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Land and Water Transport in the Soudan and on the Nile

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Wednesday, March 21, 1888.

LIEUT.-GENERAL THE RIGHT HON. LORD CHELMSFORD, G.C.B.,
&c., &c., Vice-President, in the Chair.

LAND AND WATER TRANSPORT IN THE SOUDAN AND ON THE NILE.

By Major E. A. DE COSSON, F.R.G.S., &c.

THE CHAIRMAN: I have the pleasure of introducing Major de Cosson, who will read a paper on "Land and Water Transport in the Soudan and on the Nile." Major de Cosson is one of the few Englishmen who have been at Khartoum. He travelled down the Nile as far as Berber, and then went from Berber to Suakin by land, so that a great portion of the country which he is to lecture about he knows thoroughly by experience. I am quite sure we shall derive great advantage from his lecture, and no subject can be of more value to a soldier who has to take part in a campaign than that of the transport.

MILITARY transport has been defined as "that part of the military organization which provides for the mobility of an army, for by the aid of military transport alone can an army in the field move at any moment in any required direction, complete in all that it needs both for its subsistence and its efficiency."¹

Dr. Gerlach calls the transport service the "soul" of an army, "because alone it gives life and movement."² In short, after men, arms, and munitions of war, transport is the most essential requirement of a force in the field. It is to an army what the legs are to a man, and the force that is without it, is practically in a crippled condition.

The whole fortunes of a campaign may be changed, the most ably conceived schemes of a General frustrated by any breakdown in this department, arising either from miscalculation or from want of proper management of its resources. All Officers, therefore, whether combatant or not, should carefully study both the general organization of transport, and the working capabilities of the various classes of transport that can be employed; because it is only by so doing that they will be able to form a just estimate of what can and cannot be done with the resources at their command in the field.

I am only asked to talk to you to-day about some of the lessons in transport that may be learned from the experience of the late war in the Soudan, and I shall not, therefore, go into the wider question of transport in civilized regions. Colonel Furse, in his able work on military transport, tells us that—"In well populated, industrious

¹ "Military Transport," Furse, p. 1.

² *Ibid.*

countries, where the soil is regularly tilled, and good roads are plentiful, there will be no serious difficulty in requisitioning transport."¹ Moreover in most parts of Europe railways, rivers, and canals afford facilities which the General who has studied the theatre of war beforehand will know how to make use of.

But in our frequent small wars with savage races the conditions are entirely different, for they are generally undertaken in countries the topography of which is imperfectly "known," where the climate is trying to Europeans, and native labour must be largely employed, where the means of transport vary with each campaign, and the ordinary forms of equipment kept in store cannot be used, because we do not know beforehand of what the equipment will have to consist.

Coolies alone may be employed, as in the Ashantee Campaign, where the loads were carried on the heads of men, women, and even children, since no transport animals could stand the climate; or ox-transport may be used, as in South Africa; or pack mules and elephants, as in Abyssinia; or boats and camels, as in the Soudan. In short, the transport has to be improvised to suit the occasion, and it often happens that it is necessary to commence active operations in the field before there has been any time for its proper organization.

The action at Hasheen was fought just eight days after Sir Gerald Graham landed at Suakin, and when much of the camel equipment had not been disembarked. Yet, once operations have commenced, there is no time to pause. Sir Frederic Roberts is reported to have said, "If you get an Oriental on the trot you must keep him going;" and this is quite true with a race who hold it as a proverb that "hurry is the devil." Lord Wolseley tells us, speaking of savage warfare, that "If you have at any period of the operations to halt for some time in order to bring up provisions, you give such renewed courage to the enemy as to make him often forget the success you had perhaps already achieved." "It is much better," he adds, "to postpone beginning the campaign to a late period, so that you may be able to complete all your supply arrangements beforehand."²

This is good advice, but unfortunately we cannot always follow it in savage warfare, when precious lives hang in the balance, public opinion clamouring for prompt action, and the approach of an unhealthy season often combine to render delay dangerous, if not impracticable. The Nile Expedition was an example of how the delay entailed by an elaborate scheme of transport may become a source of danger to the success of a campaign, and we must, therefore, recognize the fact that in savage warfare we shall often be compelled to complete the organization of our transport while the campaign is actually in progress.

The writer of last year's Prize Essay for this Institution says, "That the skeleton transport service, as provided for a Continental theatre of war, is totally unsuited to the exigencies of such irregular campaigns as fall frequently to the lot of our troops, has long been recognized."³

¹ "Military Transport," Furse, p. 21.

² "Soldier's Pocket-Book," p. 401.

³ R.U.S.I. Prize Essay, 1887, see Journal, vol. xxxi, p. 401.

But, in point of fact, our transport, however well organized, must always remain in time of peace simply a nucleus capable of expansion, and it is, therefore, necessary that all Officers employed in its development should thoroughly understand the important nature of the duties they are undertaking, if we are to have an efficient transport in time of war. I fear, however, we shall never succeed in making transport service popular in the Army, until it has been rendered as distinct from the Commissariat as it is from the Army Pay and Ordnance Store Departments. I do not say this in any disparagement of the great non-combatant departments of the Army, which require men of the highest intellectual capacity for their work, but I think that the qualities required to make a first-class Commissariat Officer are very different from those required to make a first-class Transport Officer; and it is a mistake to try and roll the two into one. If the first, as Sir Randolph Routh tells us, "must be a complete man of business," the second should be especially gifted with that military training and habit of command which will enable him quickly to organize and bring under discipline large numbers of undisciplined followers. He should possess the soldier's instinct, which will tell him how far he can depend on the endurance of men and beasts when it is necessary to put them to the test, and though, like many Staff Officers, not actually engaged on a combatant duty, he should hold combatant rank so as to be fully qualified to speak with authority in the military counsels of his colleagues, and bring his transport experience to bear on all questions relating to the mutual safety of the convoys and the troops. The danger that was entailed on the square which fought at Abou Klea from there being too few camel drivers to control the camels,¹ and the difficulties which beset Sir John McNeill's march to Tofrek through dense bush with an unwieldy convoy, are examples of the necessity there is for bringing transport training to bear on tactical movements.

I hope presently to show you that the success of our attempt to save General Gordon depended very much on a proper understanding of the transport question, and that we had less to fear from the enemy than from any deficiency in the transport arrangements.

No doubt our Arab foes displayed desperate gallantry in their charges, and succeeded in penetrating our square at Abou Klea, partly through the "bulging" of the transport camels, which gave them a favourable opening;¹ but even so, the hard logic of figures teaches us that they were powerless to contend against the effect of the breech-loader, and, had it not been for this accident, our loss from the enemy would have been very slight. During the whole of the Nile Campaign we are told that the number of men actually killed by the enemy, or who died subsequently from their wounds, was only 126, though 557 died of disease, and no less than 8,593 passed through hospital out of a total of 10,771 Officers and men.² These figures clearly show that the rifle fire of the enemy must have been very ineffective, and that we had little to fear from anything he could do

¹ "Too Late for Gordon and Khartoum," Macdonald, p. 209.

² *Ibid.*, p. 238.

if our men remained well in hand. Indeed the very gallantry of his attack only led him to his own destruction, when it was met by a properly controlled fire; but we also learn that the climate of the Soudan was a grave source of danger to our troops, and that it was therefore desirable to make the campaign as brief as possible. How to do this was principally a question of transport.

I need hardly remind you that the transport of an army is usually divided into two parts, called the first and the second line. The first line moves with the army, and provides for the conveyance of reserve ammunition, sick and wounded, field hospitals, forage, and supplies, ordnance stores, baggage, and camp equipage: in short, all the multifarious things that are required to maintain a force in the field for a certain number of days; while the second line works in rear of the active zone of operations, usually out of reach of attack from the enemy, and pushes forward supplies to the advanced magazines, from which the first line is replenished.

In European warfare the magazine system, so far as it applies to food and forage, has been found too slow for the rapidity of modern operations; and an organized system of requisitioning on districts occupied has to a great extent taken its place. But in savage wars, where the native produce of the country cannot be depended on for the support of an army, the whole of the supplies for the expeditionary force must often be pushed up long distances from the base, which is generally the nearest seaport. This was essentially the case during the Nile Expedition, every article of store for which, after being landed at Alexandria, had to be sent 1,000 miles up to Sarras, the point at which the troops actually embarked in the whalers. Colonel Butler points out the disadvantages which attended such a long line of communication, and, referring to the supply of coal at Assouan having run short, says: "The steamers between the first and second cataracts were delayed for want of fuel. It was a serious want at such a time, for the links in the chain of this great enterprise still stretched back to the Mediterranean, and to cut one link in any spot was to affect the line of effort through its entire length."¹ Again, he tells us, "The failure of the coal supply at Assouan had cut the flow of soldiers up the Nile, and during the ten days following the departure of the 'Stafford,' there were only six mixed companies of the Cornwall and Essex battalions ready to be sent off."² From this we learn that the danger of a long line of communication is increased in proportion to the various kinds of transport employed on it, because the greater the number of links in a chain, the greater the chance that one may be defective, and we know that the strength of a chain is only equal to that of its weakest link.

At Sarras, the troops commenced the ascent of the Nile in the boats designed to take them to Khartoum; 800 of these boats had been specially constructed in England, the first 400 of which, it was calculated, would reach Sarras early in November. As they proved eminently suited to the navigation of troubled waters, and will

¹ "Campaign of the Cataracts," Butler, p. 145.

² *Ibid.*, p. 165.

probably serve as a model for such craft in the future, I will briefly describe them.

They were what is called whaler-built, and though there was a slight difference in some of the measurements, the usual dimensions were: length, 32 feet; beam, 6 feet 9 inches; and depth, 2 feet 6 inches. Each boat was designed to hold twelve men fully armed and equipped, with 300 rounds of ammunition per rifle, and stores for 100 days complete, weighing in all about 4 tons. Empty, the weight of the boats rather exceeded 1,000 lbs., and when laden they drew from 20 to 22 inches of water. Besides oars, they were fitted with masts, two lug sails, pushing poles and gear for tracking, towing, &c. In order to contend with the difficulties of Nile navigation, it was necessary they should possess many qualities: to use Colonel Butler's words, they had to be "large but light, safe in cataract, but swift in smooth water; fast sailing, but easy to row; roomy, but small of draught; strong, but portable; heavy with cargo, but light of build; staunch, but elastic; slight, but lasting," and there is no doubt they fulfilled all these requirements admirably, for not only did they successfully overcome the dangers of the worst cataracts on the Nile, with a very small percentage of accidents, but they safely conveyed to Korti a large supply of stores, both for their own crews and the mounted troops.

Colonel Butler is of opinion that it was an error to have given them this extra load, and that the progress of the boats was much retarded by their having to carry 100 days' rations for the mounted troops in addition to the original cargo. He says: "To-day was the 28th November; not one boat except my own had yet passed the Third Cataract. It was the eleventh hour of our effort, but even yet it was not too late. Cast only on shore from every boat this extra twenty-six days' food, reduce the big load by even 1,000 lbs., and that long line of slow-moving, hard-labouring little vessels will fly forward over this great stretch of rock-encumbered river." Nearly a month later he writes: "A reduction of 500 lbs. weight in every boat had been ordered, and the whole expedition with its lightened load was now averaging 10 miles a day over the worst water of the Nile. But for all that it was Christmas Day; had this average been made a month ago we would now have been assembled at Korti, with the vanguard of the army within touch of Metemma."² We learn from this, that if the load which a certain class of transport can carry has been properly calculated, it is a very dangerous experiment to attempt to add to the burden, as the efficiency of the transport is certain to suffer.

There is no doubt that the whalers beat the native craft completely in their sailing powers and general fitness for ascending the rapids, but it appears from the experience of the 1st Royal Sussex, which, starting early in September, only took thirteen days to reach Dongola from Sarras in nuggars, that, had it been considered desirable from the commencement to occupy Korti with a portion of the force at

¹ "Campaign of the Cataracts," p. 201.

² *Ibid.*, p. 229.

General Stephenson's disposal, and to organize there a land transport for a dash across the desert as soon as the first reinforcements arrived, there would have been no difficulty in using native boats at high Nile for the purpose, and the whalers need not have been so heavily laden.

Though the fleet of whalers had been very hastily constructed in England, and many contractors employed on the work, they proved as a rule well and soundly built, but there was some difference among them, and it would be well to remember in future that only boats planked with pine can bear the wear and tear of rapids well, and that the white spruce used in some of the boats proved valueless. The keel plates, also, which extended from the top of the cutwater along the keel and up the stern-post, were a great protection when made in one piece; but in some cases where the iron had been attached in three pieces, it was easily torn off. Every boat carried a supply of nails, sheet lead, pitch, paint, spare canvas, &c., for slight repairs, and one boat in eight carried a tool chest, with the necessary appliances for repairing graver damage.

As detailed tables of the equipment of each boat, the nature of the rations carried, and their daily issue to the men, will be found in the appendix to Colonel Butler's interesting work, "The Campaign of the Cataracts," I need not go through all the items here; but I should like to say a word about the 240 lbs. of sugar which each boat was supposed to carry, because sugar is an important article of store when tea is the only stimulant available, and General Brackenbury tells us that the River Column was reduced to half rations of sugar, owing to its having been packed in bags that were not waterproof.¹ I would suggest that the chance of damage would be avoided in future, and a great saving in bulk and weight effected, if saccharine were substituted for sugar in expeditions of this kind. The small 2-inch bottle on the table contains enough saccharine tabellæ to sweeten 50 large cups of tea, and as it is hardly possible to detect any difference in flavour, and as saccharine is considered even more wholesome than sugar, its advantages seem obvious.

The means by which the boats were sent up the river comprised railway, towing, portage, tracking, poling, rowing, and sailing. On the rail from Alexandria they were packed on the trucks in beds of coal, which answered well.² For towing, six pairs of boats were lashed together with a hawser between them, the spare end of which was then passed round the stern and up between another six pairs, the two ends of the hawser being attached to the stern of a steamer, so that the flotilla of twenty-four boats followed it four abreast. When portage became necessary, the boats were emptied, turned bottom upwards, and two masts placed beneath them at each end; they were then lifted and carried by manual labour overland. Eleven relays, consisting of 30 Egyptian soldiers each, transported in this way 10 whalers weighing over 1,000 lbs. apiece, a distance of 2,480

¹ "River Column," p. 46.

² "Campaign of the Cataracts," p. 59.

yards in two and a half hours, at the Bab-el-Keber of the Second Cataract.¹

The method of hauling the boats up the cataracts was as follows. The cargoes having been first removed, two of the voyagenrs sent with the Expedition were placed in each boat to keep her clear of the rocks, while the disembarked crews hauled at the track line. The rush of water was sometimes so powerful that as many as seventy-nine men were required to haul up one boat,² and the additional labour entailed by the unshipping, portage, and reshipping of the heavy cargoes was naturally very severe. It was found best to send the boats through the cataracts by companies, and not by wings of battalions, as in the latter case the delay of one boat retarded many more; whereas the emulation between the companies encouraged the men to work their best.

General Brackenbury issued the following order to the River Column: "From the time of leaving Korti, the company will be the unit by which boats will work. The utmost efforts must be made to keep companies together. In every case an Officer will be with the last boat of the company, and it will be his duty to urge on and assist where necessary any boats of his company which may be falling behind."³

At night, when advancing through a hostile country, the boats were anchored to the shore, and a zareba of mimosa bushes constructed beside them; the men lay down to sleep fully armed and equipped behind it, and strong picquets were posted at the two ends of the zareba that rested on the river, a company or two being usually held in reserve in the centre, and sentries posted at each of the angles. As a rule the spot selected for the camping ground was part of the mainland which had been an island at high Nile, and had therefore a dry gully in its rear, which served as a convenient place for picqueting the horses and baggage animals under cover from fire. The River Column formed two zarebas at night during its advance, the first for the mounted troops and about four companies from the leading boats, and the second from 2 to 6 miles in rear for the main body.

It will be well, before leaving the water transport, to consider whether it justified the confidence that was placed in it. I have already said that the whalers were excellent of their kind, but they could not perform impossibilities, and, though they were perfectly capable of coping with the difficulties of Nile navigation, it was not possible for them to reach Khartoum by the water way in time to save it, starting at the date they did.

To understand this, we must glance at the conditions under which the campaign was commenced. It will be remembered that when, on the 12th August, 1884, the Government finally decided to take active measures for the relief of Khartoum, there was not a moment to be lost if relief was to reach the city in time. General Gordon had

¹ "Too Late for Gordon and Khartoum," p. 67.

² *Ibid.*

³ "River Column," p. 7.

written in July to say that he could hold out four months—that was till the 13th November, and there was every reason to suppose that when a man of his stamp mentioned such a limit he was speaking in grim earnest, as indeed he was,¹ and that after that date he would have to struggle with the most terrible of all foes, famine, to say nothing of the apathy, selfishness, treachery, and despair which quickly demoralize a garrison wasted by the pangs of hunger.² To postpone, therefore, the advance on Berber and Khartoum, till a special form of river transport could be constructed in England, entailed this consequence—that with the utmost diligence, it was impossible to commence placing the water transport equipment of the force on the river at Sarras, 1,000 miles from its base at the Mediterranean, and with nearly another 1,000 miles of river broken by over 200 miles of comparatively unknown cataracts still between it and Khartoum, before the first week in November, or just eight days prior to the expiration of the time that General Gordon had said he could hold out.

The "grizzly experts in African travel," as Colonel Butler calls them, had long foreseen that if a purely river transport were relied on for the relief of Khartoum, it could not reach the city in time; and that a difficulty in procuring a sufficient land transport would probably arise when it was found necessary to depart from the river and enter the desert. This is exactly what did happen when General Gordon's letter of November the 4th came to emphasize the fact that Khartoum was in a desperate condition, for it then became apparent that if the city was to be saved, land transport must be resorted to, and that there was not a sufficient supply of camels and drivers obtainable for the purpose. Sir Charles Wilson, writing on the 13th January, says: "The supply of camels is much too small."³ General Buller, telegraphing on January 17th, in reply to General Earle's urgent demand for only forty more camels, says: "I have not a camel or driver to send. They are in the desert;"⁴ and Mr. MacDonald, speaking of General Stewart's first march, says: "Had a thousand more camels then been available, General Stewart could have gone on to Metemmeh and reached it on January 6th, without firing a shot."⁵

We may learn from this, that though river transport in an inhospitable country like the Soudan possesses the two great advantages that it secures the first necessary of life, water, and enables a force to move itself and its supplies for a certain number of days independently of non-combatants or baggage animals; yet it cannot be depended on alone, if speed of movement is essential to the success of the campaign; because it is always tied to the water way, and every

¹ See Gordon's "Journal," Sept. 23, 1884, and Nov. 8.

² Sir C. Wilson says that "from Christmas Day, 1884, to the 26th January, 1885, the garrison lived on coarse bread made from the pith of the palm tree, or gum, and a little tobacco."—"Korti to Khartoum."

³ "Korti to Khartoum," p. 15.

⁴ "River Column," p. 61.

⁵ "Too Late for Gordon and Khartoum," p. 310.

obstacle, natural or artificial, that may arise to delay its progress, must be patiently overcome before it can proceed. In fact it cannot deviate from the fixed route before it, unless it is accompanied by an efficient land transport to take its place, in which case it becomes merely an auxiliary of that transport, and to a great extent dependent on its proper organization for the ultimate success of the operations.

Let us take an example, and ask ourselves what would have been our position had Sir Charles Wilson arrived at Khartoum before it fell, and found the city in the last stage of starvation; or arriving after it fell, if he had ascertained that General Gordon was still alive and shut up in the stone mission house. We know from General Brackenbury, who wrote on the 12th February, that he did not believe he could reach Berber before a month from that date,¹ that there would have been no possibility of pushing supplies by water into the starving city before the middle or end of March, and the question arises how, without a large reserve of camel transport, we could have even supplied a force of our own, to send to General Gordon's immediate rescue? That the camels we had were broken down with overwork, and that there was no reserve available, is evident from the message which recalled General Brackenbury in February, for it said, referring to General Buller's position, "He awaits camels to fall back on Gakdul, which I hope he will begin to do to-morrow, the 21st inst., but owing to the weak state of his camels, all his men must go on foot. I have abandoned all hope of going to Berber before the Autumn Campaign begins."² We may gather, I think, from the evidence before us, that, though the water transport on the Nile was a successful aquatic experiment, in so far that it proved the sailing qualities of the whalers, it was unsuccessful as a means of transport for an expedition the primary object of which was to reach Khartoum in the shortest possible time, and push supplies into a starving town. No need of praise can be too great for the work done by the Officers and men engaged on it, and we must, therefore, look for the cause of its non-success to the length of the line of communication, and the impossibility of covering the distance in the time at the disposal of the expedition.

If for centuries it has been considered a marvel that the Nile can survive through that 2,000 miles of sandy desert, how much more difficult for an army to do so, without impairing its power of striking effectually at the end of the journey. Colonel Butler, reviewing the necessity for the retirement of the troops, justly says: "The course of an army is like that of a river: you must feed it with fresh currents or its volume will lessen and run dry."³

Let us now turn to the land transport employed at Suakin. Berber was the objective of the force sent there, as it was of the River Column, but it had no long line of communication behind it; stores

¹ "River Column," p. 181.

² *Ibid.*, p. 218.

³ *Ibid.*, p. 323.

and transport animals in any quantity could be disembarked on the sea shore, only 241 miles from Berber, and, if we examine the experience gained during the operations, I think we shall find that no grave transport difficulty would have arisen had it been desired to send a flying column, like that which crossed the Bayuda Desert, direct from Suakin to Berber; or in establishing a chain of magazines along the route behind it on the telescopic system, which I shall presently explain. Some years ago I rode from Berber to Suakin accompanied by a very heavily laden camel, and it took just eight and a half days to accomplish the journey; that was in the middle of June, when the sun was at its hottest and the wells at their worst. However, in March, 1885, the time had passed for saving Khartoum, and the operations of the Suakin field force were confined to the breaking of Osman Digna's power and the construction of the Suakin-Berber Railway. I need not enter into a description of that historic line as a means of transport, because, though it was ascertained that the nature of the country presented few obstacles to its construction, I do not think there is much prospect of anybody desiring to complete it for some time to come.

I will, therefore, pass on to the natural transport animal of Eastern Africa, the camel, the general characteristics of which should be carefully studied by all who wish to organize a successful transport in this region, for any disregard of them may lead to disaster. The camel is essentially a slave to routine, and if it be sought to get more than a certain average of work out of him, he breaks down and dies; a large reserve must, therefore, always be provided whenever it is considered necessary to work camels unsparingly.

There are two ways on which camels can be worked on convoy duty without much injury. They can be made to march an average of eight hours a day for an unlimited number of days, or they can be made to march for sixteen hours a day, at their normal pace of from 2 to 2½ miles an hour, for a small number of days—say ten—on condition that they are allowed an equal number of days' rest at the end of the journey, before being required to do more work. In both cases the average of speed is the same for a long journey, but there is this great difference, that for a short distance, like the 241 miles between Suakin and Berber, they form a fairly rapid means of transport; as marching at only 2 miles an hour, they can cover the distance in eight days; and if you are in a position to command a practically unlimited supply of camels at one end of the road, and to give them ten days' rest beside a big river at the other, the difficulties of transport are materially diminished.

Unfortunately, the organization of a Camel Corps at Suakin was not completed till shortly before the order was received to suspend active operations; otherwise, I believe the enemy would have been greatly demoralized by the mobility this class of transport imparts to infantry. The 300 riding camels used for the Camel Corps were fitted with double saddles, so that they could carry 500 Europeans, with one native to every three camels: thus 600 camels would have been suffi-

cient to transport a fighting square of 1,000 men in any direction, at a rate of between 30 and 40 miles a day.

For a march extending over several days, it would probably be best to substitute ten days' rations, and a 10-gallon rubber water bag, weighing in all about 10 stone, for the second rider, as the men would then be independent of the transport, and safe in case of accident to it. Indeed, there was nothing to prevent a force of 2,000 camelry, equipped in this way, and escorting a convoy of 500 camels carrying 20 days' extra rations, from marching direct from Suakin to Berber in nine days, and seizing the other end of the route. Berber is exposed on the land side, and the experience of Tofrek proved that one sharp lesson was enough to break Osman Digna's power of opposition. In short, had Sir Gerald Graham been free to go to Berber first, and make the railway afterwards, there would have been no transport difficulty in the way.

I have before said that active operations commenced at Suakin almost simultaneously with the disembarkation of the troops and transport, the organization of which had, therefore, to be completed in the field. In order to break the power of Osman Digna, it was decided to pursue him into regions where there was no water obtainable; and in order to construct the railway, camps had to be established along the line of its advance to cover the working parties. Both the troops acting in the field and these advanced posts along the line of railway were entirely dependent on a supply of condensed water sent from the base, and Sir Gerald Graham says in his despatch of the 30th May, that in this climate each man consumed 12 lbs. weight of water to 4 lbs. weight of food. Any failure in the water supply would, therefore, have led to the most distressing results, and it was decided to organize a water train, the special duty of which should be to keep the troops in the field and all the advanced posts beyond the camp at Suakin constantly supplied with condensed water. As the organization of this water train, with slight modifications, is applicable to all other classes of camel transport, and I happen to be familiar with its details, I will briefly describe it.

A water dépôt having been formed on the shore near the condensing ships, from which the water was pumped into iron tanks and then into long wooden troughs fitted with six taps each, so that a large number of vessels could be filled at the same time,¹ two Officers with a small staff of non-commissioned officers and men and about 300 Bheesties were stationed there to carry on the work. It was usual for the troops to assemble at daybreak in front of the advanced forts, which were about 2 miles from the water dépôt, and it was, therefore, necessary that the convoys should load up during the night, in order to reach the rendezvous by sunrise; to enable them to do this without confusion, a loading ground was marked out and the water-tins when filled placed on it in rows, each row consisting of fifty couple of tins, ranged side by side with a distance of 8 feet between each

¹ A fatigue party of 100 men could fill and lay out camel tins to carry 16,000 gallons of water in about eight hours.

couple; the distance between the rows from front to rear being 18 feet.

At sunset the transport camels were watered and brought down to the loading ground, where they were made to kneel between the tins in successive rows of fifty camels each, and their evening meal having been placed before them, were tied down for the night. On the signal to load up, parties of the drivers were told off to go down each row and lift the pair of tins lying on either side of every camel into the nets attached to the saddle; the whole convoy then stood up in close column ready for the march. By following this method, 500 camels picqueted in ten rows of fifty and carrying 12,500 gallons of water, could be loaded up simultaneously and marched off in perfect order in twenty minutes.

If the night were very dark, Her Majesty's ship "Dolphin," which covered the water depôt with her guns, turned her electric light on the loading ground, and then threw it up the path the convoy would have to follow to reach the rendezvous.

The camels were sent to the depôt in complete sections from the various transport companies, with their own Officers and men, but an Officer of the water train accompanied each convoy in administrative charge of it, his duty being to see that the water convoy followed close to the leading face of the square, and did not get mixed up with the other transport, so that it might be immediately available if required, and well in hand in case of attack, for in such a climate to lose their water would have been a serious disaster to the troops. In order to ensure the camels being under proper control, one driver was allowed to every two. The Officer in charge also superintended the issue, storing, and guarding of the water in the field, collected all empty tins, and sent them by the first return convoy to the water depôt, where they were washed, refilled, and placed on the loading ground ready for use, a reserve of 6,000 gallons being always kept on hand in case of any emergency. If this reserve were not required, the tins were emptied and refilled every three days, for owing to the heat of the sun, the water soon got a brackish taste if left in them. The convoys were arranged to follow each other in regular rotation, so as to keep up an even supply, but, as they were frequently attacked, and the number and position of troops in the field constantly varied, the strain on the resources of the water transport was naturally severe, and the work of preparation and organization had to be carried on day and night without intermission. As an example of the demands made on it, I may mention that the force which destroyed Tamai and slept two nights in the desert numbered over 9,000 souls, all of whom were dependent on the supply of condensed water sent with them.

When regular posts began to be established along the proposed line of railway, the telescopic system was adopted, that is to say, at each camp a water depôt was established, with an Officer in charge, a reserve of water, and a certain number of camels. If a body of troops unexpectedly passed one of these advanced depôts and exhausted its reserve, that depôt called on the depôt next in rear of it to make good its loss, every depôt being ordered to supply at once from its own

reserve the demands of the dépôt next in front of it. By the time the last dépôt in the chain had emptied its reserve, a convoy would have reached it from the base, as the first dépôt on being exhausted would have telegraphed to the Officer in charge of the water train at headquarters, whose duty it was to keep all the threads of the organization before him, and provide for any sudden demands. To enable him to do this, all the dépôts telegraphed to him at noon each day the quantity of water received, issued, and in reserve, which reports he placed in duplicate before the Senior Commissariat Officer, and Director of Transport.

It is not necessary that I should go into small details, because every transport must be organized according to circumstances, the golden rule being to have a well-considered plan laid down from the beginning, which shall provide for the possibility of accident, and be capable of systematic development without confusion; the means of meeting all emergencies should be thought out and provided for beforehand, so that the general scheme may not have to be altered in any material point, hasty and ill-considered changes in a plan of transport being always dangerous.

We have seen how on the Nile the addition of an extra load to the boats retarded their progress, how the failure of the coal supply at Assouan stopped the flow of troops up the river, and how the absence of a reserve of camels at Korti crippled their movements at a critical moment.¹ All these things teach us that the organization of transport is a matter for careful study, and that it is just as essential to have a reserve of transport in the field, as it is to have a portion of your men in reserve when going into action. Another point which should be thoroughly understood is, that the load of a baggage animal ought to be under, not up to its full carrying powers, for you must leave your animals a reserve of strength, in case you may be forced to make an exceptional call on their powers of endurance.

General Brackenbury says that he found 300 lbs. was as heavy a load as camels in good condition could on the average carry for several days in succession.² The English camel tins were made in three sizes, to hold 12½, 10, and 8 gallons of water respectively, and it was originally intended that the strongest camels should carry four 12½-gallon tins, those of medium strength four 10-gallon tins, and the weakest four 8-gallon tins; but it was found practically that it was unsafe to load a Berbera camel with even as much as four 8-gallon tins on a long march, and that any attempt to proportion the loads to the capabilities of each individual camel was productive of enormous delay, when loading had to be got through rapidly and in semi-darkness. Moreover, it made it impossible to lay out the loads beforehand, because it does not answer to separate camels from their

¹ Sir C. Wilson says: "From the Emir of Berber's letter, it is evident that the concentration of Arabs to fight us at Abou Klea took place after, and was consequent upon, Stewart's occupation of Gakdul; so that, if he had gone straight across, as at one time intended, he would have met with no opposition in the desert, and probably not much at Matammeh. The original plan had to be given up for want of transport."

² "River Column," p. 41.

companions, to classify them as strong, medium, or weak; for they will always try to get back to the camel they are accustomed to follow, and, by so doing, throw the convoy into confusion.

Camel tins should be all of the same size, and the only practical rule is to make the heaviest load the weakest camel can carry, the average for the whole; for by this means alone can the chance of camels getting wrong loads be avoided, and breakdowns and delays secured against. If any camels are much stronger than the others, they will be available to take up the loads of exhausted animals, but as delay is always dangerous, it is better to provide 5 per cent. of unladen camels for this special purpose.

Two 12½-gallon tins, when full, weigh about 316½ lbs., to which must be added the weight of the camel saddle, and the forage, which on a water convoy each camel should carry for its own consumption, as it keeps the tins cool and helps to support the camels on the march. I am of opinion that if the capacity of the pattern camel tin was fixed at 15 gallons, two of them would make a fair average load for a camel of ordinary strength; I say this because it was found that the camels were able to support the weight of two 15-gallon casks well; but wooden casks proved most unsuited to camel transport, as they are cumbersome and difficult to load, quickly shrink and become unservicable when partly empty, and when new, the tannin from the wood mixing with the rust in water pumped out of an iron reservoir, often turns the contents into the colour of ink.

India-rubber bags, which were also tried, caused much complaint from the taste they imparted to the water; this would probably have passed off, and for mounted troops they are excellent, but for ordinary transport they had the defect that they were not strong enough to bear the jostling of camels against one another, while they offered too great a temptation to the drivers to prick them and steal the water. The same remarks apply to water skins. Two 8-gallon tins on mules answered fairly well, but were not economical, as mules require at least 2 gallons of water a day each, and should be given more when possible.

The last, and, in my opinion, the best means of transporting water, when it is desired to perform rapid marches in a country like that round Suakin, which is fairly suited to wheel traffic, is the ordinary regimental water-cart, holding 108 gallons, and drawn by two mules. On the marches to Hasheen, Tamai, Handoub, &c., I noticed some of the regimental water-carts, which answered admirably. 100 such carts can carry 10,800 gallons of water, that is 10,000 gallons for the troops and two days' supply for the mules, should other water not be available. Water kept in carts remains sweeter than in the camel tins, which soon get heated right through, and it can be more easily and economically distributed at the halt, if the carts are fitted with several small taps, as they always should be, to enable the men to fill their bottles without waste. The escort for a water-cart convoy may be much smaller than that which would be necessary to protect the 420 camels and 210 drivers which make up a camel convoy carrying 10,000 gallons of water. No non-combatants need be employed,

because the drivers should be armed transport men who, at the first signal of danger, would range their carts in two rows, wheel to wheel, with the mules facing inwards and the backs of the carts outwards; a kind of laager which can be rapidly formed and easily defended against a savage attack.

All these advantages point to the conclusion that a convoy of this kind would be very useful in a country like the Eastern Soudan, when it is desired to provide water for troops making rapid marches from one point to another of not more than two days' duration. In fact I had obtained permission to equip fifty carts on this principle when the order arrived to suspend active operations. Compressed forage for the mules was to have been carried in light two-wheel carts, each provided with an 8-gallon bag of water for its own mules. When mules are not available, I think camels might be employed with advantage for draught purposes; General Gordon used them for drawing guns in Darfur, and in Turkey they are used for ploughing. I believe they can draw several times the load they can carry, and experiments should be made in Egypt, both as to their powers as draught animals and the best form of light two-wheel camel cart and harness. Wherever guns can go, as a rule a light cart can follow, and if one camel can draw in a cart the load it would take three camels to carry, a great saving would be effected.

Whatever class of transport is employed, simplicity of organization should be aimed at, for any complicated system adds greatly to the risk of failure. As far as possible, one class of transport should be used, and complete uniformity observed in the laws by which it is governed. Thus, if camels be principally employed, every transport company should strictly observe the same rules for feeding, loading, and drilling the camels, regulating the discipline and number of the drivers, &c., in order that the whole machine may work uniformly in each joint, and every link in the chain of transport be interchangeable without confusion or disorder, arising from portions of one transport company being brought to work with those of another organized on a different principle. As camels readily acquire a certain proficiency in drill, and are essentially creatures of method, they should be taught to move in column, load up, and unload, on a uniform system, so that the convoys may be under perfect control, and valuable time saved by every camel and driver knowing exactly what he has to do.

If a mixed transport of camels and mules be employed, it is best to give the mules a distinct organization, and tell off special Officers to form a mule transport train, who will have nothing to do with the camels. If boats are employed, it should be settled beforehand whether they are to move by companies, wings, or battalions, a small unit under thorough control being always the best, as the whole mass can then be broken up or joined together without confusion, as circumstances may require. Indeed, this is the principle of all drill, and applies as much to transport as it does to men.

Every battalion of infantry should have a certain proportion of its Officers and men trained to transport duty, so that it may be able at

once to organize an efficient regimental transport on being supplied with the necessary animals and equipment; this will secure to each battalion individual mobility, and leave the transport proper free to direct its whole energies to keeping up the flow of supplies from the base.

The best means for the protection of transport in the field in savage warfare, where convoys are a favourite object of attack, is a question which presents some difficulty, and requires a technical knowledge of transport to be properly dealt with, as the conditions are always varying according to the nature of the transport employed. Officers engaged either in protecting convoys or surprising those of the enemy will, therefore, find a previous transport training of great use to them; and I think schools of transport should be formed at our principal military centres, where regimental Officers could attend for a short course.

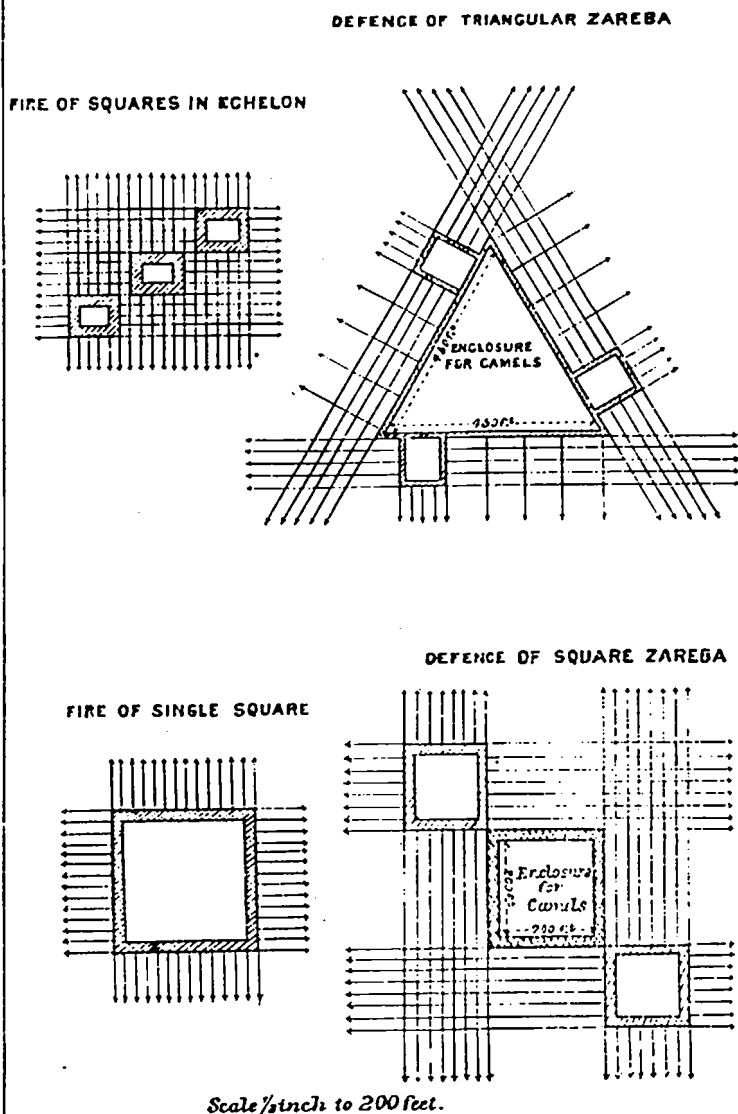
In the Eastern Soudan our transport columns were usually enclosed in an infantry square when attack was anticipated. In fact during the earlier part of the operations at Suakin they nearly always marched in these squares, but this formation has the disadvantage that it uses a great number of men, and makes progress very slow and painful, while the breaking away of some of the transport animals, through bad driving or panic, may prove a source of grave danger to the integrity of the square.

I think it might be accepted as a principle that it is better to run the risk of losing a small portion of your transport than to endanger the safety of the whole force by crowding an unwieldy convoy in the midst of troops advancing in the face of an enemy, and that some other plan should be devised.

If we take the square formation as the only one that affords sufficient protection to infantry against the rapid movements of a savage adversary in vastly superior numbers, it is probable a large convoy might be sufficiently protected without being enclosed, if its escort were to consist of three small squares of four companies each, moving either in echelon, or such other order as the nature of the country and the position of the enemy rendered advisable. These squares would be like the pawns on a chess board, and act either independently or in conjunction, forming a chain of defence for the convoy. They would consist of only four companies each, so as to be easily managed, and they would have no transport animals enclosed in them save those absolutely necessary for their ammunition, water-cart, and ambulance.

The principle would be that one square should be always free to engage the enemy, while the other two formed the defence of the convoy.

A convoy halted for the night is in a different position to when it is on the march: the troops escorting it are all available for its defence, and it is only necessary to construct a zareba of such a form that a large enclosure can be thoroughly protected by the fire of a limited number of men; but on the march the conditions are different, for not only must you be able to put the convoy rapidly in a defensive



position, but you should be prepared to engage the enemy and drive him away. Premising, therefore, that it is always best when marching through bush to send a pioneer square on in advance to burn or clear a road for the convoy, the order of the march should be somewhat as follows. The mounted troops well pushed forward scout in a large semicircle, followed by the pioneer or fighting square, some distance in rear of which marches the convoy, escorted by the eight companies forming the other two squares, either half in front and half in rear, or moving in square on either flank of it, according to the nature of the country.

On the first signal of alarm from the scouts, the convoy is halted and the camels tied down in regular rows close together so as to form a parallelogram, at the reverse angles of which the escort squares station themselves so as to enfilade its four sides. The leading square then engages the enemy and endeavours to disperse him, the mounted troops retiring round it leaving its fire clear, and holding themselves in readiness near the convoy to check any attempt of small parties of the enemy to run past and attack it in flank.

There is practically no danger of an infantry square of manageable size being broken by a savage charge, if it is unencumbered by guns or transport. A half-battalion of the Berkshire Regiment, which was outside the zareba at Tofrek, did not lose a single man though repeatedly charged, simply because there was no internal element to disturb its formation, and the fire of the breech-loader formed a protecting zone beyond which no man could pass and live. When we have a magazine rifle, it will mean total destruction to an enemy who attempts to charge a square of this kind. I think, therefore, for savage warfare, our troops should be trained to move in the square of four companies over rough ground, and to fire by word of command alone, all independent firing being strictly prohibited.

Each battalion of infantry on a war footing would be able to put two of these squares in the field, and have two companies free for other duty.

The advantage of making the half-battalion the fighting unit and moving in echelon of squares is, that this formation leaves only two exposed angles while its centre is covered by a cross fire. Whereas with the single square no cross fire is obtainable, and there are four exposed angles, always the weak point of a square formation: this will be easily seen from the diagram (see Plate) showing the lines of direct fire in the formations I am speaking of.

Again, if a zareba is made of a triangular form and defended by three small squares, a cross fire can be obtained at every point, if the rear companies of the squares resting on the zareba are utilized to line its sides. Whereas in the usual form of zareba, which is a parallelogram defended by two squares, no companies are available for this purpose, while there are six exposed angles and only two angles are covered by a cross fire. I should, therefore, suggest the adoption of the triangular form, for zarebas intended to protect transport animals at night when attack may be expected from any direction. It will be easier to construct three lines than four, and the system I have

advocated of dividing the troops escorting convoys on the march into three fighting units is eminently adapted to the defence of this class of enclosure, when they are at the halt.

Colonel CLIFFORD WALTON, C.B.: Ladies and gentlemen, that you may understand why I presume to offer you any criticisms upon the lecture, I may mention that I was Director of Transport in one of the wars to which my friend Major de Cosson has referred in his very able lecture, and from which wars he evidently derived a good deal of his experiences. It is from personal experience that any lecturer's opinions derive their value, and I fear that while the lecturer has touched upon many executive details of which he has experimental knowledge, and has given us therefore very valuable opinions upon them, he has also touched upon some very fine points of administrative organization of which in the very nature of things he cannot yet have had a personal experience; so that I think my friend will pardon me if I venture to disagree with him on these points as much as I thoroughly agree with him on the other points. He repeated what had become quite a cuckoo cry among many who have not had personal experience, that the supply and transport should be disintegrated. I can quite understand that to those who have not that experimental knowledge of the subject it is very difficult to understand why they should have such an intimate connection with one another. But the subject is a very large one and cannot be dealt with in anything like ten minutes. I must, therefore, content myself by merely recording, and most emphatically, my own humble opinion as a Director of Transport in three wars, and having also experimental knowledge of the duties of a Commissary-General in the field, that any such disintegration would be most unwise and, in my opinion, most harassing. Such a separation appears to me to be more unnecessary now than ever, because an amalgamation is evidently about to take place (judging by certain orders which have been issued, and which have appeared in the newspapers) between the Commissary-General's and the Quartermaster-General's Departments. If that amalgamation takes place, it appears to me to cut the ground from under the very last argument for such a separation. The grand object, as I take it, of such an amalgamation is to simplify and expedite warlike operations by concentrating the field administration under one direction; and to concentrate with one hand and separate with the other, seems to me to stultify the reforms that are advocated by the highest authorities. My own experience is that centralization of direction and responsibility generally signifies a desire for the efficiency and economy of the public service; while these separations and divisions too often arise from conflicting personal or corporate interests, and I think they tend generally rather to the advancement of individuals, what may be termed finding billets for individuals, than to any improvement in the efficiency of the public service. The separation in question has long been a moot subject in India, and I believe the best authorities in India have come to the conclusion that such separation is not only unwise, but impossible. It is a very important point, and is referred to by the lecturer in the beginning of his paper with great emphasis. He also seems to be of opinion that it is rather detrimental than otherwise to the supply and transport Officers respectively to possess an experimental acquaintance with each other's duties and responsibilities. I am of a diametrically opposite opinion, for my invariable experience has been that the utility of the commissariat and transport Officer who has been trained solely in transport duties, and has not yet acquired a knowledge of supply duties, is exceedingly impaired as a transport Officer. I think the Commissary-General who takes the field without the unquestioned direction of all transport will run a very great risk of failure through circumstances over which he himself will have no control, and that is a position in which no man should be placed. The lecturer spoke as if there was some antagonism between the functions of a field administrative staff Officer and an Officer of the Quartermaster-General's Department; and as if there were some mysterious reason why a transport Officer should be a strategical Officer and a supply Officer the reverse. I have been both, and I must confess that I do not see it. I would contend that no man can really be a good Commissary-General without being a good strategist, and that his utility is generally very greatly impaired if he is no

strategist at all, and that no man can be a good General or a good strategist without being a good Commissary-General. But I quite agree with the lecturer in what he says. He made a remark—an extremely apposite one at the present time—but I think it applies equally to the supply Officer as well as to the transport Officer. He says that the transport Officer "should hold combatant rank so as to be fully qualified to speak with authority in the military councils of his colleagues, and bring his transport experience to bear on all questions relating to the mutual safety of the convoys and the troops." There I agree with him; that I think is the crucial fault of the existing system, but the subject is far too wide to enter upon now. However, I would venture to assert most fearlessly that it is not your system of administrative organization that has carried you successfully through recent wars, but so far as the vital points of supply and transport are concerned, your commissariat transport Officers who have carried you through in spite of your vicious system. The strategical advice of these Officers has been taken and acted upon, but without public acknowledgment. They have had their weight in the military councils, but the black pall of prejudice, jealousy, and ignorance has been suffered to obscure this fact from public view. I could adduce some startling exemplifications of what I say, were this the time and place. This is a matter of public policy and not of personal feeling. It is simply that people do not know, and this state of things ought not to be. There is a great deal else in the valuable lecture that we have heard to call for remark, and I hope that some day there may be a full meeting here and such a lecture given as will open up the whole subject, and I hope it may be then exhaustively discussed.

Lieutenant F. S. COPEMAN: I did not wish to say anything now upon the most interesting lecture we have heard, because I hope to be allowed presently to occupy a short time in describing my improved transport equipment; but I should like to point out that it has always appeared to civilians from the reports which have come to us from the Soudan and Egypt (and this has been confirmed to-day by what Major de Cosson has told us), that the transport difficulties of crossing the desert from Suakin to Berber were infinitesimal compared with the difficulties which have arisen in the longer transport up the Nile. I think one of these days it will be settled in the minds of all military men that a mistake was committed in sending the troops up the Nile instead of taking the shorter and easier route of an eight days' journey across the desert to Berber. It has been particularly interesting to me personally to hear described the method of water transport in vogue during the expedition, especially to hear that Major de Cosson recommended the use of mule-carts and camel-carts instead of carrying the water on camel-back. He did not say whether in the course of his experience at Suakin he found any camels being used for draught purposes, but I have reason to know that some carts were sent out by the authorities who constructed the railway, the harness being made in England at the Army and Navy Stores, and two-wheeled carts built expressly for the purpose of camel transport. It would be very interesting to me if he would tell us whether any of these came under his notice during the time he was out there. I fully believe that with very little difficulty camels can be made most useful for conveying stores in a two-wheeled cart. I have had very little personal experience, but I have had occasion to try two camels at the Wellington Barracks that had never been harnessed before in a cart which was afterwards sent out to Suakin. The first thing that happened was they both lay down on the ground. I fed them for a minute or two with beans, and when I once got them on their legs and made a start, there was no difficulty in keeping them going at their work. The next time they were put into harness they went off like old soldiers.

The CHAIRMAN (Lord Chelmsford): It is now my duty to rise and ask you to give a hearty vote of thanks to the lecturer for the very interesting paper which he has given to us on a subject which is of the highest importance to the British Army. There can be no question, more especially in the wars that we have had against savage nations, that almost the sole difficulty of the campaign lies in the transport—in carrying the supplies, and in feeding the troops. The fighting, as Major de Cosson has said, is generally a very simple matter indeed, and it would be really a disgrace to us if, with the modern appliances that we have in the shape of arms, organization, and discipline, we found any difficulty in meeting a large and over-

whelming savage force, and giving a very good account of it. But the transport difficulty is the main thing, and it is more complicated because we cannot absolutely buy our experience in times of peace. Every country we go into differs in its transport, and the transport itself, even though of the same description, differs very materially. Of course our Indian experience has given us a complete knowledge of the camel, and I can speak from personal experience as to how very ticklish such transport is. A camel requires very careful treatment indeed; it is very apt to lie down and die at the critical moment, unless it is taken very great care of. In the Soudan, the camel was apparently a very much weaker animal, as far as carrying-power is concerned, than those we have in India, and one of the difficulties on that march across the desert was owing to the fact that the camel could only carry one man. The camel corps in India has always been on the principle of two men to a camel, and during the Mutiny Campaign an armed native rode with the soldier and looked after the camel at the end of the day's march. When the British soldier rides his camel singly, and is expected to look after his animal, it creates a special difficulty, and an annoying duty, and one which they could not be expected to perform in a manner which the camel himself, at all events, had a right to expect. The consequent loss of camels was enormous, and it was only what was to be expected. Now as regards the transport up the Nile, we know that it was very carefully thought out, and the boats which were placed upon the Nile were certainly of the most perfect description for the duty they had to perform, and appear to have fulfilled all the expectations of those who so carefully designed them. I do not wish to enter here into a discussion as to whether the river was the right line to adopt. That is a question which opens out into a vast strategical discussion, for which this time and place certainly would not be suitable. All we can do here is to verify the fact that the transport for that particular line was admirably adapted for the duty which it had to perform. The lecturer has alluded to that new invention saccharine, which is apparently sugar in a very concentrated form. I have no doubt, as he suggests, that it will be employed very largely, if not altogether, in substitution of sugar in future campaigns. We have always tried on a campaign to get articles compressed into as small a bulk as possible, and this appears to be only another move in the right direction. With regard to the lecturer's advocacy of the line from Suakin to Berber, there is no doubt that Major de Cosson's personal experience shows that the distance was covered by him in about eight or eight and a-half days. Such a march seems very easy, and it looks as if that line of course ought to have been adopted. It is one thing, however, to march as a single traveller, and another thing to march with a large force which has to be fed, and which has to protect itself. I cannot quite make out from the lecturer how that telescopic arrangement would apply to the march from Suakin to Berber, because it must necessarily entail the placing of small posts at different distances along the line. The total distance was about 210 miles, and the stations would have to be about 10 miles apart. There would thus be about twenty-four different posts, and the supplies would move from post to post, and gradually arrive at their destination. In theory that sounds very practical and easy. Nobody, however, who has had command of troops in the field but will appreciate the very uncomfortable feeling that exists in a Commander's breast when a number of troops along a long line of communications have to be left to look after themselves with regard to the safety of their respective posts, and to the food supply, not only for themselves, but also for the main body who are in advance. We had that responsibility in Abyssinia, but then we were marching through a friendly country; the people assisted us, and there was no risk or danger of any attack on the posts. But knowing the daring and determined fighting qualities of the Arab, it would have been certainly a time of very great anxiety not only for the Commander-in-Chief, but also for the commanders of each of the separate posts, if they had been placed along that line, having to trust for their food to the rear, and having to trust for their safety to the small body of men which could be left in charge. This question, however, opens out a very large field of discussion, and a great deal has been already written and said about it. I will not therefore say more on the subject. I could not, however, allow the lecturer's rather positive assertion that that was the right line to adopt to pass without comment. The lecturer may be right, but at the same time

there must have been very strong reasons to the contrary, otherwise such a short line of 210 miles would certainly have been taken in preference to one which was over 2,000 miles. With regard to the remarks of Colonel Walton, I go a long way with him. I have always felt that the Commissariat Department is the most important department of an army in the field, and the General Officer Commanding must look to it as the one which, if successfully managed, will most probably gain him success; but if badly conducted will undoubtedly lead to failure in the campaign. The military authorities have now for some years been trying to improve the Commissariat Department. I am not going to discuss the merits or demerits of those changes; but all I wish to state, and to state emphatically, is that every means should be taken to make the Commissariat Department as efficient as possible. As to the separation of transport from commissariat, that is a question which, as Colonel Walton says, would take very many days to discuss. There are advantages on both sides, no doubt. In the first place the commissariat Officer says, "If you do not give me the transport how can you expect me to get supplies? I shall be dependent upon some other Officer, who may be able to throw in my teeth other duties which that transport has to perform quite as important as my demands, and he may pool-pool my idea that there is not enough food-stuff on ahead." In that way, of course, the commissariat is rather heavily handicapped if they have not thorough control of the transport arrangements. On the other hand the commissariat Officer has as much work as he can very well get through in looking after his legitimated duties, and if you can relieve him, without injury to the department, of the duty of looking after a large number of very troublesome animals, you relieve him to a great extent of an onerous duty. But there again there are strong arguments on both sides, and it can only rest with the authorities who have the power to settle these matters to decide which is right and which is wrong. I trust I may be enabled now to convey your very sincere thanks to Major de Cosson for a lecture which I am quite sure, when it is studied and read in the Journal, will be found to be a very valuable addition to the military literature of that interesting campaign in the Soudan and on the Nile.

Major de Cosson: Lord Chelmsford, ladies and gentlemen, I thank you for the very kind way in which you have listened to my paper. Lord Chelmsford has so ably replied to the remarks that Colonel Walton made that he has left me practically nothing to say on the subject, except that of course I quite agree it is one which ought to be fully discussed, and on which personally I have little practical experience. I can only quote Lord Wolseley's opinion to show that I am not alone in advancing these views. He says: "In my opinion the result of all our war experience for the last thirty years goes to prove that it is a fatal mistake to take the transport of an army under the Commissariat Department. The transport to be efficient must have a perfect military organization, and it cannot succeed when under charge and command of a civil department of the Army." As Colonel Walton truly said, a good Commissary-General ought to be a good General and strategist, and a good General ought to have a thorough knowledge of commissariat and transport requirements, so that their duties should be practically interchangeable. That is the only thing I can suggest. As I have said, I have little personal experience on the subject myself, and must leave it to others to decide what is best to be done in the matter. But it is a question which I think is distinctly worth raising, and therefore I gave it a brief notice in my paper. With regard to Lieutenant Copeman's question, whether there were any camels employed for draught purposes at Suakin, I may say I never saw any camels used for that purpose, and I should have been very glad if I had, because I was very anxious to try the experiment. I think there is nothing more I can say except to thank Lord Chelmsford for the kind way in which he has acted as Chairman, and to thank you for having listened to me.

Lord CHELMSFORD: With regard to this question about camels, I meant to have stated that in India I have seen camels drawing private carriages most efficiently.