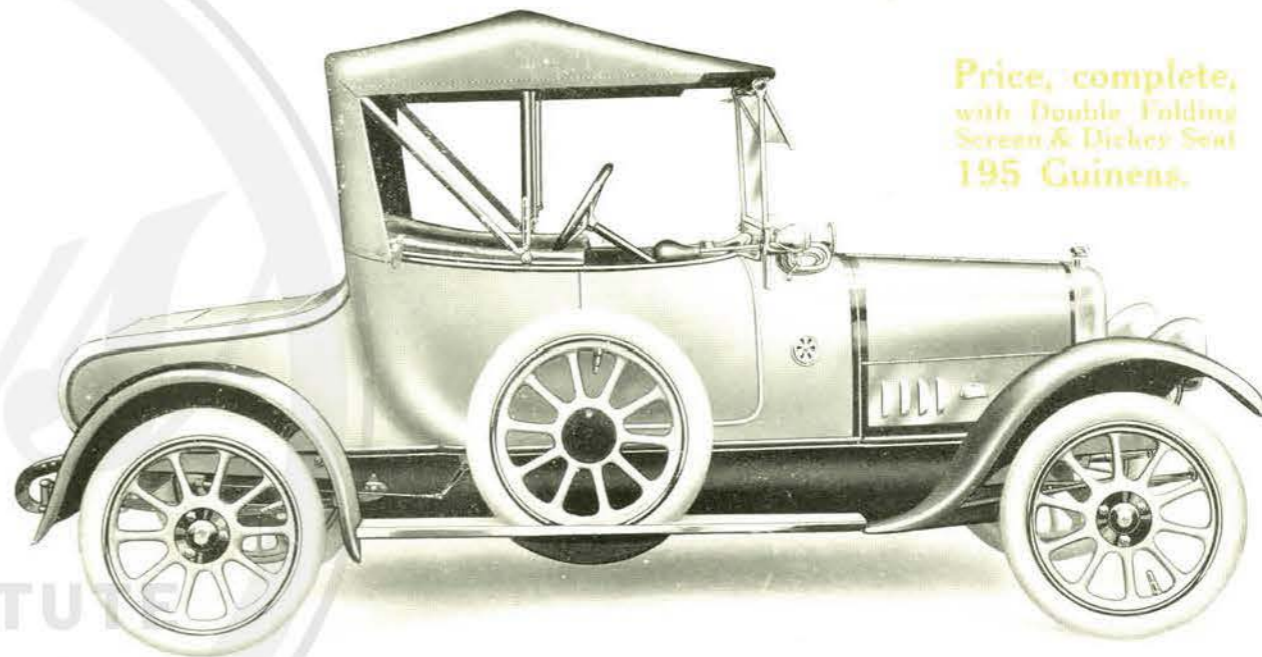
Price, complete,  
with Double Folding  
Screen & Dickey Seat  
195 Guineas.



CALTHORPE MINOR (Grand Duke Michael Type)  
(As supplied to H.H. the Grand Duke Michael of Russia)

10

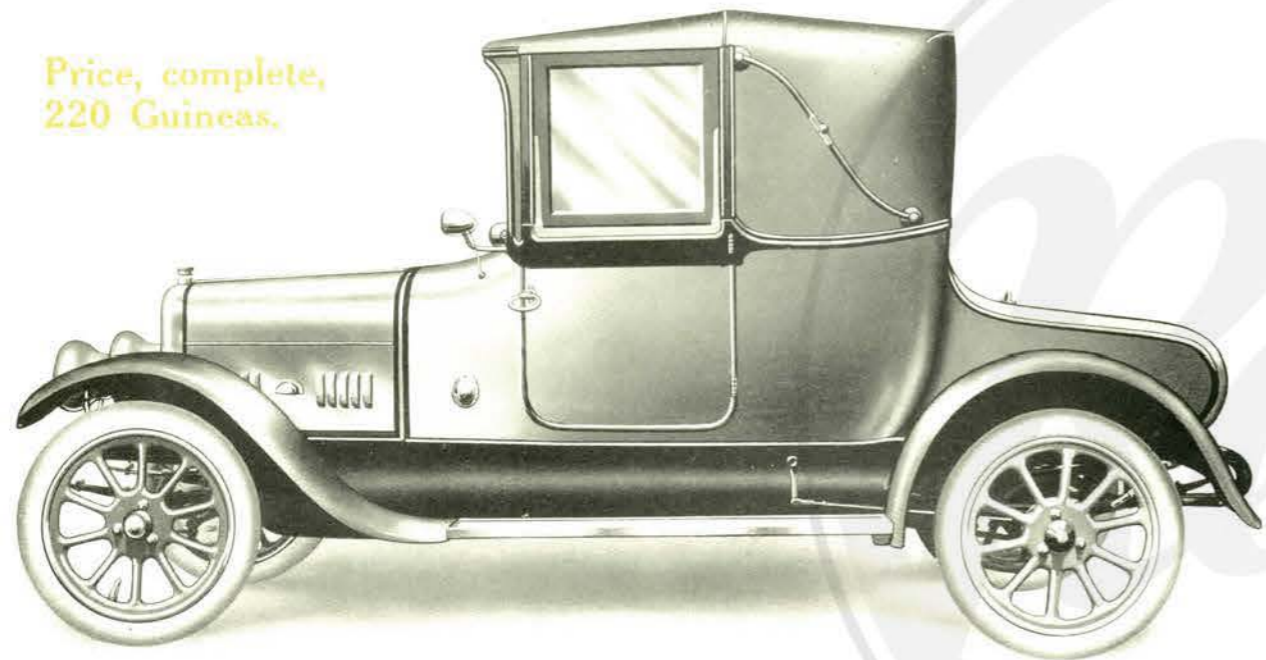
Price, complete,  
with Double Folding  
Screen & Dickey Seat  
195 Guineas.



CALTHORPE MINOR (Grand Duke Michael Type)

11

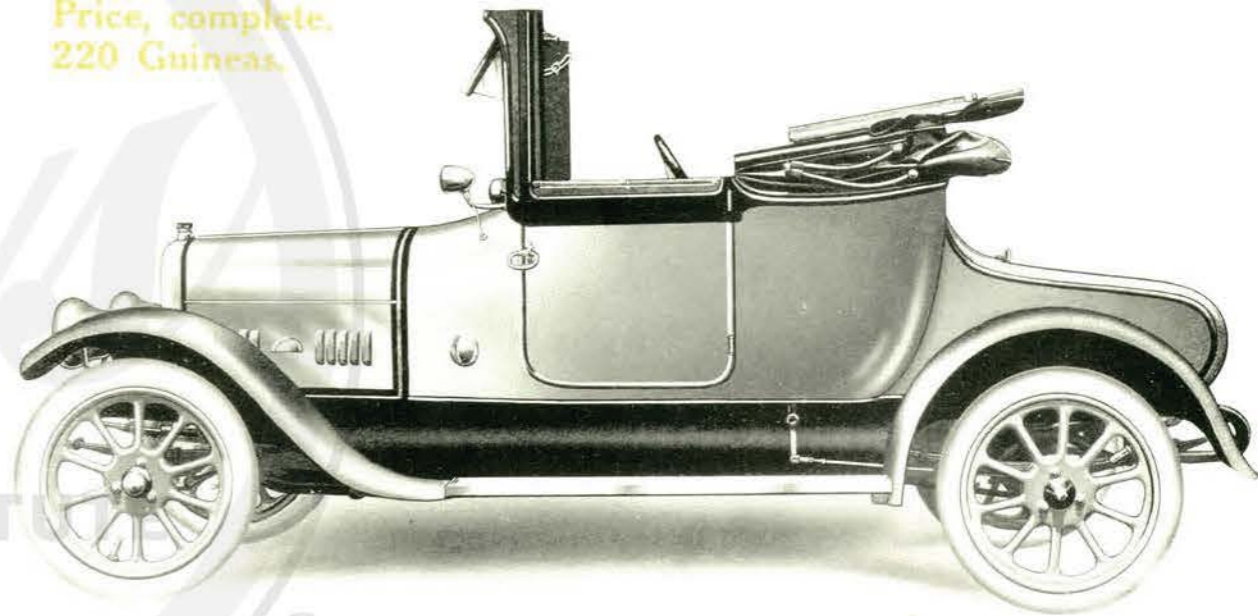
Price, complete,  
220 Guineas.



CALTHORPE MINOR COUPÉ

12

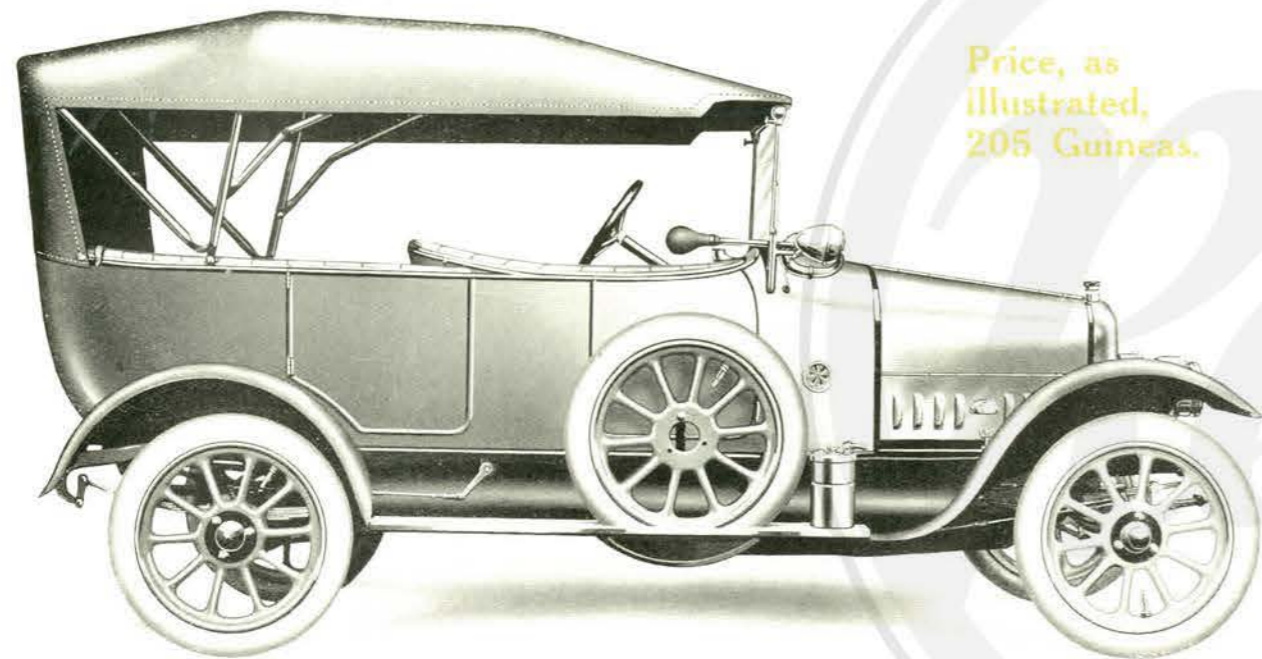
Price, complete,  
220 Guineas.



CALTHORPE MINOR COUPÉ

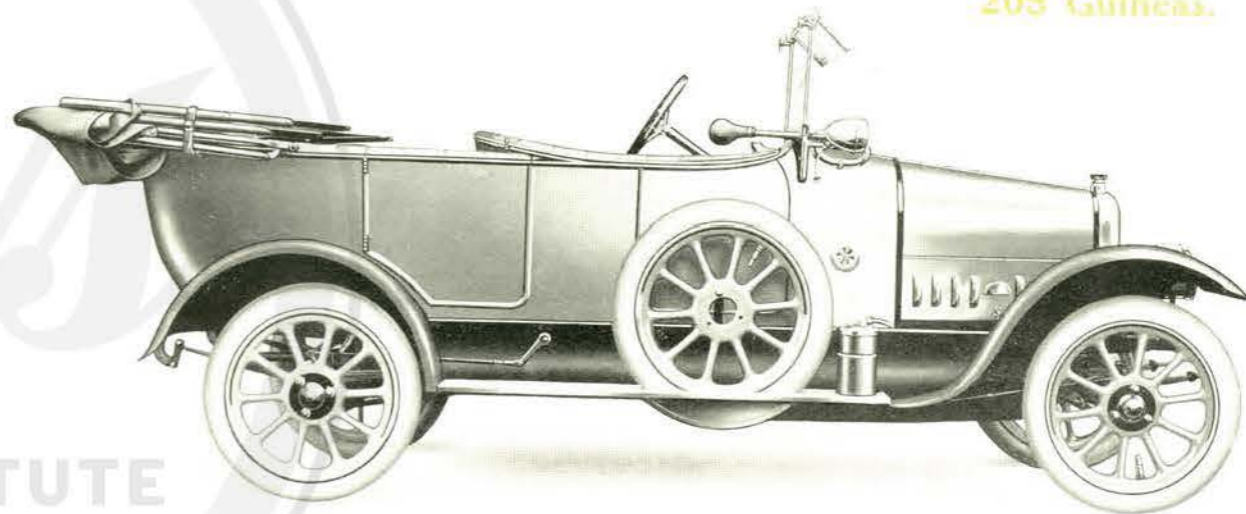
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Price, as  
illustrated,  
205 Guineas.

CALTHORPE MINOR FOUR-SEATER.

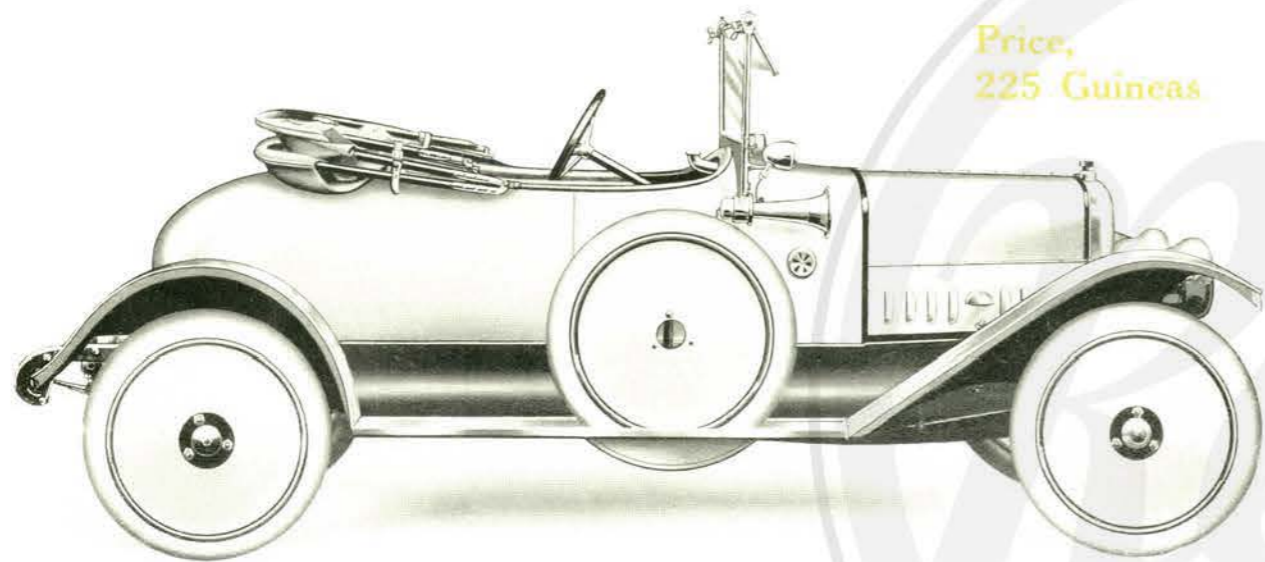


Price, as  
illustrated,  
205 Guineas.

CALTHORPE MINOR FOUR-SEATER.

INSTITUTE





Price,  
225 Guineas

### CALTHORPE MINOR SPORTING MODEL

Guaranteed speed, 60 miles per hour.

(For particulars, see article on opposite page).

LOOKS LIKE A CAR—RUNS LIKE A CAR.

## A SPORTING MODEL CALTHORPE.

ONE of the most sensibly equipped sporting models we have yet seen is a Calthorpe Minor, built specially to the order of Lieut. Halford of the Royal Flying Corps. The standard chassis is used with a specially tuned engine, which has given some remarkable figures on test. The power developed is 37 b.h.p. at 3,720 r.p.m. and 36 b.h.p. at 3,800 r.p.m., so that the peak of the power curve is about 3,720 r.p.m. Maximum speed in touring trim with two up is 66 m.p.h., and on second gear up hill the car has done 47 m.p.h. Throughout the engine, gearbox and back axle B.N.D. steel has been extensively employed. The weight of the car unladen is 9 cwt., which partly accounts for its speed and liveliness on hills.

The Sankey steel wheels have Rally wheel discs, and are shod with 700 mm. by 85 mm. Palmer cord tyres. Petrol consumption is between 33 and 30 m.p.g., which, considering the power developed, is a very good figure.

The body is streamlined with a bulbous stern, which forms a large locker, access to it being had by moving the seat-back forwards on a hinge. No door is fitted, but an extra step on the side of the body makes it easy to step into the car. The seating is side by side, and is not at all cramped, and the upholstery is in black leather. A small two-fold screen is fitted, and affords protection without materially increasing wind resistance. A small hood is also fitted, and being fastened by screw clips to the screen supports, the car is therefore not lacking in comfort, as so many sporting models are, especially as side curtains are provided and completely enclose the occupants.

The colour scheme is white and black with black lamps and nickel fittings, and the car certainly looks extremely handsome. A Broit electric lighting set is fitted and an Apollo electric horn. The distinctive appearance of the standard Calthorpe Minor touring model is not lost in any way; the lines are, in fact, emphasized by the bulbous back and slimmer build of the car. The hood and screen also do not spoil the sporting appearance of the car.

SILENT LIKE A CAR—AND IS A CAR.

## THE CALTHORPE MINOR—

### SPECIFICATION.

**CHASSIS DIMENSIONS.**—Wheel Base, 8ft. 3in. Dash to end of frame, 6ft. 8½in. Width of frame, 2ft. 10½in.  
Track, 3ft. 8½in. „ to centre of rear axle, 5ft. 11in.

**STANDARD WHEELS.**—Five Sunkey Detachable Steel Wheels.  
Tyres: Palmer Cord three-ribbed, 700 x 85 m/m., 2-seater.  
710 x 85 m/m., 4-seater and Coupé.

**ENGINE.**—The four cylinders, 65 m/m bore x 95 m/m stroke, are cast en bloc with the valves arranged in single file on the near side. The valves are made of special nickel steel, and are operated by a solid camshaft running in three white-metal bearings, and driven by a silent chain. All tappets are adjustable, and are offset from the camshaft to minimise wear, the whole of the valve mechanism being enclosed in oil-tight easily detachable covers. The pistons are fitted with two rings at the top, and hardened steel gudgeon pins and phosphor bronze bushes. The connecting rods are of high tensile steel stamped to the minimum weight, the big ends being adjustable, and fitted with heavy die-cast white-metal bearings. The crankshaft, which is of exceedingly rigid design, is carried in adjustable die-cast bearings, the bolts securing the caps being carried up to the base of the cylinders, thus taking all strain off the crankcase. A plunger pump, operated by an eccentric on the camshaft, forces oil to the crankshaft bearings and also to troughs beneath the connecting rods, on which scoops are formed, so as to give constant lubrication at all speeds.

**IGNITION** is by high tension Magneto having variable timing, and driven by a silent chain from the crankshaft through a serrated quickly detachable coupling, providing a fine adjustment.

## THE MINIATURE CAR-DE-LUXE.

## LOOKS LIKE A CAR—RUNS LIKE A CAR.

### SPECIFICATION—*continued.*

**CARBURETTOR** is the automatic Claudel-Hobson, specially adapted for our engines, and will be found to give excellent results as regards speed, economy, and flexibility.

**GEARBOX.**—From the engine the drive passes through a Hele Shaw clutch (about which little need be said except that we have fitted these clutches exclusively for the past seven years) to the gearbox. Three speeds and reverse are provided, with direct drive on top gear, being operated by a lever working in a gate. Both change-speed and brake levers are inside the body, being placed conveniently to the driver's hand. All the shafts are mounted on ball bearings, and the gears are secured to their respective shafts by the now well-known serrated drive, which was first introduced on the Calthorpe Car. Universal joints of unique design are fitted between clutch and gearbox and at the rear of the latter. These joints are noiseless at all times. The propeller shaft runs on ball bearings, and is carried in a flanged tube, which is bolted to the bevel gearcase. Gear ratios 4.33, 7.5 and 14.3.

**BACK AXLE.**—The Back Axle is of the usual bevel-driven type, and is fitted throughout with ball bearings. The hubs are carried on drawn steel axle tubes, thus relieving the shafts of all except the driving strains. The bevel gearcase is divided at an angle of 30° from the horizontal, admitting of ready inspection of the driving gears.

**FRONT AXLE.** The steering heads, which swivel on chrome vanadium steel pins, are fitted with phosphor bronze bushes. The hubs are mounted on large ball bearings.

**STEERING** is by worm and worm wheel, the former being carried on adjustable ball bearings. All steering levers are steel stampings, and all steering joints are of the ball type, being self-adjusting and fitted with lubricators.

## SILENT LIKE A CAR—AND IS A CAR.



## THE CALTHORPE MINOR—

### SPECIFICATION—*continued.*

**FRAME.**—This is of channel section pressed steel, inswept at front to give a large steering lock.

**SPRINGING.**—The springs are the usual type of half elliptic and are fitted to both front and back axles, all springs being of good length and width.

**BRAKES.**—These are all internal expanding, and are amply sufficient in size. The foot-brake acts on the rear hubs, thus relieving the transmission of most breaking strains, while the hand-brake acts on a drum at the back of gear-box, and is only intended for holding the car while standing, and for emergencies.

**CONTROL.**—Both the throttle and ignition control levers are placed in a most convenient position above the steering wheel. Foot accelerator is also fitted.

**UNDERSHIELD,** protecting engine and gearbox, of a non-rusting material.

**PETROL TANK.**—On all bodies the petrol tank is enclosed in the dome-shaped scuttle dash, and has a capacity of  $5\frac{1}{2}$  gallons.

**BODY.**—All bodies fitted to Calthorpe Minor Chassis are well designed, of pleasing appearance and very luxurious finish. Only the best leather is used for the upholstery, with the exception of the coupé, which is upholstered in cloth.

## THE MINIATURE CAR-DE-LUXE.

## LOOKS LIKE A CAR—RUNS LIKE A CAR.

### PRICES.

1	Calthorpe Minor Delivery Van, with five Palmer cord tyres, 700 x 85 oil side and tail lamps, and all tools ... ..	185 Guineas.
	Writing extra.	
2	Calthorpe Minor Two-seater Torpedo, complete with cape hood, single folding screen, including five detachable Sankey wheels, five Palmer cord tyres, 700 x 85, two acetylene head lamps, two electric side and tail lamps, horn and all tools complete, ready for the road ... ..	185 ..
3	Grand Duke Michael type (two-seater torpedo with dickey seat), double folding screen, 700 x 85 Palmer cord tyres, otherwise same specification as above ... ..	195 ..
4	Calthorpe Minor Four-seater Torpedo, fitted with one man hood, double folding screen, two acetylene head lamps, two electric side and tail lamps, five Sankey wheels, five 710 x 85 Palmer cord tyres, complete with horn and all tools ... ..	205 ..
5	Calthorpe Minor Coupé, luxuriously finished, upholstered in best cloth, fitted with spring cushions, five Palmer cord tyres, 710 x 85, two acetylene head lamps, two electric side and tail lamps, and all tools ... ..	220 ..
	The finish of the Calthorpe Minor Coupé is equal to the best coach-built bodies obtainable.	
6	Sporting Model Calthorpe, fitted with screen, hood, five lamps, five tyres, and all tools ... ..	225 ..

## SILENT LIKE A CAR—AND IS A CAR.



## THE CALTHORPE MINOR—

### PRICES—*continued.*

Additional price for fitting 6 volt lighting set to Calthorpe Minor Car ...	£14 14 0
Additional price for fitting 12 volt lighting set to Calthorpe Minor Car ...	£16 16 0
Additional price for fitting 12 volt self starter and lighting set combined ...	£29 8 0

In the above prices credit is already given for the standard equipment of five lamps supplied with the car.

Weight of Standard Two-seater ... ..	10 cwt.
Weight of Coupé ... ..	11 "
Weight of Four-seater ... ..	11½ "

The petrol consumption of the two-seater averages 35 miles to the gallon and of the four-seater 32 miles to the gallon.

All designs, weights and measurements must be taken as approximate.

We herewith reserve the right to make constructional alterations of any part described in this catalogue if considered advantageous, or to revise our prices without notice.

## THE MINIATURE CAR-DE-LUXE.

## LOOKS LIKE A CAR—RUNS LIKE A CAR.

### TERMS OF BUSINESS.

**CONDITIONS OF PURCHASE.**—Purchasers of Calthorpe Minor Cars will please note that they do so on the distinct understanding that the vehicle purchased shall not be exhibited either directly or indirectly at any exhibition in the United Kingdom of Great Britain and Ireland without the written authority of THE CALTHORPE MOTOR COMPANY (1912) LIMITED.

**PAYMENT.**—Net Cash. One-third of the total cost with order, and the balance upon receipt of invoice when car is ready.

**DELIVERY.**—At Works. We can generally arrange for a competent driver to deliver customers' cars, but do so at customers' own risk. Wages of driver and expenses only charged.

**GUARANTEE.**—The following guarantee is given in lieu of all implied guarantees, which are hereby excluded in the event of any defect being disclosed in the car (apart from tyres, dynamo, lighting set and accessories for which we are not responsible), we undertake, on the return of the defective part, carriage paid to our Works, within six months from the date of purchase, to carefully examine it, and if found faulty through bad material or workmanship, to replace the defective part free of charge. We wish it to be clearly understood that our liability is confined to the replacement of the defective part, and that all labour, time and other expenditure is charged for. In no case are we to be held responsible for contingent liability of any kind. This guarantee does not apply to cars used for hire, racing, nor to defects caused by wear and tear, dirt, misuse or neglect. Defective parts must always be sent carriage paid, together with chassis number, date of purchase, and as far as possible the particulars of the conditions under which the defect became apparent.

®  
SILENT LIKE A CAR—AND IS A CAR.

## THE CALTHORPE MINOR

### A FEW CALTHORPE MINOR SUCCESSES.

The Waddington Fells Hill Climb, making fastest time and winning on Formula.

The President's Silver Cup, at Shelsley Walsh Hill Climb, and the

Caerphilly Hill Climb, Cardiff, making fastest time and winning on Formula.

Winner of the 6-hour Race at Brooklands.

Colmore Cup. 2 Gold Medals.

Colwyn Bay Speed Trials, Fastest Time and Gold Medal.

Sutton Coldfield Hill Climb on Style Cop; the Calthorpe Minor swept the board, gaining no less than 6 Gold and Silver Medals, besides winning the G. W. Hands' Cup.

THE CALTHORPE MINOR established two years ago the following Records which still remain unbeaten as we go to press:

1 kilometre	average speed	77.4	miles p.h.	5 hours	average speed	66.10	miles p.h.
1 mile	"	76.77	"	6 hours	"	65.54	"
10 miles from standing start	"	70.95	"	300 miles	"	65.51	"
4 hours	"	65.87	"	400 miles	"	65.46	"

## THE MINIATURE CAR-DE-LUXE.

## A 1,404 MILES TOUR IN INDIA.

The *Times of India* of 8th April, devotes practically two pages to an illustrated description of a magnificent 1,404 miles tour in India, **not** on a 60 h.p. car with every conceivable provision and equipment—but on just an ordinary standard model of the 10 h.p. Calthorpe Minor, driven by a private owner, entirely without the knowledge of the Calthorpe Motor Co.

Here are the out-standing points of this wonderful performance—a performance that would have done credit to any car of many times the rating:—

### 1,404 Miles Across Rivers—Up Mountains and over stretches of description-defying roads.

" . . . at the 145th mile from Bangalore the road was exceedingly bad . . . no difficulty was experienced in running through the river, which was from nine to twelve inches deep.

" . . . there was considerable water in the river and the ascent and descent were very stiff."

### NOT A SINGLE MECHANICAL HITCH ALL THE WAY.

" No mechanical troubles of any sort were experienced either on the outward or the return journey."

### 47 MILES TO THE GALLON ON PETROL.

" . . . Petrol consumption for the whole run worked out at 47 miles to the gallon."

### CLIMBED THE BHOR GHAUT WITH PASSENGERS AND LUGGAGE.

" . . . started up the Bhor Ghaut with three people instead of two, and three suit cases. The car, however, did not seem to mind the extra load, although the gradient is very stiff."

### BEST DAY'S RUN—207 MILES.

" What does any ordinary trial or hill-climbing contest mean when placed alongside such a marvellous performance as the above? It is this steady **doing things**—this getting **there**—that holds the Calthorpe Minor aloof from its competitors, in a class altogether its own."

## THE CALTHORPE MINOR—

### SIX-DAYS' A.C.U. TRIAL.

The only Car to obtain **MAXIMUM MARKS AND GOLD MEDAL** in the English Six-Days' Trial was the 10 h.p. **CALTHORPE MINOR**.

*The Light Car and Cycle Car*, 13th July, commenting on what they describe "The A.C.U. Test to destruction over grass-grown tracks and river bed surfaces," says:—

"It is almost impossible to exaggerate the severity of the trial, and when it is remembered that out of the total entered, over 60 per cent. retired altogether, some indication of the terrific test imposed on the machines will be gained.

"The performance of Mr. Burgess on the Calthorpe deserves special mention. To lose no marks at all in a trial of this freakish and almost unprecedented character is an accomplishment which must move the entire motoring world to admiration, not only for the sturdy, speedy and reliable little machine, but also for the skilful and intrepid driver. This performance is undoubtedly a landmark in the history of the 'new motoring.'"

*The trials day by day as reported in THE LARGER CAR, 15th July:—*

- MONDAY . . . "Undoubtedly the finest climb was made by the little Calthorpe."  
TUESDAY . . . "Easily the fastest ascent was made by the Calthorpe."  
WEDNESDAY . . . "The Calthorpe accelerated in a wonderful manner."  
FRIDAY . . . "The Calthorpe again simply streaked up Holmforth Hill."  
                  . . . "The Calthorpe simply flew up Outhelbridge Hill."  
                  . . . "The performance of the light car is very creditable, for it has not only climbed all the hills, but has simply flown up them."

## THE MINIATURE CAR-DE-LUXE.

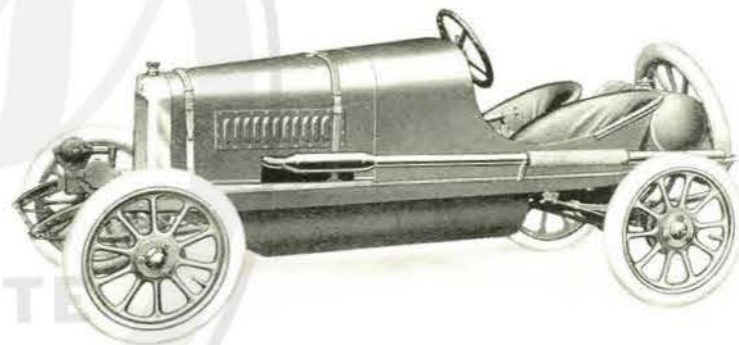
## LOOKS LIKE A CAR RUNS LIKE A CAR.

### THE ELIXIR OF MOTORING.

A Trial Run on the International Calthorpe Racer—Vivid Description of Road Racing at 60 m.p.h.

*In the following Article, which appeared in the "Light Car and Cyclecar" of September 21st, Mr. McMinnies of the "Light Car and Cyclecar" gives his impression of a 200 miles run on one of the Calthorpe I.O.M. Racers.*

#### INTERNATIONAL GRAND PRIX MINOR RACER.



One of the Racers built for the I.O.M. Race.

## SILENT LIKE A CAR—AND IS A CAR.

**T**H**E**R**E** are two kinds of motoring enjoyment. One is the pleasure that comes from gently ambling through country lanes on a sunny day and watching the changing face of the landscape and the effects of the lights and shades on the distant hills. But this makes no appeal to me. The other kind of enjoyment is full of life, and is of a more exhilarating type.

Out on the open road with the wind and speed sending the moisture flying from one's eyes, the roar of the exhaust drowning everything, and the rain of boiling water from the radiator cap combining to add still more to the

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## THE CALTHORPE MINOR

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impression that one is wrestling alone with the elements! But to this there is still to be added the fearsome joy of clinging desperately to the steering wheel of a bouncing, roaring car that is devouring the miles at the rate of one per minute.

You can see the road for miles ahead, and yet, despite that, you are continually coming on bends and landmarks before you realize it. This is owing to the fact that you are probably travelling two or three times as fast as you usually do.

Then again there is the additional thrill of not being quite certain whether you are going to keep on the road at all, for at 50 to 60 miles an hour, a light car wants a deal of holding, and a bad bump may send you several feet into the air, followed by a series of wobbles which are somewhat disconcerting. But the thrill is there, and the feeling of battling with the elements and the excitement of speed provide the real joys of driving.

Such are my impressions after a week-end on the International Calthorpe racer. This was entered for the Dangerfield Trophy Race, and is reputed to be able to do 80 m.p.h. under favourable conditions. Indeed, this actual machine has been on the Isle of Man course, where it put up a very astonishing and creditable performance.

The little car, stripped of all superfluous accessories such as windscreen, hood, mudguards, lamps and horn, looked innocent enough, but the raucous note from the long asbestos-lagged exhaust pipe betokened the power stored away under the long blue bonnet. There is no dashboard proper on the machine, and one can look right down to the flywheel and to the back cylinder from the driver's seat.

It was rather difficult to get into the latter, for, as a matter of fact, the seat had been built for a much shorter man than myself. However, once there, I was firmly wedged in between the bucket seat and the steering wheel. In front there was about a couple of yards of bonnet, ending in the radiator cap, and behind there was the spare wheel and a large cylindrical brass tank for the petrol.

We were off! My passenger, his cap reversed, his coat buttoned up to the chin, smuggled down into the other bucket seat, which was slightly staggered to the one in which I sat. It soon began to rain. The sensation of speed over the sodden roads with the wind and rain beating into one's face was glorious. The milestones flitted past and the little machine evinced a great desire for annihilating gradients of 1 in 10 on top gear at high speeds.

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## THE MINIATURE CAR-DE-LUXE.

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## LOOKS LIKE A CAR—RUNS LIKE A CAR.

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### ACCELERATION IS MAGNIFICENT.

Forty miles an hour seemed as 25 on an ordinary car. Acceleration is magnificent, and when the throttle pedal is depressed there is a snatch at the back, which is the bucket seat hitting you, so tremendous is the pick-up.

The Cotswolds were selected for the test, as they provide some wonderfully open expanses of well-surfaced roads, but even on this ideal testing ground there were few lengths where one could let out so fast a machine as the Calthorpe. When I say that it would practically climb from Cheltenham up to the Cotswolds towards Northleach at 50 miles an hour, one can realize the speed of it.

Downhill it was tremendous. The hum of the exhaust and the tremendous wind pressure made it practically impossible to hear anything at all as we were careering along over some of these open Wold roads. The most thrilling part of all was when a leap more severe than the rest set up a wobbling of the machine, which it was not at all easy to counteract at speed, but, generally speaking, the little car held the road well.

In front it was fitted with Houdaille shock absorbers, and at the rear, as the shock absorbers for the axle had not yet arrived, straps were fitted between the chassis and the back axle to prevent the rebound of the body being excessive. But even then I could have wished the machine had been underslung, as I feel certain that it would have increased its stability at really high speeds, and, after all, it should be possible to make it perfectly safe to drive over a lumpy road at 70 to 80 miles an hour, despite its light weight, if the centre of gravity were sufficiently low. One has only to watch the Continental racing car to see how it holds the road, and this is on account of the fact that the weight is distributed evenly between the two wheels and carried very low.

### A STRANGE SENSATION.

Goggleless, half-blinded with wind and rain, it is no easy matter to see distinctly. The road ahead assumes a blurred appearance, and though you can see there is something perhaps half-a-mile off, you have no idea of whether it is a pedestrian, a horse and cart, or another motorcar. Then, again, at a very high speed you get that strong impression of the road coming towards you instead of your coming towards the road. The white ribbon seems to be rushing towards you, faster and faster. Objects in the far distance approach slowly and then whisk past on each side with marvellous acceleration. It is a strange sensation, but this is the real elixir of motoring and the thrill is there.

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## SILENT LIKE A CAR—AND IS A CAR.



## THE CALTHORPE MINOR

Reprint from "The Light Car and Cyclecar," 19th April, 1915.

### A DUCAL MODEL.

Extensive Trial of a Grand Duke Michael Model Calthorpe reveals an Engine of astonishing power and a Chassis of remarkable excellence and comfort.

#### SUMMARY OF RESULTS (Three up).

Maximum speed . . . . .	45.50 m.p.h.
Minimum speed (on top gear) . . . . .	6 m.p.h.
Petrol consumption . . . . .	35 m.p.g.
Oil consumption . . . . .	800 m.p.g.

**M**ANY improvements have been made in the 1915 Calthorpe, but the greatest is undoubtedly in the ability of the new model to hold the road well at speed. This has been effected by lengthening the wheelbase to 8ft. 3in., and as a result the full benefit of the extremely lively engine may be obtained with safety and comfort.

Taking over a Grand Duke Michael model for a long test, the outstanding feature which immediately forced itself on our notice was the engine, for it possesses a power and vim which would not be discreditable to an engine twice the size. The

## THE MINIATURE CAR-DE-LUXE.

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### A DUCAL MODEL—continued.

Cylinders are cast en bloc and have a bore and stroke of 62 mm. by 90 mm., giving a cubic capacity of 1086 c.c. The valves are arranged on the near side and are larger than last year, and the exhaust passages also provide an easier path for the gases, the consequence being an appreciable increase in power. Adjustable tappets are provided, and are offset from the camshaft, so as to minimize wear. The whole valve mechanism is enclosed by oil-tight covers. The solid camshaft, running in three white-metal bearings, is driven by a silent chain.

#### LUBRICATION.

The lubrication is very efficient, and for such a willing engine this is very necessary. A plunger pump is driven by an eccentric off the camshaft and delivers oil direct to the main bearings and to troughs under the connecting rods. Both big-end bearings and main bearings are lined with die-cast white-metal brasses and are adjustable. The pistons are as light as is consistent with strength and have two rings each only, thus keeping friction to a minimum. Connecting rods are also light, and the engine is capable of high speeds in consequence, while, owing to the lack of friction and the efficient lubrication, the power curve continues to rise even at high speeds.

The charm of the Calthorpe engine undoubtedly lies in its power and efficiency, but it must not be imagined that flexibility has been sacrificed in an endeavour to give speed. It is possible to pick up on top gear on a really severe hill by carefully retarding the ignition. The magneto control is mounted on a quadrant over the steering wheel, together with the extra hand control of the Claudel-Hobson carburetter. On hills the Calthorpe stands supreme, and we found that with three up we were able to take hills on top gear which call for a drop to second on most light cars, even with only one up.

Sheer speed is also an attribute of the Calthorpe, and during some 600 or 700 miles we were constantly overtaking cars of all sizes, yet were never once overtaken ourselves. It is possible to take full advantage of the speed possibilities of the car,

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### A DUCAL MODEL—*continued.*

for it holds the road perfectly and is entirely free from disconcerting side swings when passing over rough ground. This is largely due to the longer wheelbase of this year's models and the rearrangement of weight distribution.

The frame is stronger than last year and is of pressed steel, inswept at the front to give a large steering lock. The result of the increased length is noticeable in the generous leg room, and the driving position is ideal. The steering is comfortably raked, and the pedals are designed so that they are easily operated with the driver's feet in a natural position. The brake and gear levers are also conveniently situated and are both inside the body. Although our test included one or two long non-stop runs, we were never conscious of stiffness or fatigue.

The worm and wheel steering is carried on adjustable ball-bearings and is very easy. The steering joints also are of the ball type with provision for lubrication, and this undoubtedly contributes largely to the driver's comfort.

The necessity for changing gear occurs but seldom, but the well-designed gearbox merits description. The drive is taken from the engine by a Hele-Shaw multiplate clutch and through a substantial leather ring universal joint to the gearbox. Three speeds forward and reverse are fitted, and the top gear of 4 to 1 is direct. An enclosed gate controls the gears, and when we had overcome the initial stiffness of a new car we found gear changing a matter of simplicity and certainty. All the shafts are mounted on ball bearings, and the gears are secured to their shafts by the serrated drive, which was first introduced on Calthorpe cars and has been widely adopted.

### HILL-CLIMBING.

Despite the high top gear ratio, we had no difficulty in making a top-gear run from Birmingham to London with three up. The road taken was through Coventry, Fenny Stratford, Dunstable and St. Albans, and the average speed can only be stated in confidence. Second gear is employed for starting away from rest on the level, and throughout our test we never had occasion to use first gear on any hill after once getting away.

## THE MINIATURE CAR-DE LUXE.

## LOOKS LIKE A CAR—RUNS LIKE A CAR.

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### A DUCAL MODEL—*continued.*

The excellence of the driver's position has been mentioned, but the comfort of the springing and body generally is exceptionally good. Semi-elliptic springs are employed throughout, as on previous models, and 700 mm. by 85 mm. Palmer tyres combine to produce very easy riding. The body has very graceful lines, but is wide and has plenty of leg room, while the same may be said of the dicky seat, which is a standard fitting on the Grand Duke Michael model.

The owner-driver's convenience has been carefully studied. For instance, undershields protect engine and gearbox, lubricators are provided to spring shackles, steering connections, etc., and a well in the floorboards accommodates the driver's heels. All these may be small details, but to the man who drives and looks after his own car they are of importance. Domed wings and side valances to the running boards ensure protection from mud, and all sheet-metal work is carefully fixed to the frame in a most rigid manner, so that it is impossible for it to rattle.

### A HANDSOME MODEL.

The model which was handed over to us for test presented a most handsome appearance. It was finished in a royal blue with black wings and valances, the metal fittings being of brass. A special V wind-screen was fitted, which considerably added to the imposing appearance of the car and had advantages over the ordinary flat type. No side draughts were felt, and owing to the hood fitting down on to the centre support, there were no draughts with it up. The hood is held up by a single screw clip on the centre screen support, and is very easily put up or down, while it is extremely rigid when up.

The addition of side curtains would convert the car into a very comfortable cabriolet.

On this car a six-volt Brolt dynamo lighting outfit was installed, and we were thus once more able to test a small lighting set. It proved thoroughly reliable, and the best that one can say is that nothing more was needed. Night-driving was, indeed, a pleasure, for the road was lit up so far ahead that a high average speed could be kept up with ease and safety.

## SILENT LIKE A CAR—AND IS A CAR.

## THE CALTHORPE MINOR—

### A DUCAL MODEL—*continued.*

When it is considered that one long run took us from Birmingham to Kidderminster, Bridgnorth, Shrewsbury and on to Llangollen, it will be seen that we were in hilly country. Some hills on which the Calthorpe performed remarkably well were that leading up to Bridgnorth High Town from the river, the climb up through Shrewsbury, and those encountered just before reaching the Pass of Llangollen.

After lunch at the Hand Hotel, which was thronged with motorists on cars of every shape and size, all taking advantage of the fine weather, we essayed the climb of the Horseshoe Pass. Despite the bad corners and the necessity for proceeding warily, on account of the precipice at the side of the road, we never needed first gear, but, indeed, were frequently able to change up to top. After this display of power we gave up trying to find an adequate test for engine and gearbox as hopeless. The engine remained cool whatever demands were made on it, so we retraced our wheel tracks to Shrewsbury and thence to Birmingham along the old Roman road to Brownhills.

The final drive is taken through a leather-disc universal joint and enclosed propeller shaft to a bevel-driven back axle. Ball bearings are used throughout this, and the differential wheels and hubs are secured to the axle shafts by serrations. The hubs are carried on drawn-steel axle sleeves, thus taking all stresses off the shafts except that of driving. The bevel gearcase is so arranged that the driving gears may easily be inspected and lubricated. The silence of the back axle is a strong point, and it seems greatly improved by the extra strength which has been given to it this year.

The brakes deserve special mention for their efficiency and long life. The hand brake in particular is very powerful and progressive in action. A pair of expanding shoes is contained in a drum at the rear of the gearbox, and throughout our test this brake was never once adjusted, while it did not seem to have worn to an appreciable extent. The hilly nature of much of our test course must be considered in relation to the brake wear, and although we adjusted the foot brake—which is internal expanding in the rear wheels—after 500 miles, there is no doubt that the Calthorpe brakes are excellent.

## THE MINIATURE CAR-DE-LUXE.

## LOOKS LIKE A CAR—RUNS LIKE A CAR.

### TESTIMONIALS.

Northampton,  
July 8th, 1915.

I am extremely satisfied with the car, and still regard her as the best light car by far that I have owned or driven yet.

RUNABOUT.

South Farnboro,  
February 28th, 1915.

No doubt you are wondering how my special Calthorpe has been behaving since I left your works a week to-day, so I will give you a brief resume of its existence:—

Friday	-	Birmingham to Nottingham	-	-	-	60	miles.
Saturday	-	Nottingham to Manchester, and return	-	-	-	171	..
Sunday	-	Neighbourhood of Nottingham	-	-	-	60	..
Monday	-	Nottingham to Farnboro	-	-	-	160	..
Tuesday	-	Farnboro, Basingstoke, and return	-	-	-	50	..
Wednesday	-	Farnboro	-	-	-	30	..
Thursday	-	To London, and return	-	-	-	100	..

631 MILES TO DATE IN THE WEEK.

All the long journeys were non-stop runs, and the average petrol consumption over these was 35 m.p.g. exactly, which I think is excellent. The car runs awfully smoothly and I am delighted with it; she holds the road well and is a pleasure to drive. Bunny Hill (1 in 7), outside Nottingham, she accelerated to 49 m.p.h. on the steepest part from a standing start at the bottom.

## SILENT LIKE A CAR—AND IS A CAR.

## THE CALTHORPE MINOR—

### TESTIMONIALS—*continued.*

The car has been universally admired, and wherever I stop in town many motorists come to eye the name-plate on the radiator to find to whom the credit is due. Nothing can live near it on the road, and on a long run she keeps up 43 m.p.h. for hours without tiring, hills disappearing without a murmur.

LIEUT. F. B. HALFORD, R.F.C.

It gives me great pleasure to inform you how well pleased I am with the 10 h.p. Minor I bought from you last July. I cannot say too much in its favour. It is reliable in every sense. I have not yet placed the spanner on the engine parts. It is fast, yea, faster than any around here. She will average 38 miles to the gallon.

COUNCILLOR GWILYM T. JONES.

London, May 5th, 1915.

I am very pleased to tell you that my chassis is running perfectly. The engine will tick over running dead slow, while from a speed point of view this is absolutely the fastest four-wheeler I have been on for some considerable time. It is really extraordinary what it will do in the way of hill work. I have now had time to carefully examine the chassis, and must really congratulate you on the fine job, as I have no fault whatever to find with the design. It appears to be perfect everywhere.

O. C. GODFREY.

My Grand Duke Model is going better daily, and I have now got her to run quietly at about 5 or 6 miles an hour on top speed, and my petrol consumption is now 35 to 40 miles per gallon on good roads. I had occasion to do over 40 miles during the week on a very bad road (canal bank) which was greatly cut up with cart tracks and numerous pot-holes. This necessitated very slow driving, 10-15 miles an hour, and on this I got 33 miles per gallon of petrol.

A CIVIL SURGEON STATIONED IN THE PUNJAB INDIA.

You may be interested to know that my car has run 11,500 miles since May, 1914, and is, I think, now running better than ever. It is out in all weathers, and the present condition of the roads in this district makes a severe test on any car.

WAL. CROWTHER MALLINSON.

## THE MINIATURE CAR-DE-LUXE.

## LOOKS LIKE A CAR—RUNS LIKE A CAR.

### CALTHORPE HINTS.

It is most important that any car be properly and intelligently looked after.

Treat the car as carefully as you would a horse, and satisfaction will result.

Remember that want of lubrication will quickly ruin any bearing. This is especially true of the engine, and a heavy repair bill may result from an insufficient oil supply.

Use only best cylinder oil for water cooled engine.

The engine lubrication is entirely automatic, but the filter in the sump should be removed and cleaned every few thousand miles.

Do not overfill the sump: as long as the indicator on the dash board is working there is a sufficiency of oil.

Do not run the sump empty and then fill up, but add each day sufficient oil to compensate for the amount used.

Treat the clutch in accordance with the booklet sent with each car: further copies will be supplied on request.

The above remarks apply to the ignition system.

The carburetter is entirely automatic, and is properly adjusted before the car leaves the works. It is fully explained in the booklet supplied.

Clean out the petrol filter under the tank every few thousand miles.

Attend to the general lubrication in accordance with the instructions on the chart herewith.

Keep the brakes properly adjusted: remember that they are the only means of stopping the car when required.

When starting up advance the ignition half-way or more, and do not open the throttle more than two or three notches on the quadrant.

It is not necessary as a rule to flood the carburetter for starting.

Do not put the gears into mesh when starting or changing up unless the clutch is right out.

## SILENT LIKE A CAR—AND IS A CAR.

## THE CALTHORPE MINOR—

### CALTHORPE HINTS—*continued.*

Always throttle down when changing up: when changing down only slip the clutch sufficiently to enable the change to be made, and keep the throttle open.

Always filter water added to the radiator, petrol added to the tank, and oil added to the sump.

Always keep in the highest gear possible, so that wear and tear on the engine is reduced.

Retard the ignition when the engine begins to knock.

Use the foot-brake in preference to the hand-brake, as it acts direct on the road wheels and does not stress the transmission.

Remove the detachable wheels every thousand miles or so, and grease them where they fit on the inner hubs to prevent rust.

Always let the clutch in gently.

Never jam the brakes on hard unless you are interested in a Tyre Company.

When side-slipping declutch and straighten the car by steering: never apply the brakes when slipping.

Always empty the radiator through the plug at the bottom in frosty weather, as otherwise you may have to buy a new set of cylinders.

When starting up make sure that the gear lever is in neutral: it may save you a doctor's bill.

See that the sparking plug points are kept adjusted or you will have trouble in starting.

Always tighten the detachable wheel nuts up well when replacing in position.

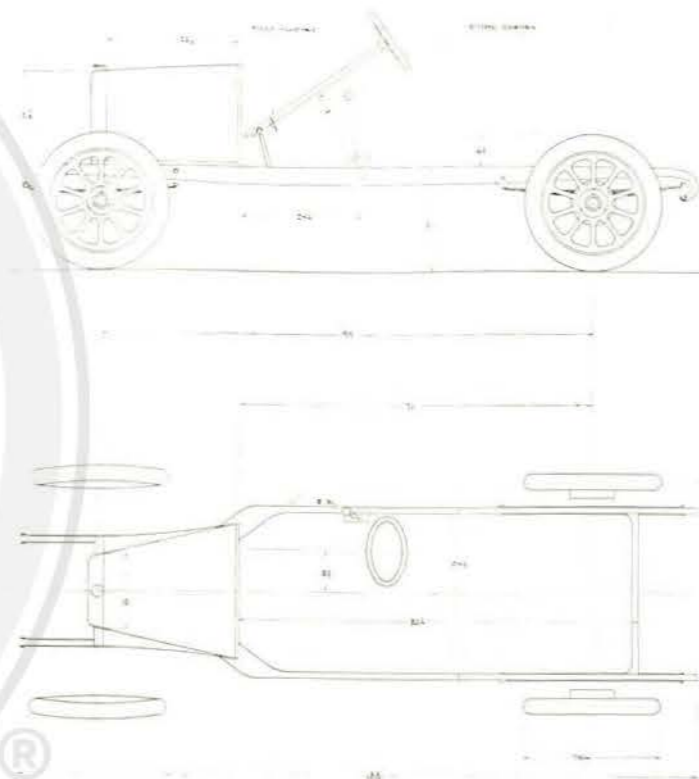
Turn the petrol off when standing for some time: it saves petrol and facilitates starting.

Do not always blame the car: the user is sometimes at fault.

Do not attempt adjustments of important details yourself unless you are sure of your ground.

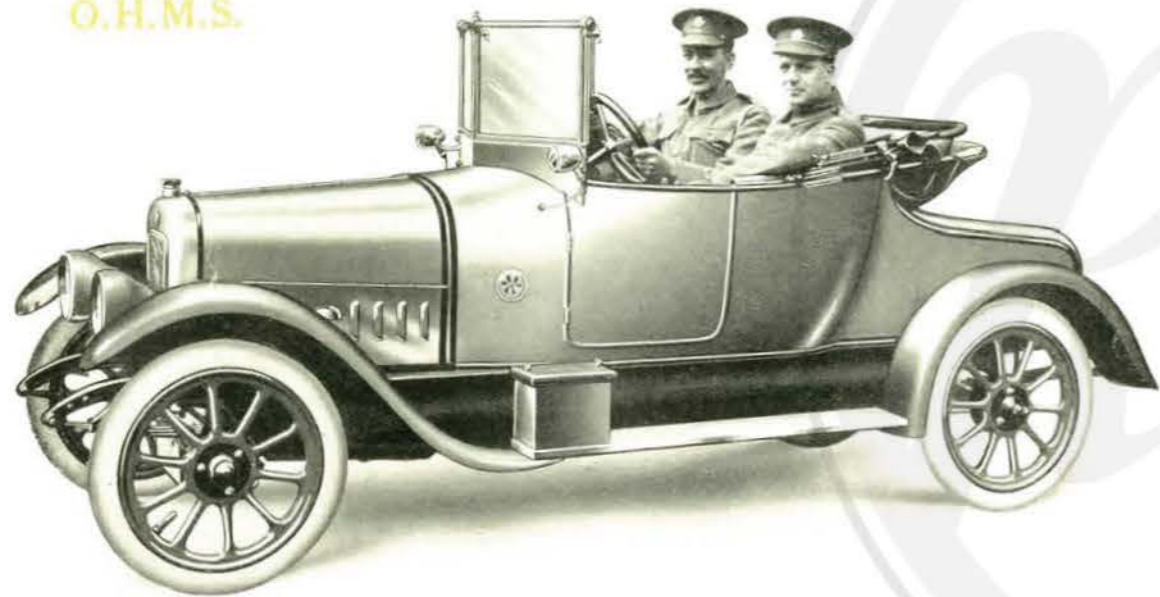
When in doubt write us.

## THE MINIATURE CAR-DE-LUXE.



View of  
10 hp  
Calthorpe  
Minor  
Chassis

O.H.M.S.



CALTHORPE MINOR (Grand Duke Michael Model)