

The Crocodile is not said by Herodotus to be sleeping during the operation, as Mr. Wilkinson asserts, otherwise the observation, "that pleased with the service, he never injures the *Trochilus*," would be absurd—*ωφελεύμενος ἦδεταί καὶ οὐδὲν σίνεταί τὸν τροχίλον*.*

Fourthly, as to the polite understanding which Mr. Wilkinson presumes, this may appear strange to a person only acquainted with wild animals as seen in showmen's caravans and menageries, but not to those who have studied their habits in their native haunts. The facts relating to this subject are worthy of more consideration than I can give them, without deviating from my present purpose; I will therefore only add, that I believe the common Paddy bird of Bengal to be the *Trochilus* of Herodotus, or a bird of the same genus. Now both Europeans and Bengallees agree in asserting, that this bird is constantly seen standing on the head of the Crocodile, and though I never heard any one assert that he saw it in the act of picking his teeth for him; I think it will be admitted that the visit is not without an object.

I am, dear Sir,

Yours very truly,

W. C. HURRY.

COSSIPORE,
September, 1839.

ART. VI.—*Documents relative to the application of Camel Draught to Carriages; communicated by C. B. GREENLAW, ESQ., Secretary to the Bengal Steam Committee.*

At a period when the applications of steam to locomotive purposes absorb the attention of the civilized communities of the world, it may seem almost too late to propose new directions of animal power to this object. The copious extracts we now publish from the documents of the "Steam Committee" and of other authorities, will place the subject in a different light. We willingly devote our pages to its consideration, in the conviction of its great value to all classes of Indian Society.

The discovery of the applicability of the Camel to the draught of carriages of every kind, we regard as one of surpassing value to countries of the peculiar climate, and in the still more peculiar social state in which India and Egypt exist, and through which for more than one generation they must slowly and almost insensibly advance.

* Herod. Euterpe. clxviii.

To Major Davidson, of the Bengal Engineers, we believe must be assigned the signal credit of having first demonstrated the practicability of using the Camel for carriage draught. Some years have elapsed, since Major Davidson exhibited a Camel harnessed to a light car, on which he travelled at the rate of eleven to fourteen miles an hour, and executed daily stages of thirty-six miles for several days in succession. Encouraged by this example, Mr. Bird, of Allahabad, constructed the carriage of which we publish a striking sketch and plan, and in which he has accomplished the tours described by Mr. Taylor, in his note published in the present series of documents ; for the illustrations we are indebted to the kindness of the Hon. Mr. William Wilberforce Bird, of Calcutta.

In a subsequent number we hope to be enabled to publish interesting details regarding the Camel Artillery organized by Major Pew, and which, throughout the whole of the trying march on Cabul, has given such perfect satisfaction to the projectors of this important addition to our military resources. Meanwhile, the papers we subjoin, afford copious information on the practical points to be considered in attempting to introduce this system on the great line of communication through Egypt and in India. Under the auspices of the British Consulate, and the direction of Mr. Walne, we are sanguine as to the early success of the attempt to establish across the isthmus of Suez a train of vehicles in celerity only inferior to the steam vans, of which the Camel is the certain precursor.—EDS.

*Extracts from a letter to CAPTAIN BARBER from ALFRED WALNE, ESQ.,
Vice-Consul in Cairo.*

Her Majesty's Vice-Consulate, Cairo, 17th March, 1839.

[*Comparative expenses of Horse and Camel draught in Egypt.*]

I question altogether the feasibility of finding persons in Egypt willing and able to contract for a supply of one hundred and twenty horses, to drag the ten vans, which are for the carriage of coals to Suez, and of goods from that place. But supposing even that persons were ready to come forward with the capital, it would be impossible for them to find here horses suitable for such an undertaking. The horses of Egypt, as experience has proved, are not in the least calculated for draught, and not at all accustomed to it ; and even if they were, the wear and tear in this climate, more particularly in the deserts,

would lead to a constant and serious loss. Supposing however that the horses are provided, *and it is only England that can supply them*, we must calculate the annual cost, compared with the work they can perform, and again with that of Camels, which, whatever may be the opinion in Europe, are the best, because the natural means of conveyance for a desert road. Premising that the following calculations are only approximative, inasmuch as the price of provisions varies considerably from year to year, I proceed to offer you the following details of expense.

120 horses, being constantly employed for three hundred days of the year, will consume $1\frac{1}{2}$ roobs of barley per diem; in all 54,000 roobs, or 2,250 ardebs, of which the price has varied in the last two years from p. 30 to 65, and even more. Taking it at the calculation of p. 40 we have this result, $2,250 \times 40$ p. 90,000. Four-fifths of this being for the stables in the desert, or for those in Suez, will require carriage, which, taking the long and short distances into full consideration, cannot be computed as averaging less than p. 15 the ardeb, or $1,800 \times 15 =$ p. 27,000.

It is calculated that with the above supply of corn, each horse will require *per diem* 4 okes of cut straw (tibne), which, purchased with the greatest advantage, will, at the Government price, cost 4 paras the oke. Thus $120 \times 4 = 480 \times 4 = 1,920$, or paras 48 per diem— $48 \times 300 =$ paras. 14,400.—

Of the 120 horses, 96 would naturally be either in the desert or at Suez, and it would be necessary to carry their supplies to those places; now, though heavy *Belladee* Camels may carry 200 okes of tibne, it is fair to calculate that three of the Bedouin Camels will not take more than 384 okes, or the day's supply. Thus $3 \times 30 =$ p. 90 $\times 300 =$ p. 27,000, as expense of carriage.

Forty-eight, or $\frac{2}{5}$ of the horses being at Suez, or near the Nile, may be supplied with water at an expense which need not enter into calculation; but seventy-two, or $\frac{3}{5}$, being in the desert, will require (unless boring or other means should supply new sources) that water should be conveyed to them. Allowing for a little wastage, but on the other hand using the most serviceable (cow) skins, each horse will require a quarter of a Camel-load a day. Thus $18 \times 30 = 540 \times 300 =$ p. 1,62,000.

It is indispensable that horses in this climate should be turned out, say for sixty-five days, to *Berseem* or clover. Each horse is allowed half a feddan, and taking it at about the cost of the present year, p. 400 (which happens to be unusually low) we have $60 \times 400 =$

p. 24,000, to which we must add the expense of *rafeeahs* or guards, six of which, in addition to the ordinary attendants, will suffice to protect the animals from robbery. Estimating each at p. 100= $100 \times 6 =$ p. 600.

For the management of the five stables there would be required one Nazir, or a general Superintendent, at p. 300 a month, five chief Saises, resident at the several stations, at p. 100; and ten stable assistants, at p. 60 each. In addition to these, I calculate that each set of four horses would require one good groom, to be always with them; and as much of his time must be passed in the desert, the monthly wages of each cannot be estimated at less than p. 80. The total annual expense for these men will be p. 38,400.

The horses will require shoeing at least once in 30 working days, and supposing that this is done by contract, each set of *shoes* (Arab) will cost p. 6. Thus $120 \times 6 =$ p. 720 a month, or in the year, p. 7,200.

To meet veterinary, and minor charges, I add p. 2,200.

Summary.

	paras.
Cost of 2,250 ardebs of Barley at p. 40,	90,000
Carriage of $\frac{4}{5}$ of do to Suez and other stations,	27,000
Cost of cut straw (tibne,)... ..	14,400
Carriage of $\frac{4}{5}$ of do. to Suez and other stations,	27,000
Carriage of water for 72 horses to do.	1,62,000
60 Feddans Berseem,	24,000
6 Rafeeahs or guards, 65 days,	600
1 Nazir, or general Superintendent of horses, at p. 300 a } month,	3,600
5 Superintendent <i>Saises</i> at p. 100 do.	6,000
30 Grooms, or <i>Saises</i> , p. 80 do.	28,800
10 Stable Assistants, p. 60 do.	7,200
Shoeing 120 horses, at p. 6 each,	7,200
Veterinary and minor expenses, say,	2,200
	<hr/>
	4,00,000

In the above calculation, nothing is put down for the wages of English carters—the wear and tear in harness and stable gear—the expense of water skins, which must be very great—the interest on outlay—or the loss in cattle.

But we may now calculate what work can be done with 120 horses, kept at an annual expense of p. 4,00,000. It has been already observed, that the animals are available for only about ten months of the

year; and I consider, that, with due allowance for rest, each set of twelve horses can make only one journey to Suez and back in ten days; in other words, thirty vans might proceed to that place and return every month, for ten months of the year. In the estimate it is stated, that each van will convey 15 tons admeasurement, the heaviest horses, however, would have great difficulty in dragging forty sacks of coal, or five tons, weight;—thus $5 \times 30 = 150 \times 10 = 1,500$ tons in the year; supposing even that there were 1,500 tons of goods to return from Suez, the expense per ton, merely reckoning the keep of and attendance on the horses, would be each way p. 133 $\frac{13}{40}$, more in fact than that of Bedouin Camel-hire for the same amount; coals being now sent to Suez for p. 132, and goods returning from there, at from p. 80 to 100.

Much misunderstanding appears to exist as to the nature of the Suez road, which will be found on examination to be by no means adapted to heavy waggons, although there is nothing to interfere materially with the transit of light carriages; always excepting the expense of horses, in a climate in which they cannot do half the work that they would in Europe. The first part of the road, for about ten miles, is in reality a deep sand, which would require very broad wheels to pass over; the rest is, with a few exceptions of sandy intervals, a tolerably compact gravel. I should suppose much of the road would be cut up by only a few months passage of heavy vehicles, and that with little or no chance of repair, so far as the Egyptian authorities are concerned. The want of water on the road adds enormously to the expense of transit where any other animals than Camels are used, and though it is possible, but from the geological formation not very *probable*, that boring may succeed on some points; it must not be forgotten that experiments have already been made, (see Transactions of Geographical Society) and without any permanently useful result. In Mr. Holme's Report, pp. 121-122, this matter is however treated very lightly. Mr. H. says, "another objection has been made, that there is no water between Cairo and Suez; if this had to be carried, as it now is, for the supply of the cattle, &c. it would amount to a small addition in the cost of transit, that is all; but it can be shown from analogy that good water could be found by boring at any point on *this* line, and at about depth; and were this not the case, or did it present a greater difficulty, 25,000*l.* or 26,000*l.* would lay down a pipe, the whole distance; and consequently provide a *self-acting supply* from the Nile at any point where a plug might be fixed." Mr. H. writing at a distance from this country, seems not to have been aware that the principal level of the desert is more than sixty feet above the surface of the Nile, during the period of

inundation, and that several parts of the road are *still* higher. However convenient therefore this self-acting supply may appear on paper, we who are on the spot know very well, that the expense would not by any means be confined to so many miles of iron pipe, but that to raise the water to the requisite height, there would be a considerable outlay for a steam engine, raised tank, &c., &c. in addition to which there is nothing to prevent the pipe being injured or destroyed in any part of the road, whenever the Bedouins should wish to impede the carriage transit, on which they cannot look *with* very favourable eyes, depriving them, as it would do in great measure, of the means of existence. Reflecting upon the subject of transit across the isthmus, I cannot too strongly urge on you the necessity of abandoning the van scheme, so far at least as the carriage of coal and heavy goods is concerned. Till such time as enterprise may have re-opened the ancient canal, or laid down a rail road, I would advise you to use the means which this country places at your disposal. Should the demands of the Egyptian Government, as I think is very probable, so far engross the Bedouin Camels as to prevent your hiring a sufficient supply, it will I believe be in your power to find persons in Egypt ready to purchase, keep, and furnish by contract, a sufficient number of heavy Camels, to carry across any quantity of coal you may require, at about the present cost, as estimated in my report. The following sketch will however shew, approximatively, what would be the expense to a Company, keeping its own animals, in order to have a regular and certain supply entirely at its own disposal.

Three hundred heavy camels, to be kept in good condition, will require, at the rate of a roob each, 300 roobs of beans daily, or say 300 days of the year, or 3,750 ardebs. The variation of prices has been so great in the last few years, that it is difficult to estimate the average, but I put it down as double the cost of barley, which I reckoned at p. 40 the ardeb, $3,750 \times 80$ p. 300,000.

Taking into calculation, that when crossing the desert Camels brouse by preference on the prickly plants and shrubs which abound along the whole line of road, I estimate the quantity that will be required of cut straw (*tibne*) at 600,000 okes, which, at 4 paras the oke, will cost p. 60,000. Each animal carries his own provisions, so that there is no extra expense upon this head, as in the case of horses.

For the above number of Camels at the rate of $\frac{2}{3}$ a fedden each, 200 feddens of Berseem will be required, which at p. 400 will cost p. 80,000. During sixty-five days, 10 *rafeeahs* or guards must be employed, at p. 100 each, 10×100 p. 1,000.

To take charge of the Camels I allow one *Nazir*, or general superintendent, at p. 300 a month; 3 *mukuddems* at p. 100 each; and 60 Camel men at p. 60—making an annual outlay in wages, of p. 50,400, to which must be added two men to mend the saddles, &c., at p. 70, or for the year, p. 1,680.

Summary.

	paras,
Cost of 3,750 ardebs of beans, at p. 80,	300,000
Do. Tibne,	60,000
Do. 200 feddens of Berseem, at p. 400,	80,000
10 <i>Rafeeahs</i> , (guards) at p. 100,	1,000
1 <i>Nazir</i> , at p. 300 a month,	3,600
3 <i>Makuddems</i> , at p. 100 do.	3,600
60 Camel men, at p. 60 do.	43,200
Veterinary and incidental expenses, say,	4,600
	496,000

Not to overwork the Camels, I should allow ten days for the journey to Suez and back again, the animals being loaded each way, and carrying a quarter of a ton each. In the three trips per month, they would convey 250 tons of coal to Suez, and working only 300 days of the year, would place at the depôt there 2,500 tons, being available to bring back a similar weight of goods from Suez. Calculating the carriage of the former at p. 132 the ton, the latter would be about p. $73\frac{18}{40}$.

The great advantage in an establishment of this kind would be the regularity with which the coals might be transmitted to Suez; and as the departure and arrival of the caravans would be entirely subject to the Company's arrangements, all the packages landed from the steamer at Suez, might be immediately brought across the desert, and proceed without loss of time to their destination.

Any one who has long resided in this country, and has had opportunities of comparing the relative cost and utility of Horses and Camels; will have no hesitation in deciding in favor of the latter. The Camel is a most hardy animal, carries its supply of water in its stomach and its beans upon its back, browses on prickly shrubs no other animal can touch, and does not ever require a shade or covering to its resting place. These are qualities which even the English horse most certainly does not possess, and if ever the communication between Cairo and Suez is to be made by vans, it is the Camel and not the horse, or even the mule, that must be harnessed to them.

In the event of a Company requiring a Camel establishment of their own, the agents must not be allowed to purchase the village Camels that are to be found in the neighbourhood of Cairo. Such animals, although very heavy, appear to have lost somewhat of their natural habits, and to be less fitted for the desert than those of the Bedouin breed. It would be necessary to send persons of competent knowledge to the Bisharee desert or the Sennaar, where Camels are good, plentiful, and cheap. Some losses in bringing them down would be unavoidable, and it is but safe to calculate a good stud of well chosen, strong, heavy Camels as averaging not less than 15*l.* a head.

(Signed) ALFRED S. WALNE.

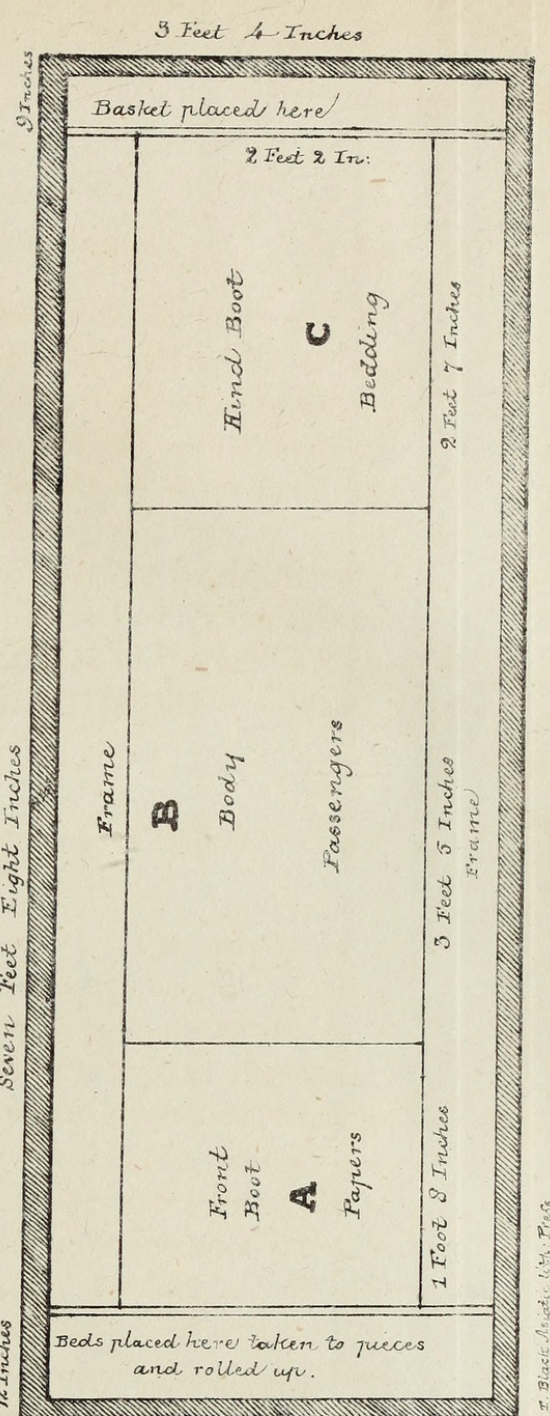
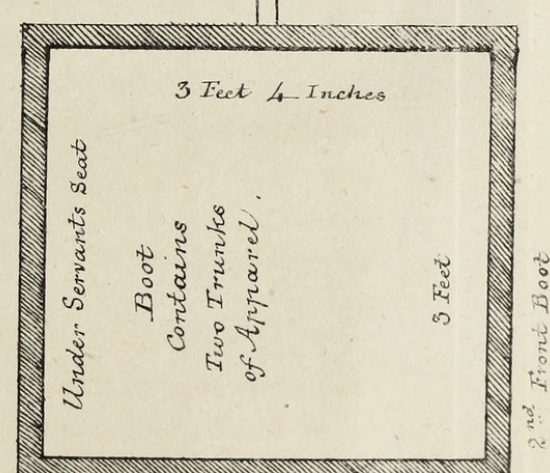
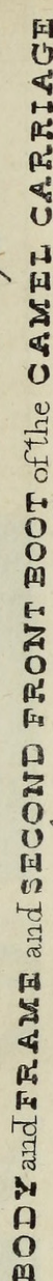
Memorandum on Camel Draught and Harness. By Captain TAYLOR, late Agent for Post Office Inquiries.

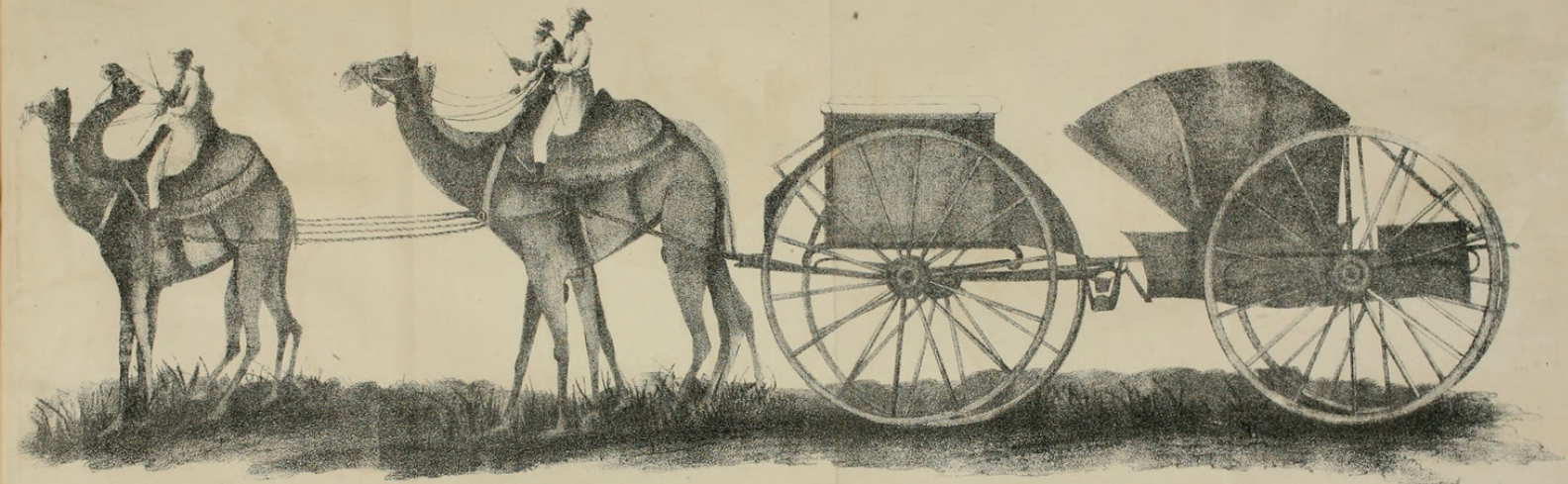
The recent discovery of the efficiency of the Camel in draught, is a point of singular moment in respect to overland communication. Mr. Bird, the able and intelligent senior member of the Board of Revenue at Allahabad, has recently made the tour of Upper India in a carriage drawn by two, three, or four Camels, as circumstances rendered their power necessary. The more usual number in harness, was three. The carriage was a light britska on four wheels, each of five feet diameter, with a dickey fore and aft, and a well for baggage. The carriage conveyed Mr. Bird and his lady, and four servants, and baggage consisting of beds, tables, portable chairs, crockery, cooking utensils, wines, &c., and clothes, writing apparatus, and official documents. They travelled at from thirty-six to forty miles per day, going half the above distance in the morning, and half in the afternoon. Either half was usually performed in from three to four hours; the pace averaging about six miles per hour, when the road was good; and about four and a half, or five miles per hour, when the road was indifferent. In deep sand, the pace would of course be less; but in sand, such as the desert is represented between Suez and Cairo, I should think five miles per hour might be easily obtained. I made some experiments myself while in Upper India, in respect to the Camel in draught, which I here take the opportunity to mention.

First, in respect to conveyance of baggage. Secondly, in respect to conveyance of men.

A small frame composed of strong bamboos was placed on a pair of wheels, and balanced much in the same manner as the ekkas in the North-West Provinces. On this was placed a large stout tin box,

Plan and Elevation of the
SECOND FRONT BOOT of the CAMEL CARP
belonging to R. M. Bird Esq.^{re}





J.B. Fecit. May 1839.

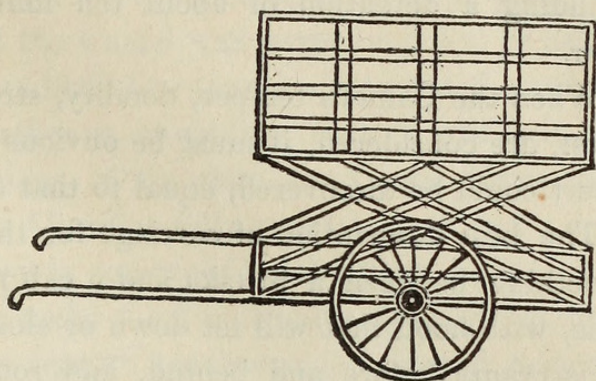
CAMEL CARRIAGE belonging to ROBERT M. BIRD ESQ.

Built and driven by Robert M. Bird Esq Two Thousand Miles in his Official Journey through the North Western Provinces, during the cold Season of 1838-9.

Diameter of the Wheels Six feet.

Oriental Lib. Press, Calcutta.

in a wooden frame, four feet square by two and a half high. A Camel was then brought, equipped just as a common Huckaree Camel, but having a small loop on either side of the saddle, into which the hook of the shafts was passed.



The Camel was mounted, and in lieu of putting baggage into the van, we put four men and started it. The Camel moved away with it at the rate of full six and a half miles an hour, and trotted gaily all round the stony and uneven surface of a large compound. We then proceeded some distance along the road, and the Camel van was found to answer admirably.

The next day we tried a four wheel conveyance for passengers. It was a light carriage, something between a palanquin carriage and a double bodied coach, with rattan-work blinds, which let up and down, and excluded the glare, while they let in the breeze. It had a small dickey in front, and afforded excellent accommodation for two persons and their servants, and a couple of carpet bags, and minor &cs. To this we harnessed two Camels, the pole being attached to one side of each saddle, and a bamboo trace being fastened to the other side. The Camels were mounted, and Dr. Ranken—the ingenious inventor, and prime mover of the whole—and myself being seated inside, and a servant on the dickey, we started, and drove half round the city walls of Delhi, then entered the gate and drove through the Chandrichouk, to the no small surprise of the natives: our pace being somewhat more than seven miles an hour. We returned home after a drive of some six or seven miles. The next evening a second experiment was made. Three miles were measured from the Cashmere gate. The road was mostly good and smooth, but by no means level, the load about thirty stone; the carriage started, and completed the entire three miles out, and three miles back, total six miles, in thirty-eight minutes;—nine and a half miles per hour.

Again I left Delhi en route to Allyghur, and after crossing the river, started in the above mentioned carriage with two Camels for Dadree, distant twenty-two miles. The first eighteen miles were certainly as rough a road as I ever remember to have passed in a wheel conveyance, and in places indeed was so bad, that I was compelled to quit the road, and drive through the fields. The last four miles were good. The whole distance was performed in four hours and twenty minutes,

including a detention of about ten minutes in crossing the Hindon river.

When the Camel's temper, docility, strength, and capacity to endure thirst, are considered, it must be obvious that no mode of crossing the desert could be discovered, equal to that of a Camel carriage.

The best description of carriage for the purpose, would probably be something between a britska and a cab phaeton, made as light as possible, with hood that will let down or close up entirely, and with dickies for servants before and behind, and room in the body, or under the dickies, for clothes and other baggage. On a good road such carriage should of course be made with steel springs, but for crossing rough roads, I should think, that long springs of buffalo leather, like those used for the Caracollas in the Havannah, described in Alexander's travels, would answer well. The wheels should be all of the same size, and five feet in diameter. I should think that carriages of the sort required, might be built both cheaper and better in India than in Europe. Calcutta built carriages are usually lighter than those imported, and the wheels are especially much lighter, and certainly stand the climate better. I have reason to believe that for 1,500 or 1,600 rupees, a carriage of the above description, every way efficient, may be built in Calcutta.

Three Camels per stage would be ample for such carriage, to take two passengers, their servants, and light baggage; and the distance from Suez to Cairo being under eighty miles, four stages would suffice. Three relays would be necessary, and the journey might then be performed with safety and ease in twelve hours. These relays might be sent forward from Suez, when the steamer was first signalized, and would then be ready to take forward the carriage, when the traveller reached the relay station.

The Camel draws with perfect ease, and requires but little training. His pace is a long walk, or a long trot, and there is no unpleasant motion of any sort imparted to the carriage by his movement. It is not generally advisable to take a Camel in draught a longer stage than twenty miles, as when over-worked they are apt to lie down, and will not move; an unpleasant proceeding in mid-stage. But for eighteen miles they will trot readily and well. Camels for draught should be highly fed, and it is a good plan, at the expiration of a stage, to give them half a seer of ghee; this if laid out in skins, they will lap up at once, and will then readily eat their grain or fodder; but otherwise, they will sometimes be off their food; and it cannot be too strongly impressed on all who employ the Camel in draught, that good feeding is a *sine quâ non* to ensure its efficiency.

The Camel men generally have a prejudice against employing Camels in draught. They say that the Camel was never intended to draw, but to carry, and look upon it as little less than a sin to put the animal into harness. They have further a prejudice, that it will kill the Camel : this is altogether fallacious. On a plain, the Camel draws with extraordinary ease, and a single Camel is fully equal to two and a half horses. It is not however so easy to combine Camel labour, as it is that of horses, i. e., it is less easy to make them pull quite steadily together ; and four Camels are not equivalent to ten horses ; I should estimate their power rather that of seven or eight horses. They do not draw very well up hill.

In India, the Rewarree Camels draw with the least training, because they are accustomed, in their own country, to draw the plough ; and I should think the Egyptian Dromedary would draw equally well, for I think I remember to have read in some book of travels, that in Upper Egypt they are occasionally harnessed to the ferry boats.

The carriage should be built as light as is consistent with the union of strength and comfort, for it is far preferable to have a light carriage drawn by two Camels, than to have a heavy carriage with four Camels.

The Camel will draw a buggy well, but the buggy should be so balanced, like the ekkas, that but little weight may rest on the animal ; and it must be borne in mind, that in consequence of the Camel's height, the shafts must necessarily have a considerable inclination upwards.

The bridle and saddle required for the Camel in draught, are precisely the same as those used for the common Sandees or Hurkaruh Camels of Upper India. On each side of the saddle however, and a little behind the legs of the rider, is an iron ring into which the hooks of the traces are looped. Around the neck of a Camel is a sort of breast-plate of broad tape or rope, which serves to keep the saddle steady in its position.

The traces are of male bamboo, with a hook at one end to hook into the ring on the saddle, and on the other a loop, like those of a leathern trace, to loop on to the carriage.

The Camels are harnessed in pairs. There is a pole like that used for horses, but its position is more upright, and which is buckled to the saddle, as it would be to the harness of a horse.

When four Camels, or three Camels are used, splinter bars are put on the top of the pole, and the front Camels are harnessed to them by traces in the same manner as the wheel Camels. Each Camel has a separate rider.

T. J. TAYLOR.

CALCUTTA, *April 15th*, 1839.



Greelaw, Charles B. 1840. "Art. VI.—Documents Relative to the Application of Camel Draught to Carriages." *The journal of the Asiatic Society of Bengal* 8(91), 591–605.

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