

EAST AFR. PROT.

C O.
4794

No. 1, 194

7 FEB

Individual
ago (to)

(Subject)

1907

Harold Fort Hall Rd

et previous paper.

Report as to - remarks as to necessity
for a fly

(Minutes)

Mr. Read

Minute written on this
7489 - (Mr. Churchill writes
to our chief. f.)

MM 1/3

W. O. C.

4 2 2

8/3

W. O. C.

Mr. Read Perhaps you can say
whether the Media Traction
Committee has now been
discontinued a suit all together

was con. 29 April

Subsequent Paper.

W. O.

16409

whether he desires to suggest
any modification of the list of
motors recommended by the
Committee

314

1912 9/2

Mr. Arthur ...

H-242

1912

for but I cannot help feeling
rather sceptical as to the road
being capable of taking these
vehicles.

W.H. ...

Mr. Churchill

Los Angeles

Motor traction is all very well
for passenger & light goods - the
road for this purpose the cost of
working would likely exceed that on a
narrow gauge tramway or trolley -
but I cannot think it is likely to be
a success on such a road as this new
soft & uneven material - the advantage
of motor traction is the justification for paying
the greater working cost is found in its
flexibility for collecting & delivering parcels
& to a few any place else traffic offers
and many between two fixed points -
Mr. Churchill will be able to tell us about
this route - from point I should say it
is a case for a fixed rail.

15.2

Prague. Weigh of motor room, cost of collecting
with the frequency of road work ~~is~~ ~~of~~
under ~~the~~ ~~of~~ this plan, etc.

It appears that the plan for a rail of some
sort. But before we can settle that
the ~~best~~ ~~is~~ ~~not~~ ~~to~~ ~~leave~~ ~~on~~ ~~flourish~~
export of the ~~North~~ - ~~Carolina~~ railway,
necessarily ~~kind~~ of the government
necessities of the ~~Carolina~~ forest.

It is not ~~under~~ that the railway - ~~Carolina~~
and ~~to~~ ~~of~~ ~~not~~ ~~only~~ ~~become~~
to the ~~North~~ ~~Carolina~~ and ~~that~~ ~~is~~ ~~Carolina~~
there ~~to~~ ~~be~~ ~~the~~ ~~best~~ ~~method~~
to ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
to ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
to ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~

to ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
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to ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
to ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~

A ~~large~~ ~~is~~ ~~a~~ ~~commercial~~ ~~and~~
I think we can pay \$50,000 in
the ~~is~~ ~~not~~ ~~to~~ ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
me ~~is~~ ~~not~~ ~~to~~ ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
passages - ~~the~~ ~~best~~ ~~method~~ ~~is~~ ~~not~~ ~~inter-~~
Thinks ~~is~~ ~~not~~ ~~to~~ ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
to ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
This would be ~~is~~ ~~not~~ ~~to~~ ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~

to be used is not inter-

to be used is not inter-

to be used is not inter-

I must start the refutation of the N.O. application
for a ~~large~~ ~~is~~ ~~a~~ ~~commercial~~ ~~and~~
I think we can pay \$50,000 in
the ~~is~~ ~~not~~ ~~to~~ ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
me ~~is~~ ~~not~~ ~~to~~ ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
passages - ~~the~~ ~~best~~ ~~method~~ ~~is~~ ~~not~~ ~~inter-~~
Thinks ~~is~~ ~~not~~ ~~to~~ ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
to ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~
This would be ~~is~~ ~~not~~ ~~to~~ ~~be~~ ~~used~~ ~~is~~ ~~not~~ ~~inter-~~

March 25 - 1872

Attach to 4/9/07

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**BOUNDARIES: EAST AND WEST OF
LAKE VICTORIA.**

[February 8]

SECTION 1.

CONFIDENTIAL

[3801]

No 1.

Foreign Office to Colonial Office.

Foreign Office, February 8, 1907.

Sir,
WITH reference to the letter from this Department of the 17th November, 1906, I am directed by Secretary Sir E. Grey to transmit to you herewith a copy of a despatch from His Majesty's Ambassador at Berlin upon the subject of the Anglo-German boundary east and west of Lake Victoria.

I am to state that Sir E. Grey proposes, subject to the Earl of Elgin's concurrence, to instruct Sir F. Lascelles to conclude a Convention with the German Government embodying the Agreement of the 18th July, 1906, with the amendments subsequently agreed upon by the two Governments.

I am, &c.
(Signed) ERIC BARRINGTON.

S. F. Lascelles, No. 12 Africa, January 31, 1907.

[20-6-07]

PORT HALL - HAIRONI ROAD.

The Mechanical Transport Committee are of opinion, from the facts placed before them, that the Port Hall Haironi route is suited for Mechanical Transport.

The question of economical employment can best be decided by actual experiment. The Committee recommends provision for the purchase of the lorry of 2 tons carrying capacity, with an internal combustion engine and use of kerosene petroleum fuel, or preference to petrol (as used in the lorry).

Messrs. Thornycroft and Messrs. Milnes Baines will supply the vehicle and if for use with petroleum fuel, Messrs. Sandilay and Messrs. Straker will supply the petrol. The cost being from £700 to £800.

For purposes of comparison the Committee also recommends the purchase of a light steam tractor, using coal fuel, and wagon or wagons, such as could be obtained from Messrs. Fowler, Barrall, Foster or Wallis and Sons, and the New Farmer which could probably supply the more suitable vehicle.

The tare weight of the tractor, which in this case is limited to 2 tons on account of English regulations, might be increased by 2 tons as the ordinary commercial tractor in England, as its scantlings

reduced to a minimum in order to be within the legal tare weight. The driving wheels should also be shod with diagonal road strips.

The wagon should be of 4 ton carrying capacity or possibly the tractor might, if more suited to local conditions, haul two wagons each having a carrying capacity of 3 tons. For general carrying purposes a platform wagon fitted with fuses is recommended.

The tractor could be purchased for about £550 and the wagon for £250.

The heavier form of tractor, the lorry of larger carrying capacity and the steam lorry are not recommended on account of their great weight and the consequent possible damage they may cause to the road.

Should it be decided to carry out this experiment the Committee would be glad to hear the result and, if possible, to know the working costs for one year.

D. R. K. Bayne

Secretary.

War Office Mechanical Transport
Committee.

MRS. READ

This letter is the reply to one which I wrote to Mr. Ross enquiring as to the feasibility of encouraging motor traffic on the road from Fort Hall to Nairobi as a substitute for the construction of a Railway.

When the construction of the Cyprus Railway was under discussion some years ago, I opposed it on the ground that short railways cannot compete effectually for goods traffic with vehicles on roads unless the traffic is bulky or requires to be carried at a great speed.

The railway was nevertheless made, my views being set aside in favour of Mr. Bellord's, the Controller of Railways, the afterward experienced the construction of the Railway. My opposition has, however, so far been justified by events, as the Railway does not at present even pay its working expenses.

In these circumstances I have thought it worth while to make some calculations as to the amount of roads traffic which would be required to enable the proposed Nairobi Fort Hall line to pay 5% on the cost of its construction, giving credit to it for the new traffic brought by the Uganda Railway.

The distance by road from Fort Hall to Nairobi is 40 miles. The railway is sure to have to deviate more than the road and the length can hardly prove less than 45 miles.

The cost can hardly be less than £5,000 a

mile

mile - the Uganda Railway cost nearly £10,000 - so the capital expenditure would be £350,000, 5% on which is £10,500.

The cost is the cost of the maintenance of the way, and of stations which are nearly independent of the amount of traffic on the line.

They may be taken as the same per mile as on the Uganda Railway, where they amounted during 1905-6 to Rs. 1,277.72 per mile. For 70 miles, then the cost will be in £ sterling: $\frac{1,277.72 \times 70}{15} = \text{£} 6,135$.

We have thus to meet a standing charge of £6,135 per annum.

The problem then is how many tons of goods will be attracted to the Railway in order to cover this standing charge.

Let x be the quantity required in 1,000 gross ton miles - that is a thousand of tons including tare carried one mile.

Then we have an equation of the form

$$£16235 = x(y-z)$$

where y is the average receipts on the Uganda Railway per 1,000 gross ton miles and z is the average expenditure per 1,000 gross ton miles on those items i.e.

Locomotive Carriage and Wagon Expenses, Traffic Expenses and General Charges which are roughly proportionate to the amount of traffic on the line.

y is Rs. 30.47 and z is Rs. 10.40

The equation then becomes

$$£16235 = x \times £11.07 \text{ or } x = 14635 \times \frac{30}{41}$$

$$x = 11600.$$

The additional traffic required then is represented by 11,330,000 gross ton miles. This number requires to be divided by 303 the average load of goods on the existing line, and by 1.15 being the ratio of total weight to freight on existing line, in order to arrive at the number of tons of traffic originating on the new line which will yield 3% profit. The result is 11,330,000 tons.

So far we have taken no account of passenger traffic. I do not see any better way of estimating the amount of passenger traffic than to assume that the profits on passenger traffic will bear the same proportion to the whole profits on the new branch as they do on the main line.

This proportion was in 1904-6 about $\frac{2}{10}$. We may therefore, reduce by the same fraction the amount of goods traffic required to make the line pay.

11,330,000 tons multiplied by $\frac{8}{10}$ gives 9,064,000 tons. This is the amount of goods traffic which will enable the line to pay 10,000,000 tons.

Now, the whole amount of traffic handled by the Uganda Railway itself in 1900-6 was only 30,000 tons, so that the quantity is relatively a very large one and it will probably be a very long time before such a traffic as 10,000 tons per annum is available.

The produce of the district would be "plantation" produce mainly of a fairly light character, while the timber from the forests is conveyed that way, unless the timber can be floated down to the sea by the

Tana

... even if a railway were established, be prohibitive.

According to Mr. Ross, half the length of the road is already adapted for motor traffic in all seasons, the other half would not be available in the winter but could be made so for 270 a mile = £2,100.

Accordingly obtained information as to the cost of motor traction on roads - & the most trustworthy of up-to-date accounts to be those given in pp 61 to 64 of the accompanying feasibility pamphlet by Lt. Col. Crompton. It will be seen that the cost of conveying goods (Tables I to III) varies from 9.49d. to 1.01d. per ton mile. It is however probable that the weight of the vehicles employed would be too great for a road which in the case of the motor vehicle the cost of oil is 2.50d. per ton. So again the cost of conveying passengers by motor is given at 12.945 pence per mile, but probably this which would not be suited to our roads.

Manuscript
fragment attached
p. 2.

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My attention was then called
to the Renard Motor Traction,
& at Mr. Church's request
I attended a demonstration
of the invention at Barbours Court.
The peculiarity of this traction
two fold - firstly that each
wheel has its own driving shaft
connected with the motor by
suitable shafting, so that the
reciprocating of an enormous weight
on the driving wheels of the tractor
is avoided, & secondly the steering
gear is so arranged that each wheel
follows exactly in the path of
the others and the sharpest corners
can be readily turned.
It seems, accordingly, to be specially
adapted for mountain winding roads
of wide different surface. There has
however been able to show any
actual facts as to its behaviour
under such circumstances: at Barbours
Court it was tried on a perfect
surface, quite level, & the Co have
not supplied me with any the
particulars for which I asked
in regard to the behaviour of the
train which is running.

7489.

between Johnson & Grant.
The Co. has however suffered me
with some interesting estimates
including working costs.

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on railway

The latter estimates for an east
ward road & provides for the
average daily of ¹⁵ 20 tons of
43 passengers daily ^{with pay}
on a route 41 miles long at a
cost capital cost of
Fr. 295,000 = £10,000 & an
annual expenditure of £40,000
including interest at 4 percent
£5,600 p.a.

Proposed road was raised on
30 deepening dips & re
built on the same

The passenger at 20 miles
would yield nearly £3000 a
year & the goods at 2d. per
ton mile about £2000.
On our road we could nearly
expect as many passengers
but in view of the great cost of a
railway I think the possibilities
of this train & of other kinds of
motors deserve to be investigated.

and I should ask our engineers
 Messrs Russell & Robinson to
 report on the matter with particular
 ref. to the Fort Hall Road
 Road - mentioning their copies
 of Mr. Russell's & of the Board
 of Engineers letter.

Should also ask H.O. about
 how the track of the Board
 Train was laid at
 Alder 1/3

and Clayton tell
 that it was
 done on the
 ground
 H. J. R.
 Yes - but I
 heard they
 laid it off
 the road
 altogether, up
 a board hill
 which was at
 the end of

W. Johnston
 W. Ellis has taken a great deal of
 trouble in this matter. I certainly trust
 that the attention of our tractor shall
 be increased, but I doubt whether our
 Board of Engineers are the best people to
 advise on the subject.

The U. S. has a Standing Committee on
 the subject of mechanical transport which
 has been in existence for 8 years & has
 done a lot of experimental work & has
 collected a great deal of valuable information
 with respect regarding different forms of
 tractors.

The India Office has a representative
 it is John Clayton the Chairman
 tells me that they would be glad to have
 a C.O. representative to work out as far
 as possible, any problem in mechanical
 tractor

tracter which we could be submit to them. They have already experimented with the Renault tank over rough ground at Aldershot & it broke down within the first half hour. They are now working at a new tractor which will, it is hoped, be able to cope with almost any kind of country.

It seems to me that the question of mechanical motor tractors is one of great importance for all most of the lower classes of agriculturists & might be taken up by a more systematic manner. We already have the experience of the War Office & India & it is to draw upon & refer to them & added the experience gained in our Colonies, so ought to be able to evolve the special form of motor tractor suited to the conditions of each Colony.

I attach the last Report of the Committee. *Robert Ball* *Secretary of the War Office* *London* *1918* *8/3*

I agree that the Committee should be referred to use the experience of the War Office & India & added the experience gained in our Colonies, so ought to be able to evolve the special form of motor tractor suited to the conditions of each Colony.

I think that the Committee should be referred to use the experience of the War Office & India & added the experience gained in our Colonies, so ought to be able to evolve the special form of motor tractor suited to the conditions of each Colony.

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To forward the information apart from the experimental work of a Committee which I think should see collected & analyzed. It is of course better to have a better understanding in the War Office & India & it is to draw upon & refer to them & added the experience gained in our Colonies, so ought to be able to evolve the special form of motor tractor suited to the conditions of each Colony.

In P. forward I understand that the War Office & India & it is to draw upon & refer to them & added the experience gained in our Colonies, so ought to be able to evolve the special form of motor tractor suited to the conditions of each Colony.

I think that the Committee should be referred to use the experience of the War Office & India & added the experience gained in our Colonies, so ought to be able to evolve the special form of motor tractor suited to the conditions of each Colony.

28 Kings Shourt,
Boston

C.O.
1907

R

Dear Mr. Ellis
Buckhead,
December 1907

The replies to your queries as to the road from Gresham to Fort Hall are as follows:

(1) The distance from Navajo Railway station is 60 miles.

It is hoped that this will be reduced next year to about 53 miles by crossing the narrow neck of a large mesa near Fort Hall instead of going round the end of the mesa as proposed. It is to be hoped that funds do not allow of horse running out the work in the present fiscal year.

(2) The maximum grade on the road is one per cent, or less. In the upper part of the mountain the horses that are used are guaranteed to camp grades of 1 in 100.

(3) As far as the well known *Chama* is concerned, the road is of the same material, known as *Chama* and locally as *Chama* or *Chama*. It is of coarse rock in a somewhat decomposed condition and forms a hard surface not unlike gravel. This surface remains hard even in wet weather. An 8-ton wagon traction engine belonging to some settler near Fort Hall runs on the road without leaving marks on the portions covered with the *Chama*.

Beyond the *Chama*, over the road to

12 ft wide and the surface is of red earth, which is never the better in a river some subdivisions. It forms a narrow road in hard surface at all times. Except in the winter when it is so frozen that it is not fit for any heavy wagon. The river is a good one, as during the season very little traffic by any kind takes place on the road.

(A) The timber bridge built last year was designed to take a heavy load of 50 tons. The structure consists of 4 reinforced concrete piers which were built this year. The spans and the keels are made of steel plate & heavy wood of 30 tons. The work is done in the road and the bridge across the river is 210 ft and spans 200 ft. The bridge is now in use and has been in use since it was built.



Both had to be especially strengthened in order to pass the 8-ton traction engine referred to above. With a little attention they will last through several financial years. But in 1919 they should both be rebuilt. If done in reinforced concrete which would be practically indestructible and would require no maintenance they would cost \$200 and \$400 respectively.

(5) At the beginning of last financial year Fort Hall was distant a three days' journey from Navaho. Before the end of the year a corduroy road of fair drive through, over temporary bridges in 10 hours. The total cost of the year's work was \$2500. In the present year a couple of the ten cross bridges are being replaced by permanent arches of 6 ft span, at a total cost of \$2000. As you can see from the map the road is 20 miles long, the road affecting temporary improvement of 10 miles from Navaho to the Chama river. The average cost was \$150 per mile from the Chama river to Fort Hall the cost was only \$40 per mile - the road surface being of dry earth and not macadam. The figures include the cost of fuel, but not the cost of the labor shown in Fig 3. The figures are not for the



Fig. 2

THE THERIKA BRIDGE.



Fig. 3

EMBANKMENT WITH TWO ARCH BRIDGES, CUT ALONG THE THERIKA BRIDGE.

and curbstones and a heavy embankment about 18 ft high and only a quarter of a mile long. It was a main road (Fig 4). The cost of work in this part of the road was at the rate of \$1800 per mile. It will be seen that all these costs are extremely low. The reason is

that our navies & the work are the legal
 to business who receive 5,4 and in some cases
 only 4 per cent the work ing time hours of
 Sunday excepted. In instance the work in the
 amount referred to above had been carried out by
 unskilled Indian labour, the cost would have
 been at the rate of more than £5000 per mile. It

CROWD OF WORKERS WAITING FOR WORK
 AT AN ENGINE WORKS

will thus be seen that the Government
 road construction in this part of the
 with some assurance that a large amount
 of traffic for the country.

(a) The project for a railway from
 the factory to be considered as follows
 (a) There is at present no legislation
 the Kenya Province requiring railway construction
 with Nairobi.

(b) The only produce for transport to be
 would be according to present indications
 from and plantation produce.

(c) This would mostly be in the form of
 at certain seasons of the year so that a
 railway, if built, would for some years
 come expensive long periods of cooperation

idleness - most unattractive conditions from
a commercial point of view

and the maintenance of a road in a region
where previously road transport has been in
vogue has almost always resulted in the
first instance in the decay and disappearance
of small villages, towns, ports and communities
and in the rapid expansion of the territory
that would have a result as in the present
to be discourteously avoided. It is in every way
desirable to have a moderate population spread
over an area and to act in concert than to
have the same number concentrated in a few
places, presenting a serious concentration in
the direction of population in a few
buildings.

It is in future date a vast development
of the human race did occur necessitating
a rapid communication with Nairobi and
the hinterland. It would be possible to provide
a first class macadamised road at a
cost of about £2000 per mile - about a
quarter of what a metre-gauge railway might
be expected to cost. In such a road

motor cars would run much faster than
trains on a single line with frequent stops
and motor omnibuses would reach Fort Hall
in half a day easily, and motor buses or traction engines
would make the journey in one
day easily.

Even in the immediate present, the road in its
present condition offers ample facilities. It
would no doubt be considerably improved

by steam rolling, but the P.W.D. only possess
 one steam roller so far, and it is in constant
 use in Nairobi. A most desirable step in the
 near future will be the substitution of
 permanent bridges for the temporary ones
 which now are used and the widening and
 surfacing of the bottom from the Chan-
 a river to the base at the cost of an extra
 £200,000, it would doubtless be
 unimprovable in the device of a
 districts of a feeder system of motor vehicles
 for passengers and goods were contemplated
 over all the more important roads leading
 from the main highway to outstations. The
 car to come would be the most of the
 and one of the most important to be
 to alter the present system of the
 port it would be to establish a
 the north and south stability of a
 system as now and with the quick
 constitute advantages which would
 to the Government.

There are of course extensive and
 available forests on Mount Kenya but
 I do not wish to whom I have discussed
 the Government in East Africa has suggested
 the one method by which they could be
 to be put with profit would be to raft
 logs down the river to the sea. I
 have never had any opportunity of
 investigating the course of the Sabaki
 as I should have done. I believe however
 that there is only one small rapid which
 would interfere with navigation, and that
 work of no great expense would result

in the opening of a feasible waterway right
down to the sea. I have never heard
of any proposals with regard to exporting
timber from Mount Kenya down a branch
railway to Kisumu and then down the
main railway

Do not me

Very truly

J. H. G. G. G.

Director of Public Works, F.P.S.

RENARD ROAD TRAIN SYSTEM.

The Renard Road Train was invented and patented by Colonel Renard, the well-known Engineer Officer of the French Army, in 1903 and was shown at the Paris Motor Exhibition in December 1903. M. Surcouf effected valuable improvements in 1904 and 1905, which have been protected by further Patents, and in May, 1905 the first commercial train was ready for delivery.

Renard trains are now running in:—

FRANCE.	(Boulogne, Valognes (Manche), Department of Vosges.	SPAIN. AUSTRIA-HUNGARY (Buda-Pesth). PERSIA. Teheran—2 trains.
HOLLAND.	(La Haye, Utrecht.	PARAGUAY.

The Renard System for the transport of passengers and goods on any roads is admirably described as "the train of the future," in *The Morning Leader* of January 12th; as "a fresh development in motor road traction," in the *Daily Telegraph* of January 22nd; as "the new system for Rural Traffic," in the *Daily Chronicle* of January 31st; and as "a development in road locomotion of the highest interest," in the *Standard* of January 31st. Copies of these articles are attached.

The general arrangement of the Renard System is thus described by Mr. F. J. Field, late Engineer to the London and District Motor Bus Company, Limited:

A light Tractor is provided principally for the purpose of carrying the Motor which generates energy for propulsion and for steering purposes. Each unit of the train is provided with a longitudinal driving shaft, gearing with a differential gear on the ends of which are fixed road driving wheels. The driving shaft is connected with the motor on the tractor by suitable universal couplings, which allow a very large angularity of movement between tractor and unit and between units themselves, such as is required when necessary to turn round sharp corners, &c. Each unit of the train is provided with similar shafts and couplings. It is readily apparent that by these means the power from the motor can be equally and readily applied to each unit as they are coupled up. In addition to coupling up for taking off power, each unit is provided with radius steering rods which are linked together and equal to the steering arrangements on the tractor, the mechanism allowing the direction of each unit to be completely guided, compelling all to follow exactly in the path of the tractor and apply equally to forward or backward motion.

The advantages of the system over ordinary road haulage by traction engines are thus described by Mr. Field:

- (1) The employment of a light tractor in lieu of the heavy traction engines necessary for securing sufficient grip for hauling a good load, and consequently avoiding damage to road surface.
- (2) Accessibility to roads where bridges exist over which it is not permissible to run heavy traction engines.
- (3) Perfect control of each vehicle forming part of the train in all operations of forward, reverse and turning movements.
- (4) Automatic braking of each unit.
- (5) Compensation of springs and axles allowing for all surface irregularities, and the facile surmounting of any obstacle without strain or injury to components of units.
- (6) Comparative quietness of running, allowing increased speed without creating a nuisance.
- (7) Economy of fuel, due to lessened weight of tractor.
- (8) Greater haulage power through each unit being self-propelled.
- (9) General adaptability to traffic conditions.
- (10) The adaptability of the arrangement for the employment of various forms of motors for securing the necessary guiding power.

After a personal test Mr. Field reported as follows:

All the mechanical arrangements of the system have been developed to a high state of efficiency, and after a test under all manner of road conditions have been found to be thoroughly reliable. It is found that the system of haulage is well adapted to all applications and works well on the system. The test of a tractor of 12 horsepower, with units of 10 percent, involving road corners of 90 degrees and also involving turning on a road of 10 percent, and running over rough and smooth roads, could not be a fair test of any road in this country. The tractor in this particular case consisted of the tractor and three coaches.

Attention is specially drawn to the Reports of A. Campbell Swinton, M. Inst. C.E., M.I.M.E., and Mr. F. M. Thwaites, A.M. Inst. C.E., on pages 7 to 10.

The progress which this remarkable invention has already made in different parts of the world may be briefly stated:

First in importance is **France**, the country of its origin, where its great value to the public is **generally** attested by the action of the French Government. The Reward System has been adjudged by the French Minister of Public Works as of **public utility**, and he has offered the legal Authority **annual subsidies** out of the public funds for the adoption of the system. As a result, the various Departments of France, one after another, are granting special subsidies for the establishment of services of trains (goods and passenger) on the Reward System. In some Departments a separate Company is being or has been formed to create the monopoly of the Reward System.

The first goods train was sold in July, 1905, to Breton Frères, of Valognes (Manche), large Dairymen, who have used it since daily to carry an average of 15 tons of butter by all sorts of roads and weather; the daily journey varies with the various markets, the average distance travelled being from 70 to 80 kilometres per day. During the 18 months working the train has only been stopped twice for one day, and Breton Frères have duplicated their train, being thoroughly satisfied with the working and economical results.

In April last Messrs. Breton reported as follows:

(Date) Valognes, 11th April, 1906.

Dear Sirs,

We are glad to tell you that we are very satisfied with everything you supplied us with, motors, wagons, everything, all works very well and renders us the service we expected from it.

The backing gear very much facilitates its movements in the country, especially on market days when the traffic is congested. As regards speed, we obtain very satisfactory results. We have been working during the whole winter, in all weathers, on any of the roads without a single irregularity. In a word, we are very satisfied, and felt it our duty to write and tell you that we do not regret the experiment, perhaps a little daring, which we have made.

We are, dear Sirs, &c.

(Signed) BRETEL FRÈRES.

Another Company has, since April 1906, worked a passenger and goods train between Remiremont and Plombières, in the Department des Vosges, and is increasing its capital to obtain more rolling stock.

Another Company instituted a service of two trains, passenger and goods, between Belfort, Amlefontaine and Wintzen, in June last and report as follows:

(Date) Belfort, 14th January, 1907.

Messrs. BRETEL AND CO.
Belfort.

Dear Sirs,

Please the honour to acknowledge receipt of your letter of January 1st, by which you are so good to inform us of the results of our working during the winter season, 1906.

The results have surpassed the most optimistic expectations. Commencing on 1st August the results of the Reward System have surpassed all our hopes and without interruption until the early days of November, in spite of the adverse conditions for the carriage of goods and the deplorable state of the roads. The general opinion of the public is favourable to the Reward System and will be maintained without interruption.

The public, contrary to expectation has never shown any apprehension for this new mode of locomotion totally ignored for the most part in spite of the lack of advertisement, and in a region still served throughout by the old fashioned diligences. On the contrary, the public took to it from the first days so strongly that we were obliged, to our great regret, to refuse passengers. This is in fact the only reproach which has been made concerning our enterprise, and the insufficiency of accommodation, and we were obliged to consider the possibility of finding a remedy for this season. The General Meeting of our Shareholders did not hesitate on the 9th September to vote an increase of capital which will enable us to satisfy the public requirements by a double service to be met by the new train for which we have recently given you the order. We have in addition met the question of organizing in this district, independently of our regular service excursions by means either of the Train Renard or by the Renard Omnibus.

Independently of the transport of passengers and their baggage effected until now by a train composed of two carriages and baggage van, we have studied the question of the transport of goods, in view of which we have ordered from you a truck. We hope to obtain from this new branch of our industry some interesting results.

From the technical point of view we have nothing but praise for the Train Renard. In spite of the number of trials our motors have only occasional very slight faults. Moreover, by working at full speed and by regular in-position, we have been able to satisfy ourselves that no essential part has suffered deterioration. With regard to the system of propulsion it has always acted as a unity.

In fact the expectation from the public standpoint has been a complete success. During the period of 55 days from the 1st August to the 30th September, the Train Renard has carried 9,245 passengers, with two carriages and four baggage vans per day.

With regard to the Rolling Stock we are in an admirable condition in all its parts. The Train Renard has made a splendid record, given these conditions when it regularly works.

Signed J. B. TAILLEUX

Director.

A Company has been organized in Paris, with a capital of 1,750,000 francs, subscribed by 1,400 shareholders, and to this Company has been granted exclusive rights (other than that of manufacture which still remains retained by the Surcouf Company) for the Renard system in France and her colonies. This Company is organizing the supply of efficient goods and passenger services throughout its territory.

French Departments. Concessions have been or are being granted by the Prefects, Generals of many Departments of France for the Train Renard with annual subsidies per kilometre of the route amounting to about 500 francs, including the subsidy from the Minister of Public Works.

The Departments of the Finistere, Seine, Seine-et-Oise, Elber, L'Orne, Calvados, Ardennes have also been approached from Paris to Orléans, from Paris to Metz, with an extension to Luxembourg and a practical experiment is about to be made as applied to the route of a 12 kilometre line for Paris, as it

is claimed that by a light locomotor and the transmission of power to each wagon, the train will not require heavy rails, expensive bridges, tunnels, leveling of ground, &c., and will run up any gradient.

French Army.—At the request of the Commander-in-Chief a Renard train was sent in June last to the Manœuvres of the Army de l'Est (Châlons), and was employed in carrying provisions, ammunition, ambulance, &c., through strategical roads, and proved so satisfactory that its results were brought to the Order of the Day of the Army, and a full report forwarded to the War Minister asking for its immediate adoption.

Shortly afterwards the Military Governor of Cochin China, with his staff, spent a day at the Ballmourt Works, putting the train through severe tests, and reported to the Governor that such a train was indispensable to that Colony not only for military purposes but for the administration and development of the whole country.

Holland.—Two Companies have been formed, one in Utrecht and the other at La Haye. Each one has worked a service of trains most successfully for some months past and intend to gradually extend their operations.

Austria-Hungary.—An influential Syndicate has been formed in Buda-Pesth for the purchase of those rights under an option; the train delivered to them a few months ago gives the utmost satisfaction and the expectation of very important orders.

Germany.—These rights are under an option to a good firm on advantageous terms, and active negotiations are now proceeding in Paris. An exhaustive trial was made in Paris on the 5th December, 1906, in the presence of three German Engineers, who expressed their entire satisfaction.

A train by the request of the Kaiser, was dispatched in December 1906 to Berlin where for a week it was inspected and experimented by the Military Authorities.

Russia.—After two demonstrations in Russia, large orders for military purposes were negotiated, but for obvious reasons, they are in abeyance.

Sérvia.—The grant of the monopoly of the route as well as a concession for a long railway (System Renard) have already been signed. The Railway Concession will carry a guarantee of 4 1/2 to 5 per cent. interest by the Provincial Government.

Roumania & Bulgaria. Similar negotiations are being carried on with every prospect of success.

Turkey. For some time negotiations have been in progress for the monopoly of some roads and also with the Government. Col. de la Motte, specially for this object, recently left Paris, after thoroughly inspecting the workings of the train both at Boulogne and Valognes. His report to the War Minister speaks highly of the Renard system as applied to roads, railways and military purposes. A most important concession, with actual orders, are shortly expected.

Spain. One of the original four-wheel trains was delivered some time past to the Government and orders are in negotiation for both military and industrial purposes.

Portugal. A Syndicate composed of influential parties is about to be formed on their undertaking in order at once at least one train to demonstrate the advantages of the system, plus a yearly guarantee of a certain quantity of trains.

Persia. The first train ordered by a Syndicate composed of some of the principal officials of the Government arrived at Teheran in September, in perfect order, and although the roads are not good, has created great enthusiasm; the second train has been dispatched and large orders are promised.

A service has been commenced between Teheran and Resht, carrying passengers at 20 francs, as against the present charge of from £4 to £5 for a most uncomfortable conveyance, and goods at 80 francs per ton against present rate of £5 per ton.

Argentina. A strong Company has been formed for the exploitation in the province of Cordoba, where by a decree, dated May, 1906, the rights of using the roads has been granted with the privilege of importing all materials (including oil for the Renard Train) free of any duty for 10 years.

Paraguay. A Company has secured the rights for that country where a train was delivered some time ago and works very fine results. Another has since been shipped to them and a new order for 4 wagons has just been received.

Many other negotiations in various parts of the world are in

The Renard trains would be especially useful on the Indian frontier for commissariat and transport purposes, as well as in Burmah and Ceylon, to get the leaders in the rice, timber and tea districts and in times of famine.

A prominent house in the nitrate industry states that there is a good opening for the trains at the Oficinas. Enquiry has been made within the past few days for a copper mine in Spain, a colliery in Yorkshire, and for industrial purposes in Wales, Ireland and India.

As a further illustration, the Tanganika Company recently stated that the Renard Train appeared to combine principles likely to be successful in the motor transport which that Company proposes to establish in Central Africa, and asking for certain information.

Following the arrival of the Renard Train in this country, steps will be immediately taken for its manufacture here to supply the numerous demands for its use for public and private purposes.

The patent rights for the world of this valuable system are controlled by the Renard Syndicate, Limited, 5f 122, Victoria Street, Westminster, London, S.W., to whom all enquiries should be addressed.

A. A. CAMBRELL SWINTON
M.I.M.C.E., M.I.E.E.

66, VICTORIA STREET, LONDON, S.W.
February 5th, 1907.

GENTLEMEN,

In accordance with your wishes, I proceeded to Paris on Sunday and I yesterday made an inspection and trial at Billancourt of the Renard Train, which has been manufactured as I understand, to your order by Messrs. E. Surcouf & Co.

I may say at once that the train operates in a very satisfactory manner, and the accuracy with which each vehicle follows on the exact track (taken by the vehicle in front of it and by the locomotive) is really quite remarkable. This was very noticeable in turning the curve, and in the goods service it was pulled up in an "S" form, and also in turning it round, which was done by a series of very small diameter on the road, and further, from the manner in which the train was driven when taking and coasting around corners, without the slightest shudder. Indeed, the steering qualities of the train at any rate on hard dry roads, such as existed recently in the neighbourhood of Billancourt, were nothing to be desired.

The carriages of the train were also found to run very smoothly over the rougher and less finished pavements in the neighbourhood of Billancourt. In this respect they seem to be considerably superior to the ordinary motor carriage. This is no doubt due to the ingenious compensating arrangement whereby the load is evenly distributed between each of the three

control wheels, which arrangement seems to be very effective. The quietness of running which attends the carriage is also very noticeable, this being due to the engine being carried on a separate truck, with the result that the noise and vibration are not communicated to the carriage.

The engine appears to have plenty of power, as on ascending a long hill, a portion of which I was informed had a gradient of 1 in 10, and which was certainly very steep, the train was stopped on the slope in position, and started again without any difficulty. The braking arrangement, also appears to be good, as on descending the same hill at a good pace the train was very quickly stopped at the foot of the declivity.

On return to the garage the train was backed into its original "S" position without any difficulty.

Finally, I am able to judge from a close inspection of the design and plan of parts in course of construction for motor trains in the workshops, the design of the carriage has been very carefully and thoroughly thought out, and is very strong, while the workmanship also seems good.

Altogether I was very pleased with all that I saw, and I believe that the Renard train will prove valuable for services where considerable numbers of people or large quantities of goods or material require to be carried over routes where railways would not pay or do not exist.

Yours faithfully,

(Signed) A. A. CAMPBELL SWINSON

To the Directors of the

RENARD SYNDICATE, LIMITED

122, VICTORIA STREET, S.W.

29, GREAT GEORGE STREET, WESTMINSTER, LONDON, S.W.

December 6th 1906

THE RENARD SYSTEM.

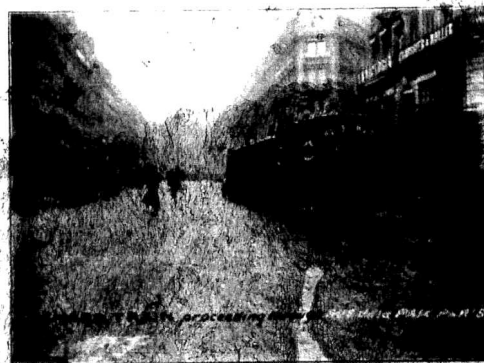
The Renard train constitutes the first invention that has done full justice to the transport possibilities of the modern motor carriage, and the possibilities which have been secured in motor car design.

The ordinary road traction engine is slow and mechanically clumsy, and most damaging to road surfaces, and it is a fact that, but for the advent of the motor car, the speed and red dust conditions on British highways would not have been removed, and yet so great is the demand for mechanical road traction, that even with these disabilities three firms, in my knowledge, have made great fortunes in the manufacture of traction engines. The facilities provided by the Light Railway Act should permit the formation of District Companies for the Renard system.

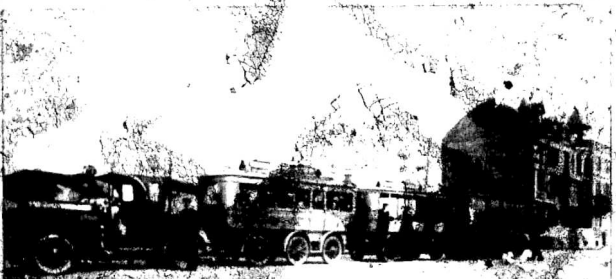
In agricultural districts, especially the factory with which the Renard transports across meadows, can be utilized for the carriage of eggs, produce and the farmers and their families, and the fact that it can be extended for markets and other special uses, will be greatly appreciated.

Further, the Renard tractor can be employed in special harvesting and cultivation, and is well adapted for every business such as ploughing, pumping, hauling harvesters, etc., and for

THE RENARD TRAIN IN PARIS



THE RENARD TRAIN IN BOULOGNE.

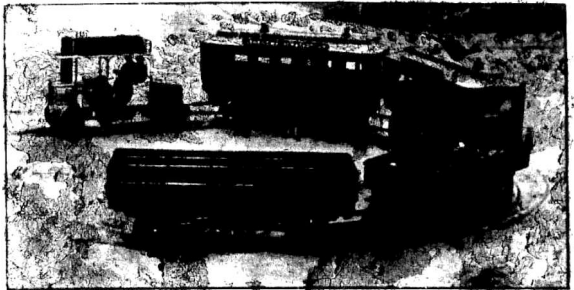


RENARD TRAIN running between BOULOGNE & WIMEREUX



RENARD TRAIN FOR USE BETWEEN BOULOGNE & WIMEREUX

A RENARD TRAIN NEGOTIATING CURVES.



The motor vehicle was built for use between Rasch and Tuering Prussia. The photograph shows clearly the ingenious connecting rod along which the power is transmitted which makes the car into a motor car. The Renard train does not run on rails, but on an ordinary road and steered with absolute accuracy.

A RENARD GOODS TRAIN.



Both goods and passenger trains have already been used with great success in France.

A RENARD TRAIN FOR PASSENGERS.



Note the small size of the motor which furnishes the power.

The train is... of the train... can... of the train...

The... of the train... of the train... of the train...

The... of the train... of the train... of the train...

The... of the train... of the train... of the train...

The... of the train... of the train... of the train...

B. H. THOMAS, A.M.I.C.E.

10, Abchurch Lane, London, E.C. 4, England.

The "Morning Leader" January 28, 1902.

THE TRAIN OF THE FUTURE.

SMOOTH RUNNING DOES...

The... of the train... of the train... of the train...

The... of the train... of the train... of the train...

The... of the train... of the train... of the train...

The... of the train... of the train... of the train...

TRANSMITTED POWER

The... of the train... of the train... of the train...

LIGHTNESS AND ADAPTABILITY

The... of the train... of the train... of the train...

The... of the train... of the train... of the train...

CONSIDERED IN FRANCE

In France, where the Renard trains have been established for commercial purposes, more than 600,000 passengers are transported daily...

The desirable features of the train that have been adopted...

No skidding and almost no noise...

No wear and tear of roads...

No level...

No difficulty in handling...

No accident...

No wear and tear...

No...

OTHER ADVANTAGES

Adaptability to all conditions...

Safety on hilly roads...

Flexibility and decreased interference with other forms of traffic...

The Renault train is used as a tractor, the neighbourhood of Boulogne, running seven or eight passenger services and several parcels and services daily between that town and Wimereux, and has proved very satisfactory.

The main use of establishing it as a tractor to pull a motor car, which is the main use of a light railway, and the new system has in the first place been used to a great and useful purpose for where a road goes there can a Renault train pass.

Illustrations of the new motor train and details of its parts are all appended to this note.

The Morning Leader, January 4th, 1907.

"THE MARVELLOUS MOTOR TRAIN WHICH WILL REVOLUTIONISE RURAL TRAFFIC."

The Renault motor train which is shown in our paper will do much when its powers are realised, show the hitherto neglected traffic of the out of court, and render the Light Railways Act more service. It is portable, runs through a country, and which carries the people from the motor in front of a passenger which on each side. Thus every car is really a separate motor car, and the economy in weight and engine required to pull an ordinary train is dispensed with. The connecting and is these portable and easily fitted with what are known as universal joints, so that the train will turn curves with the greatest ease, as the top part of the wheels, every car being being connected by the power shaft of a gear system. This will mean that the train may back water, and will be now and then.

The Daily Telegraph, September 1st, 1907.

MOTOR ROAD TRACTION.

RECENT DEVELOPMENT

These portable motor trains, which have been supplied to find a motor train, consisting of some half a dozen engines, carrying the passengers through the streets, back tracks and down into the exhibition, travelling in way to the front of the train without any difficulty, at a rate of progression varying from five to twelve miles per hour. This was the Renault train, which promises completely to revolutionise the existing systems of road traction, and take the place of the light railways. Invented by the late Colonel Renault, of the French Army, and further

improved by Mons. Surcouf, of Boulogne, under the name, the first commercial goods train started working in Valenciennes (France) in July, 1906, and has been working continuously ever since, while in June, 1906, a service of two trains, passengers and goods, started between Boulogne, Ambleteuse, Wimereux, and has since had a regular service of four trains per day. The results are so satisfactory that the service is about to be extended. Other trains are running in Holland, Spain, Austria, Persia, and Paraguay.

Within the next fortnight a Renault train will begin its work, and the event is one of the highest importance to those endeavouring to solve the transport question, both in time of peace and war. The train consists of an ordinary motor, using steam or petrol, connected to a series of six wheels, the driving the centre pair of wheels, in each case driven by the engine of the leading vehicle, with a differential gear and extended garden shaft with flexible coupling. Thus each vehicle is self-propelled, although all are coupled together. The advantages of this device over the old hauling system are numerous, as lighter vehicles can be used, and if one of two vehicles had their driving wheels on a holding ground, the others coupled to them can pull or push them out of their difficulty. The steering arrangements are so well adjusted that each vehicle follows accurately in the track of the preceding one, and permits the train to wiggle and snake-like round sharp corners, or having curved itself in a yard it can back out over its own track. The carriages having six wheels distribute the weight of the axle in pairs of two, and as each vehicle is under three tons weight laden, the wear and tear of the highways must be considerably lessened.

Revolutionary is the principle of the Renault train that the local Government order, prescribing regulations of heavy motor cars in this country, have contemplated a series of vehicles, each self-propelled, coupled together. All the regulations refer to trailers, when more than one heavy motor car is allowed to. These carriages cannot be called trailers, as they are not being pulled or pushed, but of themselves, although the engine actuating the driving shaft is contained in the lead vehicle. In a report of the local Government Board, it was stated that there is no difficulty in permitting the use of the train. As each vehicle is under three tons, it fitted with rubber or pneumatic tyres the train could travel must not exceed twelve miles per hour, with the registered axle weight exceeding six tons, but if iron-tired, eight miles per hour is the limit.

How valuable these trains have been adjudged by the French Government may be seen from the fact that the Minister of Public Works is granting annual subsidies for the establishment of services of goods and passenger trains on the Renault system in various Departments (counties) of France. These subsidies will be at the service of the military authorities in time of war, besides being used in districts and conveying produce and passengers where railway facilities are not at hand. Great Britain is fortunately in the position of being a partner with France in this invention. As some of our countrymen, possessing its advantages, are arranging with that nation's representatives in handling the patents, the light railways will be spreading more quickly as those responsible for the war expected. This more economical system should find favour in many parts of the country, for those purposes which are effected more cheaply and especially benefit the agricultural community.

The Financial News, January 13th, 1917

THE RENARD TRAIN WILL SOON BE RUNNING ON ENGLISH ROADS.

ENGLISH ENGINEERS ARE ENTHUSIASTIC ABOUT A REVOLUTION IN RURAL TRANSPORT.

The motor car accident does not solve the problem of terrestrial transport. Just as the railway traffic of 1902 could not be properly carried on if trains consisted of one coach or truck each, so the motor transport of 1917 cannot be conducted by roads and lanes, under the best possible advantages, unless we can put a train of vehicles at work; but up to now a train of vehicles has been considered impracticable for three reasons—the weight of the traction engine required to pull the train, and the consequent damage to the road, and the necessary grip on the surface, the impossibility of steering round corners and bends, and the utter impossibility of stopping at junctions. If we had a train of vehicles of which the traction factor was so completely under control that it could be made to follow the same curves as the leading vehicle, that could mount or descend a hill with ease, and in which power was so arranged as to permit the engine to disengage its wheels, so that the engine did not draw the train behind it, but merely transmitted the driving power to each engine, then the problem of rural and urban transport might be said to be solved, and this is what the Renard train undoubtedly appears to have accomplished. Our demonstrators of the day, who shortly will be available, as it is said, to a Renard train consisting of about eight low-powered engines, and a goods van, will very shortly prove in this country for the first time, the existence of a train of vehicles of the extent contended that Messrs. Suroouf, who have the French patent in control, have turned to London to organise a British company for the ownership of the world rights of this remarkable invention and its future development. This company is strong, healthy, and fit to face, as we are informed, that the total capital required for this project will be under £250,000 (equivalent to late information it will be £200,000). Messrs. Suroouf and the promoters are like to be supported on the consideration of their views, of which they will probably reap the benefit first on the enhanced value of their shares. The possibilities of this venture appear to be almost unlimited in the development of the motor car and the train. It is reported that the company has been formed in London, and that the first train will be run in the West of England, and that the West Office will no doubt ask for a report of it as soon as it is run by military transport.

The Daily Chronicle, January 13th, 1917

ROAD MOTOR TRAINS.

NEW TRANSPORT SYSTEM FOR RURAL TRAFFIC.

Next week the "Renard train" will be introduced into England. It is a practical system of mechanical transport that will, in all probability, revolutionise existing methods, more especially in agricultural districts.

The driving mechanism must be sufficiently powerful to produce a tractive adhesion to the rails, but in the Renard train there are no rails, and the wheels are acted upon by pneumatic tyres. An independent shaft passes under the train and drives the wheels in each engine. The result is that each engine supports itself, while the weight of the train is evenly distributed, enabling the train to negotiate curves and steep grades.

The advantages of this plan over the old hauling system are obvious, as light vehicles can be used, and, if one or two vehicles find their driving wheels on bad broken ground, the others equipped to haul can pull or push them out of their difficulty. The carriages or wagons cannot be steered as "trailers" as they are not drawn but propel themselves, although the tractor actuating the driving shaft is contained in the front car.

Even for excursions and parties the system should become very popular. Being independent of rails, the system will also be of use for military purposes, whether for armoured trains or for transport services. The new system was invented by the late Colonel Renard of the French Army, and has since been improved by M. Suroouf. The first experimental goods train started working in France in 1905, and has been in constant operation since, while last year two trains for passengers and 45 commenced running in other parts of France, the results being so satisfactory that other trains are being constructed.

The Renard trains are also running satisfactorily in Holland, Spain, and Algeria, and orders have already been received for trains from Northern India and New Zealand. As the cost of running these trains is but a fractional part of that of the railways, the new system should prove of great value in the agricultural districts and in bringing produce to the markets.

Both the French and German war authorities are, it is stated, considering the question of adopting the system, and Mr. B. H. Thwaite, the consulting engineer for the Daily Chronicle, informed a representative yesterday that the British war authorities also have the matter under consideration.

DRAFT

The Secretary
War Office.

MINUTE

Read 27 April

- Mr. ...
- Mr. ...
- Mr. ...
- Mr. ...
- Mr. ...
- Mr. ...
- Mr. ...
- Mr. ...
- Mr. ...
- Mr. ...
- The Earl of Elgin.

Read

Dear Sir,

I am directed by the Earl of Elgin to request you to inform the Army Council that attention has been called to the importance of developing mechanical transport through the Crown Colonies & Protectorates

2. His Lordship understands that there is a standing committee at the War Office which deals with the question of mechanical transport & that