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Studies on Transport During Operations in South Afghanistan, 1881-1882

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Wednesday, May 4, 1887.

MAJOR-GENERAL H. C. WILKINSON, C.B., late 16th Lancers, in the
Chair.

STUDIES ON TRANSPORT DURING OPERATIONS IN
SOUTH AFGHANISTAN, 1881-1882.

By Major J. D. DOUGLAS, R.A.

I THINK my appearance in this theatre to-day demands a few words of personal explanation. I wrote an unsuccessful essay for the Gold Medal competition of this year, and the referees were kind enough to infer from it that I knew something of the subject which I treated most fully, namely, transport, and desired me to read a paper on the management of transport animals in India, or some cognate subject. Reviewing my knowledge of the management of animals, I came to the conclusion that most of the handbooks for field service contain more valuable information than I can impart on the management of animals. What I hope to do then to-day is not so much to impart information as to start a discussion on certain hobbies of my own, the nature of which I hope to explain in the course of my paper. I am, unfortunately for myself, unable to give a personal narrative of any active service, but I think the period of my service from which I have drawn these "studies" is full of interest to the student of transport, however devoid it was of the stirring incidents of war. The campaigns closed by General Roberts's celebrated flying column march and the battle of Candahar, left the South Afghan Field Force with a large surplus of transport. If the transport of the comparatively small force left in the Quetta District command on the withdrawal of our troops from Candahar was not perfection itself, it was from no scarcity of Officers, trained drivers, and animals. The re-organization of the field transport was chiefly carried out by the selection of the fittest. There was no opportunity for trying experiments on such carriage as did not exist on the spot, road traction engines, elephants, horse-wagons and mule-carts, but there was practically an unlimited supply of ponies, mules, camels, and bullock hackeries. Here it may be well to remind you of what the combatant force consisted. Premising that its composition was slightly modified at different times according to political necessities, the state of affairs during the year 1881 and 1882 are fairly represented by the distribution of the troops during May, 1881. Headquarters, Quetta:

1 battalion British infantry, less 2 companies in the Pisheen, 1½ battalions native infantry, 2 squadrons native cavalry, 1 garrison battery R.A., 1 mountain battery R.A. On the lines of communication and advanced posts in Pisheen were distributed 4 battalions native infantry, 4 squadrons native cavalry, and a native mountain battery, the bulk of their strength, including the native battery and one regiment of cavalry, being on the Hurnai route. The strongest posts were Kushdilkhan and Gulistan, in the Pisheen Valley, Kuch, the head of Chuppar Rift, Hurnai, Gundkinduff, Thal Chotiali, and Sibi.

I ask you now to follow for a few minutes the movements of a small unit of the combatant force.

In February, 1881, No. 1 Bombay Mountain Battery (Native) received orders to move from Poona in relief of No. 2 Mountain Battery, which had been through the South Afghan campaigns, and was then on the move down the passes to Sibi. Our orders were to take our soldiers' families and heavy baggage to Jacobabad, where we were to await further orders as to our ultimate destination. Our route was Poona to Bombay by road, Bombay to Kurrachee by Government of India steam-ship, Kurrachee to Jacobabad by rail. For convenience of sea transport, we marched by half-batteries at an interval of about a week. I was in command of the second half-battery.

Embarking was an easy operation, the ship being in dock, and the voyage from Kurrachee to Bombay uneventful. It is worth noting, however, that the mules were placed on the main deck without bales or stalls. They were purposely packed so close that they could neither kick each other nor lie down. Some of them on disembarkation were found to be galled on the sides from rubbing against their neighbours. The galls were slight and amounted to little more than the loss of small patches of hair. The casualties were nevertheless sufficient to convince me that this system would not answer on a voyage of more than a few days' duration. Disembarking was an interesting operation. The mules were transferred to a flat-bottomed steam-barge which ran broad-side-on as close as possible to the shelving sandy shore. A gangway was run out to shore, and the mules invited to walk to land. The difficulty was that the gangway terminated in 2 or 3 feet of water, and the mules had to plunge into what to them was an unknown depth of water. I believe a mule thinks more profoundly, if less quickly, than most animals, and his opinion once formed is proverbially difficult to shake. Hearing on my way to land, from the master of the flat, of the trouble the mules of the preceding half-battery had given, I gave up the idea of forcing mine on shore against their will. I turned loose about a dozen of the mules who were nearest the gangway, sending their drivers on shore before them. Curiosity and a little judicious coaxing induced these to fill the gangway, and while those in front were hesitating what course to pursue with reference to the forbidding water and the inviting warm, dry sand beyond, their friends behind pushed them in. The flat was cleared in a few minutes, and as every mule on landing lay down and rolled as if he meant to bury himself then and there, the whole were

caught before they had thought of straying. We were entrained and arrived duly at Jacobabad. There is nothing remarkable to notice in the manner of entraining pack-mules, except that it is impracticable to keep pack-saddles on in the train. This is unimportant, except when troops of all arms are being sent on to the front by successive trains as rapidly as possible. If troop trains arrive at a terminus at intervals of about twenty minutes, it requires skill and drill to get any artillery harnessed up and clear of the station in the time, and pack animals which have to be saddled and packed with loads from their own train are apt to block a station inconveniently. We were detained waiting for orders at Jacobabad for a month, and on the night of the 18th of April, 1881, the whole battery, less, of course, families and heavy baggage, was entrained in a single train timed to reach Sibi the next morning. The next day after was spent in drawing our transport establishment, and we marched on the third day to Naree Gorge, the first post on the Hurnai route.

I found an excellent system prevailed with the Staff both at Jacobabad and Sibi. The Commanding Officer of the battery was expected to know how many railway carriages he required, how many animals he wanted for his transport, and finally how many rifles were necessary for his escort. I confess I rather shirked responsibility in answering the last question by asking in return for a general sketch of the political condition of the country. Finding on enquiry that the escort would only be required to protect my baggage column from the attacks of casual marauders, and that my own men were sufficient protection for the guns, I had little further difficulty. I trust the foregoing short account of our move by sea and land has not appeared altogether irrelevant. Our study of the transport department proper began only on arrival at Sibi.

Before leaving India I tried to get positive orders as to the amount of baggage I should be allowed. The general result was that I was told to expect carriage for service kit only, but at the same time allowed to infer that if I could transport more, I should not be committing a breach of discipline in doing so. Seeing that we expected at least two years' trans-frontier service I took, in addition to hot weather service requirements, such of the men's peace necessities as seemed indispensable for continued residence. Notably, the chief item was a *razai*, or wadded quilt, for each man. I had no reason to regret my foresight in the end, but the extra weight entailed a certain amount of manœuvring. I found at Sibi I could get a large supply of pack transport, mules and ponies, and at first drew nearly double the number of animals I ought to have had. I moved the whole battery (three marches) to Gundkinduff, where I met headquarters and four guns of No. 2 Mountain Battery anxiously expecting relief. I discovered by the time I got to Gundkinduff that a large proportion of my transport was unsound. This was not surprising, for the transport (pack) dépôt, at Sibi, was chiefly composed of animals which had been left there by General Roberts's column, on its return to India, and the best of them had already been picked for other troops moving up to Quetta. A long

rest at Sibi had apparently restored those who had arrived there lame, but they had had no hard trial of the reality of their convalescence till we worked them. At Gundkinduff my transport difficulties were over. I had orders to leave there two guns, send two to Hurnai, and two to Thul Chotiali. I gave the Thul Chotiali division a really good lot of transport animals, and marched to Hurnai with cripples lightly laden, storing my extra service regulation baggage at Gundkinduff. An arrangement with the Officer Commanding No. 2 Mountain Battery that he should send back for my battery the best of his transport animals from Sibi relieved me of all further trouble. When I had weeded out and returned my unfits, I had on charge as battery transport about 80 ponies and 60 mules, with three camels and 20 doolie bearers for sick carriage.

The battery remained at its three stations till the autumn of 1881, when it was ordered to concentrate at Hurnai and march to Quetta. Previous to the battery's march I got our extra baggage all stored at Sharigh, conveying it there with the battery transport, and we marched in service order. At Hurnai we found the 24th Bombay Native Infantry under orders to move to Kuch, and we proceeded under their escort. They were less fortunate than we in the way of transport and the bulk of their baggage was carried in bullock carts. I do not think these carts accomplished much more than one mile an hour, there being an ascent of about a thousand feet a day for the first two days, while all the marches were more or less against the collar, or rather yoke. Besides the bullocks in carts the regiment had a number of pack-bullocks. These animals were amusing to watch, but a source of great grief to the regiment. Bucking off their packs or getting suddenly footsore were among the least of their peccadilloes. Those whose entire interest in life was not crushed out of them by their loads would on every possible opportunity rush off from the track into the jungle and generally get rid of their burdens before they could be caught and brought back. From Kuch to Quetta we had as escort a squadron of Scinde Horse, and could thus march our best. With an easy fall of a thousand feet in 15 miles, we found our transport column did 3 miles an hour including stoppages. At Quetta my 120 ponies and mules were exchanged at the transport depot for 100 good sound level mules, greatly to the advantage of the battery. We had four or five expeditions from Quetta during the succeeding year, and in all, my transport worked well. I need go no further in my personal narrative, but trust you will take it for granted that I had ample opportunities of studying mule-pack transport brought as near perfection as it has ever been in our Service. I have said nothing about the camel. I could say a good deal against him, but scarcely a word in his praise as a regimental transport animal in a hilly country. I hope to introduce him again to your notice when speaking of transport of lines of communication.

I now propose to sketch shortly the organization of the Transport Department as I knew it. One of the chief causes for its success was that it was a separate department completely severed from the

Commissariat Department with which in India, as in England, transport is associated. I may be wrong, but it seems to me that it is difficult for one single department to work both supply and transport in war-time. In peace it is no doubt both economical and convenient that the small transport cadres kept up should be entirely at the service of the Commissariat. But in war-time the Transport Department becomes itself one of supply, and has to organize, drill, and provide carriage for corps and regiments, for the ordnance and commissariat, and for ambulance services. The successful Transport Officer is likely to spend more time in the saddle, or in his cattle lines, than at his office desk. These at all events would appear to have been the views of the Government of India in organizing the Transport Corps I am trying to describe. Regiments and batteries drew their transport establishments complete. The Commissariat Department drew its Station and field column carriage in the same way, but requisitioned convoy carriage as required from the main dépôt at the base, at first Sibi, and later on, Rindli. Once drawn, regimental and field column carriage passed entirely under the control of the regiment or department, the men and animals being paid, rationed, and foraged regimentally. Sick carriage was drawn and kept up regimentally. Neither the Ordnance Department nor the Medical Staff had, as far as I know, any separate field carriage during the period under review, but the principle of each corps and department having its field carriage under its own control was fully recognized. Two large dépôts were retained in transport departmental charge, that at the railway terminus containing chiefly bullock carts intended for convoy service, and that at Quetta a reserve of mules to be drawn on as required for Staff and other purposes supplemental to regimental transport. Doolie bearers, who form part of all Indian sick carriage, remained in Commissariat charge, a fixed establishment being attached to and paid by regiments and batteries, while the reserve remained as it does in India directly under the orders of Executive Commissariat Officers.

There were then two main divisions of transport, namely, regimental and other field column carriage, and secondly that of the service of the lines of communication, which for simplicity's sake we may call convoy carriage. After the departure of camels, pack bullocks, and ponies to India or elsewhere, the field carriage consisted almost entirely of pack mules, convoy carriage of bullock carts. Pack mules were allowed one driver to three mules, and were tied heels to head in strings of three by the attachment of each of the two rear mules of a section of three to the saddle of the one in front of him. I think ordinary baggage mules should be trained to travel in droves without leading. Civilian mule drivers in most mule countries use them in this way, and there seems no reasonable objection to the adoption of the plan. Ammunition mules should of course be led, and led singly, as they may be required to keep up over rough ground under fire with infantry moving at the double. Mules are generally considered very surefooted animals, but broken knees are not uncommon

among them. The explanation of this apparent anomaly is that a mule allowed to pick his own way seldom falls except from sheer want of strength, but a mule ridden at speed or dragged by the head against his better judgment over rough ground, and so prevented from placing his feet where he likes, is sure to fall sooner or later. I may remark that among battery mules, which are generally led, and worked with a view to their carrying their loads over the worst conceivable ground, I have never seen a mule lose his footing going down hill. Accidents when they occur are almost invariably due to the mule being exhausted during a steep climb upwards. He flounders or trips upwards from want of strength, and then if there is a precipice right or left of him he in struggling up loses his balance and starts for a roll to the bottom. Even at this dangerous game mules are seldom as much damaged as their loads are.

There are three different methods of leading either mules or horses.

First. Place yourself on the near side in line with the fore feet, hold the reins short with the right hand close behind his jaw, and keep the end of the reins in the left hand. If necessary you may touch the animal behind the girth, or threaten him with a whip or the end of the reins held in the left hand. Your right hand will generally be solely employed in checking and guiding him. Second. If you want to lead a horse or mule over a jump or along a narrow path, give him as much rein as possible; move in front without looking back or tugging on his mouth, and he will generally follow so fast that your only difficulty will be to keep clear of his jump or scramble. Third method, of which I only advise trial to convince you of its probable failure. Look the horse full in the face and step backwards yourself in front of him. The reason for looking him in the face is that you will thereby induce him to stand still until you get what I wish you to have, a good firm pull on the reins. As you put your weight into the struggle the horse will throw his head up so as to transfer the pull of the reins from his mouth to his poll. If he is blessed with a patient quiet temper he will stand still; if not, he may rear up and strike at you with his fore feet. In any case the chances are against your getting him to move in the direction of the pull. But this system of leading, which we may fairly characterize as utterly vicious, is the one actually pursued with Nos. 2 and 3 of a section of three tied together croup to nose in the usual manner pursued by the Indian Transport driver. Pack mules strung together in threes if fairly well laden do over fair ground from $2\frac{1}{2}$ to 3 miles an hour. This is good going as compared with that of camels or bullock carts, but it is considerably under the natural pace of a single laden mule. We find in a mountain battery that the pace is regulated by the marching powers of the men. If every man in a battery can do his 4 miles within the hour the mules keep up without a sign of distress. In a transport column, on the contrary, the slowest, worst laden mule sets the pace. I do not think myself we should consider the pace of a transport column thoroughly satisfactory unless it can be regulated by that of good infantry, and if transport can be devised which will keep up at a walk or very slow trot with cavalry and artil-

lery, so much the better. As regards infantry transport, I believe the desired result can be attained in the following manner:—Divide regimental baggage into three sections. The first should comprise only such absolute necessities as reserve ammunition, pioneer and entrenching tools, water in very hot weather, or blankets in very cold weather. The second section would include tents, cooking utensils, and such stores as may generally be left without very great inconvenience two or three hours behind. The third section would consist of service luxuries, such as Officers' mess, baths, filters, and two-thirds of the Officers' tents, changes of clothing for all ranks, Quartermaster's stores, office books, files of correspondence, &c. The first line of regimental transport would then carry the stores necessary for a battle and bivouac, the second the additional ones required to convert the bivouac into a camp without any superfluity of comfort, the third the necessities for keeping the field in health and fair comfort for some months. I do not know if I am justified in mentioning luxuries as among the articles to be carried by the third line. I have heard it whispered that members of the Staff in some of our campaigns have been known to drink champagne, enjoy a bath, and sleep on mattresses and stretchers instead of wrapping themselves only in their cloaks with their saddles for pillows. I am on safer ground when I mention changes of under and outer clothing and boots as among the articles which must be carried somewhere by Officers and men on a campaign, and which yet can well be spared if necessary for a week at a time. Section No. 1 should in my opinion be carried by first-class mules led by native drivers and by privates of the regiment, one man to each mule, Section 2 by mules driven without leading, Section 3 by light mule carts.

I once marched about 150 miles in rear of a field oven, carried on a mule, one of a section of three, and again on another march behind another section of three mules carrying the reserve ammunition of a squadron of Scinde Horse. In each case my guns were greatly delayed, and we had frequently in our own interest to help both the oven in the one march and the ammunition in the other. Why the oven should have formed part of the fighting column, or why the cavalry ammunition should not have been placed in the troopers' wallets, I have been unable to ascertain; but both incidents combined to convince me that improvements might be effected in the distribution of baggage.

Leaving the Sections 1 and 2 for the present, I proceed to describe the description of cart I propose for the transport of Section 3 of regimental baggage, and to discuss the general question as to whether any carts may be fairly expected to keep up with infantry on the march. The cart to which Captain Heyland, of the Bombay Cavalry, gave his name, was successfully tried during the Afghan campaign. It travelled well over all the military roads used by our troops. It broke down only when overloaded or when it was tried over ground utterly impracticable for wheeled traffic. Used for its legitimate purpose of carrying loads of 500 lbs. over even very rough military roads, it attained distinct and signal success. To carry out the principles I advocate for

regimental transport, the total number of mules would be reduced by at least one-third, and of the remainder one-third would be put into draught. Take for illustration a supposititious transport unit of 120 mules and forty drivers. As pack mules they would carry, allowing one-sixth for weakly and spare mules, 100×200 lbs. = 20,000 lbs.; 80 mules under my proposed system would carry 21,500 lbs. as follows:—
 25 carts $\times$ 500 lbs. = 12,500 lbs., one spare cart *nil*, 45 pack mules $\times$ 200 lbs. = 9,000 lbs., 9 spare mules *nil*. We should retain the original 40 drivers, 26 with carts and 14 with 54 mules. Of the 48 laden pack mules probably 12 would carry ammunition and be led by privates, 2 first line necessities, and this would leave 12 drivers to 34 laden mules, which they would conduct in a drove. I think this system would ensure the pack transport keeping well up in the required position with reference to the infantry column. Whether the carts would be able to keep their stations is a matter of experience. From Sibi to Quetta, both *viâ* the Bolan and *viâ* Harnai, the road was constantly traversed by bullock carts. The route from Chuppar Rift to Quetta *viâ* Kuch was made practicable for carts before the summer of 1882. From Quetta to Candahar, if the proverbial coach and four could not be driven owing to bad crossings of watercourses, certainly a field gun can, and an American stage coach would make nothing of the difficulties of the road after those of the Far West. A similar remark would apply to the Quetta-Khelat road. I think it can be proved that the use of light mule carts is, if desirable, practicable wherever a British Army is likely to march from India, operating from a base along lines of communication. Leaving India for a moment, it is probable that they would be out of place in countries such as parts of North Africa, where deep loose sand renders nugatory the mechanical advantage of wheels, or where, as in Ashanti, traffic is carried through forests by narrow single file paths. They would also be useless for the small flying columns sent against refractory Hill Tribes on our Indian frontier, where the ability to move irrespective of beaten paths is a *sine quâ non*. I have mentioned the Heyland cart as a model. This cart has long shafts of hollow bamboo or of iron gas piping, a light axle, and low wheels. I forget the diameter of the wheels, but if I am not right at putting it at 40 inches, that height would do very well. The shafts form two of the sides of the platform of the cart, and the shafts, and consequently the platform, are nearly horizontal. There being no springs, the platform has two struts to connect it with the axle on each side. For those who have seen neither the Heyland cart nor an Ekkha, I may state that a costermonger's donkey barrow is as near a representative of the cart as I can think of. In the original Heyland cart, as in the Ekkha of Northern India, the platform is flat. It should I think be made of loose strong tarred cord network, sinking in the middle, as the lower the load the more stable will be the equilibrium of the cart. It is well to have no special harness for these carts, but to attach the shafts by short chains like those on an English farm cart, to the ordinary service pack saddle. The breast piece and breeching of the saddle would take the

draught of the cart. The use of the pack saddle not only simplifies equipment, but if a short piece of impracticable road is encountered, the mules can carry the loads over the obstacle in two or three trips. The carts themselves must take to pieces and be put together again without the aid of skilled labour. For instance, I have stated that the Hurnai route at the time I knew it (now it carries a railway) was practicable for bullock carts. It was so generally, but riding once from Hurnai to Gundkinduff I found that about 200 yards of the road lay under 10 feet or so of water. This was at Spin Tungi, or the White Pass, so called from the marble walls which enclose the defile. The river had come down in flood, and hollowed out a deep clear pool to where the road had been. I found a large convoy of bullock carts waiting for the repair of the road, but turned the obstacle easily with my own baggage on mules by a mountain path.

I have not yet fully stated the considerations which lead me to believe that the pack carriage of regiments should be reduced to a minimum. Some of the pleasantest years of my life have been spent in mountain artillery, and I am the last to decry the judicious use of pack mule carriage. At the same time the disadvantages of pack as opposed to wheeled carriage have been the more prominently brought to my notice from having studied both descriptions of transport. To take the obvious disadvantages first. A pack mule carries 200 lbs., but on a decent road he can drag three times as much. In a word, pack carriage is more expensive than draught carriage, and a column of pack animals is much longer than one composed of carts. The less obvious but equally forcible objections to pack mule transport will be understood from the following extract from the diary of a mule, whom I have credited with the ability to write and converse with his comrades. If I cannot vouch for the document being genuine, I can for the incidents being not only possible, but probable :—

"Monday.—Force ordered to march at 5 A.M., very cold night, below freezing point, day hot. I am the gun mule of No. 1 Subdivision, No. 20 Mountain Battery. At 3.30 reveillé sounds. I am roused by my nosebag and feed being put on. At 4 I am saddled up and fall in my place. My load is not very comfortable, but in the middle of the march it is shifted on to my relief mule, and I come in fresh and well.

"Tuesday.—The march is a repetition of the day before, except that I have been shifted to the ammunition column, and I have to carry my load the whole way. Still during two short halts, when the cavalry of the force dismount and infantry pile arms, my load is removed, and I rest with other animals and the men. In the afternoon I break away from my picket lines and wander into the camp of an infantry regiment, where I am secured and tied up among the transport mules. I gather from my new comrades that in this regiment mules are expected to be saddled ready to carry their loads half an hour before reveillé, but beyond seeing that they are fed, neither Officers nor men take much trouble about them.

"Wednesday.—March as before ordered for 5 A.M. At 2 my clothing

is removed and carefully rolled up before me, after which I am saddled, and my driver sits down near me to smoke and await orders. At 3 I am led out, thoroughly chilled and hungry, to stand near the tent I am to carry. At 3.45 the tents go down by word of command in beautiful order, and by 4 o'clock I am being walked round in a ring carrying my load. I am the last of a string of three, and I understand the other two would lie down if not walked round. I am glad to begin the march at 5. Half way I hear the halt sounded far ahead of me, and pull up as I am accustomed to do at the sound. Alas! it is not meant for the straggling baggage column, which has to close up and recover its lost ground. For another ten minutes we move on, and we halt in our places just as the head of the column falls in to move on again. Before the next halt I have been moved to the head of the baggage column, and so do halt, but to my surprise, although my load is examined and adjusted, it is not removed, and standing under it rests me but little. As I afterwards saw, if it had been removed repacking it would have been a comparatively lengthy operation. I was unfeignedly glad to find myself recognized, and led back to my own honourable post in the battery the same evening."

My friend the mule you see did not complain of absolute ill-treatment. Lest you should think he was biassed against the infantry by the fact that he belonged to another corps, I may explain that he would have fared little better if he had been among the baggage mules of his own battery. In fact in infantry regiments, if Officers and men will assist in the saddling as well as in the packing of their mules, the waiting about before fall in sounds is shorter than it is for the baggage animals of a mountain battery. But at the best, the packing daily of loads which if carts were used would be left on them all night, and the fact that baggage mules once laden must stand under their loads when the men are resting, entail a lot of fatigue on soldiers and animals which is unknown when cart transport is available.

So far I have spoken only of infantry regimental transport. Mountain artillery transport should be organized on the same lines. Like the infantry, gunners and drivers can well afford to leave their spare suits of clothing behind them on a pinch, and it is unnecessary to carry half-wroughts for repairs and other Quartermaster's stores close up with a battery.

It is specially desirable to limit the number of pack transport mules with a mountain battery, because there are comparatively few men available to pack baggage in addition to guns and ammunition. For field batteries and horse artillery I would have no pack transport at all. The best carts for them would be after the model of Maltese carts, but constructed for double draught. I should prefer pole carriage with long reins to shafts and a riding driver. The reason I have for selecting this pattern is that a two-horse cart with a track nearly the same as that of the guns would not be too cumbersome to follow wherever the guns could go, while on many country tracks in India formed by bullock carts a two-horse cart travels comfortably in the broad deep ruts, and it is almost impossible to drive a single-horse vehicle

owing to the uneven state of the untrodden middle of the track. Probably South African roads are similar. For cavalry I would have what I have called Sections 2 and 3 of infantry baggage carried in the same way as for infantry. Section 1 should, I think, not exist among cavalry requirements, but if it is considered necessary to keep some baggage animals close to cavalry, as was the case when, as I have mentioned before, the head of my battery was led day after day by a string of these mules carrying cavalry ammunition, I am of opinion that the pack mules should be led by mounted troopers. I have not tried the plan on parade, but on shooting and fishing expeditions on the Hurnai route I proved over and over again that my tent and personal baggage could get along well at 6 miles an hour, the pack animals being led by mounted armed drivers, who thus formed my escort. If not necessary for cavalry, trotting pack baggage animals might with great advantage be used by Staff and other Officers, whose duties compel them to make very long forced marches unaccompanied by troops over difficult country.

I purpose concluding the field transport portion of my paper with a few remarks on two questions which require very careful consideration from all employers of pack transport, being details connected with the two great desiderata, sound backs and sound feet.

Our Indian service pack-saddle is very satisfactory, but it, like all pack-saddles, is very heavy as compared with riding saddlery. A 3-lb. saddle is not very comfortable to man or horse, but a 10-lb. saddle will carry most moderately built men. Of course military saddlery is a good deal heavier again, but its weight is nothing compared with that of a pack-saddle. A mountain battery ammunition mule carries between saddlery and line gear about 90 lbs. before he is laden up. A transport mule has a rather lighter cradle or tree, and is seldom indulged with such heavy blankets, so his accoutrements weigh less, but I believe I am safe in putting them near 70 lbs. In the riding world you may have noticed there are two distinct schools of saddlery, agreeing in theory but differing in practice. The military saddler (using the term saddler in its best sense, and so including General Sir Frederick Fitzwygram's Committee) fits his tree to the horse's back, and regards his panels only as a lining to the tree. The average saddler of the shops selects his tree with reference to the general style of seat of his customers, and to the average girth of the class of horse, cob or pony, likely to carry it. But beyond this, all final adjustment of the saddle to the horse is made by the arrangement of the panel stuffing. Although the military saddle is heavy to start with, and necessarily so, it seldom gains more than a few ounces in fitting. I speak especially of the latest pattern cavalry saddle. The possessors of hunting saddles are not so fortunate. Without pronouncing between the two schools, I may state that military and all other pack-saddles follow the civilian saddler's principle, a cradle or tree made to suit the load on its upper surface, and curved to follow only the general shape of the mule's back and ribs. The panels are to all appearance of extravagant dimensions, but all

experience has been to show that unless they are made and, by constant repicking and stuffing, kept, to the dimensions of two huge pillows, a sore back is only a question of time. Now every transport mule carries a thick blanket, and in anything like a severe climate, two. These are a dead useless weight in the day time, and they ought to take the place of a portion of the panel stuffing. Blankets placed between the mules' backs and the saddles have been tried with partial success, but the difficulty of getting them evenly folded in the dark, and of inspecting them before the load has been put on, has caused the plan to be looked on with disfavour. Whatever may be said, and there is a good deal, in favour of its adoption by cavalry, I think there is no doubt that the folded blanket numnah for pack transport is out of the question, or only to be looked on as a makeshift, to be applied to individual mules when a threatened sore back may be saved by an altered distribution of pressure. Unfortunately the idea I am about to propound occurred to me only after it was out of my power to test its practical working. If it has been tried by others, I should like to know the result. I would suggest that panels made, as now, of leather next to the saddle tree, and serge next to mule, be used, but should have on their upper surface large leather pockets, in which blankets folded in four should be placed. I can myself see the defects of the plan, but I do not think them insuperable.

The second point I wish to touch on is the necessity for shoeing transport mules, and as my opinions are opposed to the practice of our Indian Mule Corps, whether artillery or transport, I purpose going more fully into the subject than I should if I had only to tell you what is generally thought in India, namely, that mules do not require shoeing. Mules are bred in India in sufficient numbers to keep up mountain batteries, and the peace establishment of transport. I may be wrong, but I do not think they would be bred at all if Government did not buy them. That is, they form no important portion of the ordinary carriage of the country, although no doubt, if the Indian Government perseveres in its present wise course of encouraging mule breeding, they may. When during the Afghan War there was an extra demand for mules, purchases were made in Cyprus and Persia. I had an opportunity of inspecting a sufficiently large number of these animals to satisfy myself that in these two countries mules are usually, if not invariably, shod. I believe in Spain mules are not only shod in civil use, but the mountain battery mules are shod. What the practice is in South America I do not know. I should like to learn, and further to know, if mules are not shod there, what sort of work they are called on to perform. In India our mountain batteries have found that they can work without shoes. Following their experience, the Transport Department discarded shoes, in opposition to the practice of Cypriotes and Persians, and, I think, of most mule masters. Were they right or wrong? Of course if an animal can do his work without shoes, he is much better without them; whereas on our macadamised roads shoes are necessary, they are a necessary evil. Further, a mountain battery mule is expected to climb like a goat, and if shoes are necessary for him they should

be made of something more like horn than slippery smooth iron. The shranken almost rudimentary frogs induced in too many of our English horses by the use of shoes not only indicate the approach of something very near unsoundness, but they are the cause of many more falls than is generally known.

A mountain battery mule works, as all troop animals should, well within himself. His strength is husbanded for the supreme effort he may be called on to make at any moment. If I may borrow a phrase from the practical mechanic, our horses and battery mules are not under ordinary circumstances worked within one half of their breaking strain. Our transport animals are worked near it, and it would be false economy to husband their strength, as we properly do that of the combatant portion (men and animals) of an army. So a civilian mule owner carrying a heavy load day by day finds the extra expenditure entailed by shoeing money well spent. He would scarcely shoe if he did not find it pay.

My experience of marching exactly tallies with a statement I heard made by an experienced battery Officer, namely, that mules worked continuously over hard ground require shoeing, while mules worked two or three times a week, or even for two or three weeks together, with intervals of rest, do not. I found that on the march many footsore animals could be made to work sound by shoeing. Whether transport mules start at first with or without shoes, I am certain that each section should carry a supply of shoes, especially of fore-shoes, and at the first symptom of their hoofs being too much worn down, the shoes should be put on.

I shall not detain you long over the subject of road as distinct from field transport. The Government carriage employed for the general transport of stores and provisions during the time I am considering was mainly composed of bullock carts. A proportion of Government stores and nearly all bazaar supplies were carried on the contract system, by camels. The contract was for the safe delivery of goods consigned. That these camels should work well, while those owned by Government did not, may seem to reflect on our Officers' management, but it rather proves that Indian camel carriage is unsuited to the Afghan hills. The camels employed by the caravans were either Bactrian or a cross between hill and plain camels.

If Government had owned the same breed of animals, equally good work might have been done by them. The Pathan caravans were very unevenly laden, some camels carrying double the ordinary load, and some little, or even nothing. They were grazed every day when not actually marching, and in hot weather marched at night. Grazing seems to be essential to the health of the camel, although probably the owners of these animals looked more to the economy of the plan than to anything else.

The bullock carts used were worked right along the line by the same bullocks, failing of course sickness or lameness. That is, they marched by stages. It appears to me the relay system, by which the carts could have travelled, if necessary, day and night, would have been much better on the Bolan route. Of course the return journeys

of the bullocks would have been generally wasted, but the aggregate waste of power would not have been greater than that of the return of the whole convoy. The large dépôts at Sibi and Rindli would have given place to small dépôts at each of the posts. The labour of supervision for Transport Officers would have been greater, but the nature of the work not distasteful to the majority of them. A model for the relay system existed in the Government bullock trains, worked in various parts of India, notably between Lahore and Peshawur, before the opening of the Northern State Railway. As the system was well known, probably there were some good reasons against its adoption with which I am unacquainted. I think that on this line, before the railway was opened, and indeed on many other roads which have been, or may be, lines of communications, use should have been made of light horse or mule tramways. On the Indian frontier no mean seems to be recognized between a railway and the roughest of military roads, between the steam engine and the old world bullock cart. If bullock carts had been worked by relays, it would surely have been possible to run laden carts over part of the route by placing properly constructed trollies under their axles, leaving them to be passed over steep gradients or other obstacles in the old way. For instance, from Sibi to Rindli, and from Durwaza to Quetta, are sections of road whereon a light horse-tram might have been laid out without any engineering difficulties, almost without skilled labour.

I have touched on many subjects in the course of my paper, so many that I have treated few of them at full length, and the conclusion of my lecture will be of a still more cursory nature. India is a happy field for the Transport Officer; England, I fear, almost a hopeless one. To work out a proper transport scheme for England would be as hard as getting the nation to consent to the enforcement of the constitutional law of compulsory military service, as it exists. If—how tempting and yet how hopeless is the word—the country would admit and put in practice the principle that every citizen must, if fit to bear arms, voluntarily enter the Army as a regular, as a Volunteer, or as a non-combatant, or elect to stand the ballot for the Militia, how easy it would be to make reforms. The bulk of the non-combatants to which I refer would be the drivers of the tradesmen's and farmers' carts, who now escape the carriage tax, and the carts and wagons, if fitness for military service were made a condition of their exemption from taxation, would help us much towards a cheap and expansive transport system. The recent reduction in the strength of the Royal Artillery is still a matter which has not ceased to exercise the minds of military men. The part of the scheme which has excited the least remark in Parliament up to this time is that which refers to the employment of reserve field batteries as ammunition columns. The "Standard," I think, was the first newspaper to point out that this means that in the event of two army corps being sent abroad for service, the garrison army of the country, regulars, Militia, and Volunteers, will be left as destitute of artillery as they now are of transport. The idea of employing artillery on transport

duties is neither novel nor altogether distasteful to us artillerymen. We have a natural prejudice in favour of our arm, but still, if it is a question of remaining behind as gunners, or of going on service as a transport train, we should individually be glad to go in the latter service. They manage things better abroad, and we ourselves manage, as I hope I have shown, better in India. If my sketch of Indian transport helps anyone to work out a scheme of transport for the Home Army, I shall not have spoken in vain.

In conclusion, apart from the division of baggage I advocate, I should strongly recommend, as the first principle of field transport, that regimental and departmental field carriage should be formed complete at the base; or, in the case of an expedition by sea, at the port of embarkation, that of lines of communication in the theatre of war. For instance, a force intended for service in Asia Minor might conveniently equip and drill its regimental transport units in Cyprus; one for European service, in England; or one for service in the Far East, in India, the Dominion of Canada, or Australia. Money spent in landing complete transport with regiments in a theatre of war is well expended, even if, as regards the amount of carriage in the country, it might appear like carrying coals to Newcastle. Whatever carriage the country we are operating in affords us, it should in the first instance be considered as only available for lines of communication, and not be in any sense relied on for field column transport.

The CHAIRMAN: There are some points in this paper upon which I wish to say a few words. The first thing that strikes anyone who has been much connected with transport duties abroad is the unquestionable advantage of having mules as baggage animals; they are so far better than any other sort of animal; their skins are much tougher than either ponies' or bullocks', and they will stand rough treatment and bad food very much better than either those or donkeys. They have another very great advantage, which is that if they are ill-treated or neglected they will make themselves heard. No Officer in charge of mules can possibly have his mules neglected without being aware of it, because they make such a noise when short of water or food that you cannot hear yourself speak in the camp. This may appear but a slight advantage, but it really is a very great one. With regard to the three methods of leading or driving mules, I had an opportunity the other day, on the return of Sir West Ridgeway from Afghanistan, of meeting him as he came out of the Khyber Pass, and I was much struck with the admirable manner in which his baggage was conveyed on the Persian system. It was entirely carried by very fine mules, and they were *driven* in gangs. It appears that mules will go in gangs as docilely and in as compact a formation as a pack of hounds if each gang is given a leader, and, strange to say, that leader must be a pony. Those ponies are highly prized in Persia and command high prices. I know that owners have refused as much as 500 or 600 rupees for a very moderate pony, just because he was a good gang leader. The mules will follow them anywhere. It was part of the amusement of the camp to turn one of these leaders loose and hunt him round the camp. His gang of 15 or 20 mules would follow him wherever he went, under tent ropes, round tents and back again; nothing would persuade a single mule to forsake his leader. This system appears to be an admirable one for reducing the number of the drivers. These, as you so justly remark, are a very great drawback to any system of "single-animal" transport. It may be interesting to the meeting to know that in India measures are now being taken, most carefully, to reduce in every way possible the baggage of an army, and probably before long in that country an entirely new scheme will be devised by which a great many of the so-called luxuries will be cut out of the baggage of armies when taking the

field. I regret that in most mountain mule batteries in India the mules are not interchangeable, as they must have been in the battery of the mule whose diary has just been read. In fact there are three classes acknowledged, and three prices paid—the ordnance mule, which carries the gun; the ammunition mule, which carries the ammunition; and the baggage mule, which carries the baggage of the battery. It is unquestionably desirable that these should all be of the same class, so that they can be changed. If a mule is weak or in any way slightly injured, it might be put to lighter work, and a fresh mule brought up from the ammunition column or baggage column. I am glad to say from my own knowledge that the use of mules is increasing in India. It is becoming quite fashionable amongst the natives generally to use them, therefore the demand is increasing, and consequently the supply, so that I trust that whoever lives to see the next three or four years will find that in India we shall have a grand supply of mules, produced in the Punjab, and there are none finer in the world. I have lately had the pleasure of seeing a lot of young mules, purchased by an artillery Officer in the Punjab, than which I have never seen finer. They were only three-year-olds, which is too young for any animal to begin work, but they were far finer than any mules I have seen either brought from Italy or Spain. The price paid was very reasonable, certainly under 350 rupees each. When two years have passed over their heads they will be as grand a lot of mules as anyone can wish to have for ordnance purposes. With regard to the use of carts as transport, I suppose that there can be no two opinions that light carts are the perfection of transport if you have the roads, but unfortunately in many of our wars besides those named by the lecturer (for instance in Burmah and in Afghanistan), wherever you leave the main roads you frequently come to insurmountable obstacles which completely stop your carts; they are therefore always looked upon with disfavour by those who have to lead small forces into an unknown country. Besides the many obvious advantages of a cart, there is this one, that it forms a very convenient and grateful shelter for the drivers in hot or wet weather. The tarpaulin or any part of the covering of the baggage (most carts would carry a tarpaulin) forms an extemporary tent which is an extremely useful and valuable protection. But there is that one great drawback, that a cart can never go off a road of some sort, whereas a mule can go anywhere. It is perfectly astonishing the places over which mules will go with their guns and with heavy baggage, so that they are of all transport far and away the best the soldier can use. With regard to the question of the employment of blankets as a pad to protect the mule's back, this is undoubtedly very good in theory, but imagine this system in use in a bivouac on a wet night. You have to depend entirely upon your blanket for protecting your mules' backs, either by the pocket system, or in the ordinary way, which was in use in the cavalry when I first joined the Service, and was also employed in the German Army eight or ten years ago (it may not be now); well, we will suppose that it is a wet night, most of the mules are lying down, and some have been rolling, just imagine the state of your blanket in the morning! it is pitch dark, you have to get ready so as to move off at daylight. You find your blanket clotted and simply imbedded with mud. You can hardly lift it, it is so heavy. What are you to do with it? this blanket has to be folded and placed under your horse's saddle. Of course the thing is out of the question; you would probably have to leave it on the ground; there is no doubt that that is the case in many campaigns in wet countries. Another thing is the great difficulty of folding it properly in the dark even when your blanket is dry and fairly clean. Again, on a windy night, it is extremely difficult to fold it nicely and keep it on the horse's or mule's back. Before you can put your saddle on the wind blows the blanket off, so that it takes two men to do the thing. It may be interesting to know that as far as shoeing goes in India, the rule now is that no horses, mules, or other animals are shod unless they are found to require it; with transport animals it may be difficult to adopt this system, because they are not so closely supervised, but I think we may depend upon it that in the future it will be the standing order that the moment animals require shoeing they shall be shod, and when they do not require them the shoes will be taken off, and Nature allowed to keep the hoof in its proper healthy state. I have one more remark to make about the admirable manner in which the Pathans and Beloochis

manage to convey our baggage for us on camels. The real secret of the matter was touched on by the lecturer, but he did not fully explain it. The fact is that they know the capabilities of every camel. Out of 100 of these animals, 50 may be mature and capable of carrying huge loads; 20 able to carry our standard loads, and the remainder may be young ones, only able to carry a few pounds. They load them up at the best time of the day, that is (if I remember right), late in the evening, and they march all night, going double the distance that we would think of marching a camel. They attend to them very carefully, shifting their loads when they get wrong; they also always have a lot of spare camels, and they shift their loads as they find the camels require rest or relief. They know the temper, power, and qualities of every animal they have, they do this double march, and then the moment they get in they take off everything (making a little camp of the whole of the baggage), and they turn the camels loose, always taking care to halt where there is plenty of grazing. They allow the camels to graze the whole of that day *and the next*, thus giving them ample time to recover, and get a really good feed. They then start again, and make another double march. The result was that they were able to keep pace with us, and at the same time their camels had plenty of time to feed and rest. This is the great secret of managing camels; they must be given full time to graze on the shrubs of the country, and then they will generally keep in health.

Colonel BATTIS: Could you tell us the average height of the mules in the Punjab? I have seen at Gibraltar some very large mules. I do not know what may be the height of these mules; are they good serviceable animals for height, capacity, and strength?

The CHAIRMAN: Yes. The difficulty is now rather to avoid their getting too high, as it is no joke lifting the breech of a screw-gun up to a great height. If I remember right they are fourteen hands. There were a number of excellent mules purchased by an artillery Officer in Italy the other day; they were unfortunately extremely young, and are quite unfit for work at present, but in the course of two years they will be excellent animals, though some will, I fear, exceed the height that we wish to get them. The Punjab mules are just as near perfection as anything can be, and the best of them will probably run from 14 to 14.1.

Major JARY, late 12th Lancers: I should like to say one word about the poor old blanket of the British cavalry. I can look back to the time—I am afraid to say how many years ago—when I happened to be on a campaign that lasted three years. In that campaign we had the blanket, and I must say that blanket was a very great comfort to the soldier. In those days, when we were expected to turn out at night, not knowing what was to happen before morning, the blankets were kept folded; but on other nights, when we pretty well knew what the enemy were going to do, these blankets were, with the cloak, the only protection to the men out at night, the luxury of tents being an exception to the rule. The men were perfectly well able to fold this blanket according to the condition of the horse at the time, because there were times when the horses had very little food, and they began to get very hollow in their backs. Of course it was impossible for the saddler with us to think of repadding the saddles on a campaign of the description I am talking of in South Africa; but having the blanket, the men could put it thicker in one place and thinner in the other, to make up for the small declinations there were in the horse's back from starvation; therefore, that blanket had a great deal of use. It is easier, no doubt, to put a saddle on to a horse's back with the padding just the same at the end of the campaign as it was at the beginning, perfectly regardless of the condition of the poor animal's back. I believe in the regiment in which I had the honour to serve we had few, if any, sore backs during the three years' campaign in which we were engaged, and therefore I speak somewhat in favour of the blanket, which is now totally discarded from the British Army. I say the blanket has been, and I believe would be now, properly used, a comfort to the men and the horses, certainly better than the flannel saddle of the present day. That is all I wish to remark upon in this very excellent lecture. It is a long time since I was in the Service, but at the same time I look upon the blanket as an old friend.

The CHAIRMAN: I alluded to the blanket as being useful for the mule or horse, not for the man; I mean to say at night as a protection to the horse.

Major DOUGLAS: I think I have only to thank you for having listened patiently to my paper. As regards the blanket, I think I have said very little against it or for it. The blanket I mentioned was the blanket used to cover the mule at night. I know myself that the blanket is valuable to relieve pressure, as I think I have said in the body of my lecture, but with only one driver to three mules, as we have in the transport services, it is impossible to get it folded and put on properly in the dark. I should prefer not to express an opinion about the blanket for cavalry.

The CHAIRMAN: I think I may express our great thanks to the lecturer for his interesting and fluent lecture upon a very important military subject. Every soldier must know that transport is a matter that is second to none in importance in a campaign; for without ammunition and without food, what can an army do? And these necessities cannot be properly supplied without a good and sufficient transport.