

Second report of the Committee appointed to enquire into the effect of the present system of knapsacks and accoutrements on the health of the infantry soldier.

Contributors

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SECOND REPORT
OF THE
COMMITTEE APPOINTED TO INQUIRE INTO
THE
EFFECT OF THE PRESENT SYSTEM OF ACCOUTREMENTS
AND KNAPSACKS
ON
THE HEALTH OF THE INFANTRY SOLDIER.

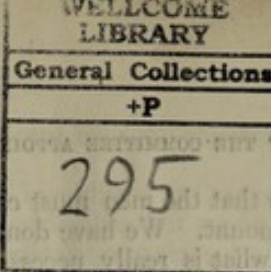


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Second Report of the Committee appointed to Inquire into the Effect of the present System of Accoutrements and Knapsacks on the Health of the Infantry Soldier.

To the Right Honourable the SECRETARY of STATE for WAR.

SIR,

IN our first report on the effect produced on the health of the infantry soldier by the present system of carrying the ammunition and kit we showed that serious injury to health and considerable inconvenience and discomfort are produced by the present regulation system. We advised that a change should be made, and that experiments should be instituted to determine the best arrangement. After examining the plans in use in the armies of Europe and America, and a great number of others proposed by different inventors, we selected four systems for trial, viz.,—

1. A plan devised by Colonel Sir T. Troubridge, Bart.
2. A plan devised by Lieut.-Colonel Carter.
3. The Prussian regulation system.
4. A modification of the Prussian system arranged by ourselves.

We have already reported to you that on trial in London by the Grenadier Guards, at Aldershot, and at Colchester, defects were found in all these plans, and the reports of the trials already furnished, and which are given in the appendix, will prove that some other arrangement had to be sought.

As soon as we learnt that these four systems were unlikely to meet with approval, we recommenced the consideration of the question. In the meantime events had occurred which had an important bearing on our conclusions.

In the first place the Bohemian and Italian campaigns of 1866 had again shown how necessary it is not to overload the infantry soldier. Even the Prussian knapsack, the best in Europe, did not answer the expectations conceived of it. We need not discuss a matter notorious to all the world, but may state without fear of dispute that the conditions of modern war demand that the marching powers and endurance of the soldier must not be lessened by unnecessary weight or by a defective mode of carrying *the weight*. *Cæteris paribus* the army that is least weighted and that can move with the greatest rapidity must have the advantage.

In the second place the introduction of the breech-loading system, and the rapidity of fire that can be thereby obtained, has rendered it most desirable to supply to each man a larger quantity of ammunition. But ammunition is very heavy, and thus the two requirements of lessening weight and increasing supply of ammunition are in direct opposition.

Under these circumstances it has been supposed by some that the difficulty might be solved by doing away with the soldier's kit in time of war; that is to say, either by leaving him entirely without a kit while on active service or by carrying it for him.

We are not able to agree with either of these suggestions. To leave the soldier without some articles of his kit on active service would not only deprive him of comfort, but would be injurious to his health; while the attempt to carry his war kit for him would be simply impracticable nine times out of ten.

We need not point out the difficulty which an army under any circumstances in war time must experience in providing transport for its indispensable stores and its daily supplies of food, forage, ammunition, &c. It might, therefore, often be impossible to find conveyance for the field kits which would have to keep up with the troops. Suppose, however, that carts for carrying them *could* be provided and attached to regiments, it is obvious that in the countless uncertainties and difficulties of active war these carts might not always be able to keep up.

It is needless to enumerate the various contingencies that might occur to leave the troops without their kits at the moment when they might most need them. In short, it seems to us beyond all question that a man should himself carry the few articles of kit he really wants in the field, and no more.

Reference to first report.

Trials made of certain knapsacks.

Reconsideration of the question.

Ideas suggested by the German War.

Breech-loading system, and the quantity of ammunition required to be carried.

Public opinion respecting soldiers' equipment. Opinion of the Committee.

The question of carrying the field kits on carts.

Kit should be reduced to the smallest possible amount.

Although we thus conclude that the men must carry a war kit, we would reduce this kit to the smallest possible amount. We have done our best, by reference to both old and recent wars, to determine what is really necessary. We find an unanimous opinion that very little is wanted. We believe that the following articles would suffice :—

- 1 flannel shirt.
- 1 pair socks.
- 1 towel.
- 1 pair boots or shoes.
- 1 hold-all, with its usual contents, *or clasp knife, Comb & soap.*
- 1 soft forage cap without any stiffening or tuft.
- 1 brush.

Suggestions about the kit.

This differs from the present field kit only by not including trousers and blacking. We have omitted the trousers because they add much to the bulk and weight, and because it may reasonably be presumed that, in these days, protracted separation of the troops from their resources would be rare, at all events exceptional, and that, as a rule, they might fairly rely on having access to their regimental baggage or to the general stores from time to time, as well as on all occasions of lengthened halts; but under very exceptional circumstances, such as a complete separation from the army stores at a bad season of the year, it might be considered desirable that the soldier should carry a pair of trousers (of the summer woollen material) in his bag. The present regulation boots being very bulky as well as heavy, we suggest whether a pair of shoes in the bag might not suffice instead of the boots on service; indeed, we believe the men would often derive great comfort from the change, especially in warm weather and in camp.

Great injury done to the soldier by overweighting him.

Every day rapidity of military movements and facilities of transport and of telegraph communication are on the increase everywhere. All these are arguments against putting any avoidable weight upon the soldier's back; and we are of opinion that his efficiency and health suffer far more from his carrying too many things than from his occasional and temporary absence from any two or three articles of his kit.

The little use made of knapsacks in the German war.

Field kit can be scarcely too light.

After the late German war the special military correspondent of the *Times* with the Prussian army wrote that "the knapsacks were rarely looked into," and we received similar testimony respecting the Austrians and their knapsacks; but that war was too short and too peculiar in its character to prove that soldiers on active service can dispense with a certain light field kit. We repeat, however, that it can scarcely be made too light.

Provision made for sufficient ammunition.

With regard to the ammunition, while we think that on ordinary occasions during war only 60 rounds should be carried, provision should be made for the possibility of carrying about 90 rounds on an emergency, such as the chance of an immediate action.

A wholly new system proposed.

We have now the pleasure of informing you that we believe we have devised a plan which will meet these requirements, and which is not only easy to the soldier and free from any possible medical objection, but has a smart, serviceable appearance. It certainly deviates considerably from the existing patterns; but we feel sure that its great practical advantages will soon cause any novelty of appearance to be overlooked. It has been tried by Colonel Tidy at Colchester and by General Hay at Hythe; but before we quote the opinions of these officers we shall describe fully the nature of our arrangements, and the reasons which led us to adopt them.

Keeping in view the conclusions we have already stated as to the kit and ammunition, we found we should have to provide for a total weight of about 20 to 23 pounds, irrespective of the apparatus itself, or of the rifle, haversack for provisions, water bottle, and blanket, viz. :—

Weight that a soldier must carry.	For the kit	-	-	-	-	6 to 7 lbs.
	For the great coat	-	-	-	-	6 lbs., nearly.
	Ammunition (90 rounds)	-	-	-	-	9 or 10 lbs.
	Canteen	-	-	-	-	1½ "
	Bayonet	-	-	-	-	1 "
Total						23 or 24 lbs.

On ordinary occasions the weight would be considerably less than this, as less ammunition would be carried.

Weight of proposed plan.

The weight of the apparatus for carrying all these has been reduced to about 4 lbs. 3 ounces, instead of 10 lbs. 2 ounces, the weight of the regulation pack and accoutrements.

Such a weight as the above (say 27 lbs.), in addition to the man's clothes (10 lbs.) and his rifle and sling (9½ lbs.), is no doubt considerable, but we do not see how to lessen it. It must however be borne in mind that on ordinary occasions during peace the men would only carry 20 rounds of ammunition, and probably during war seldom more than 60. This would lessen the weight in peace more than 6 lbs., and nearly 3 lbs. on ordinary occasions in war.

At best the weight is considerable.

In our first report we laid down the principles on which all weights must be carried, and we have endeavoured to follow them out.

The principles on which the weight should be carried by the soldier.

We are convinced that the best system for carrying the greater part of the burden is the yoke principle of Sir Thomas Troubridge, by which the weight is brought fairly on to the shoulder blades, where it can best be borne and is directly over the centre of gravity. We have accordingly adopted a yoke, making it of leather instead of metal, thus obviating any risk of breakage.

We have distributed the ammunition so as to diffuse the weight. In addition to the ease thus obtained there is another advantage. If 60, still more, if 80 rounds are carried in a single box or pouch there is not only the great inconvenience of concentrating weight (which no plan of carriage altogether removes), but when there is no necessity for carrying the full amount of ammunition the box is quite disproportioned to its small contents. During ordinary service, for example, the soldier only carries 20 rounds; supposing his pouch holds 60 or 90, he is burdened during peace with an unnecessary amount of apparatus. By having several pouches, on the other hand, one or more of these can be left off during peace, and the above objection removed.

Distribution of the weight.

We have found it necessary to place a large portion of the ammunition in front; this has been done not only to facilitate other arrangements, but because the breech-loading system necessitates front pouches to ensure rapidity of loading. We have avoided all the usual objections to front pouches by having two long narrow pouches made of soft black leather and meeting in front. Each of these holds 30 rounds. They project so little from the body as not to be in the way of the rifle, and being made of soft leather they take the curve of the body. They are carried, not by the waist belt, but by the yoke, and the weight is thus borne on the shoulders, and not by the ribs and stomach.

Arrangement for the ammunition.

A theoretical objection may at once be raised that these pouches will press on the stomach. Nothing can be more fallacious. They should scarcely touch the stomach, and should hang from the shoulders. It is quite true that no great weight of this kind can be carried in front on a waist belt; that would cause too much pressure, but when the yoke bears the weight the objection disappears.

No weight on the stomach.

The ease with which 60 rounds are carried in this way is remarkable. These two pouches are made exactly alike. During peace we propose that only one should be issued; this would be borne exactly in the centre in front, and be then supported by the yoke, or at pleasure it may be traversed to the right side, or worn behind when the kit is not carried. When a regiment is called on active service a second pouch (a supply of which would be in store) would be issued, and as no other addition is necessary a few minutes would see a regiment supplied with its war equipment.

Only one pouch to be used in peace, two in war, and mode of carrying them.

In addition to these pouches, containing 30 rounds each in packets of 10, a small bag to contain 10 loose rounds is proposed by General Hay to be worn on the right side, and in addition we have placed two small pouches, each to contain 10 rounds, on the bag which carries the kit.

Extra accommodation for ammunition if required.

Thus the amount of ammunition that can be carried by the soldier in war is:—

In two front pouches	-	-	-	-	60 rounds.
In kit bag pockets	-	-	-	-	20 "
*In expense bag	-	-	-	-	10 "
					<hr/>
					90 "
					<hr/>

The amount of ammunition carried in war and in peace.

On all ordinary occasions, however, during peace no ammunition would be carried in the kit bag pockets or in the expense bag. In fact, only one pouch with 20 rounds would be used, and even in war it is presumed that generally no ammunition would be carried in the loose cartridge or kit bag pouches; they would be reserved for days of action, and be filled at the proper moment.

We are perfectly satisfied with the ease of this arrangement, and are convinced that no injury can be done to the men, even if they were called on to carry this large number

The ease and advantages of this plan.

* We think it may be worthy of consideration whether on active service, a pocket below the waist belt in the man's tunic might not with advantage be adopted for his loose cartridges, thus avoiding an extra article of equipment.

of 90 rounds for long distances. But we again repeat that our object is not to load the men on all occasions with so great a weight, but merely to provide the means for carrying it on emergency.

Insurmountable objections to the framed knapsack.

Free action of the lungs and limbs impossible with it.

A yoke bag proposed.

We now come to the question of carrying the kit. We have found ourselves obliged to abandon the framed knapsack. The frame gives an appearance of neatness, but at the expense of increasing the weight and of rendering it impossible to fix the knapsack with that degree of comfort that is essential to the soldier's health and efficiency. In fact we find that the object we have all along had in view is not to be reached with the framed knapsack. Not only to secure perfect expansion of the lungs, but to allow free action to the great muscles of the shoulder and back (action so necessary in the use of the rifle and in the bayonet exercise), it is necessary to remove the stiff framed knapsack from the back.

The more we considered this point the more we became convinced that the true plan is to place the kit low down, so as to leave the freest action to the muscles moving the neck, shoulders, and shoulder blades. After various trials we have accordingly adopted a bag which holds easily the kit we propose, and will, in fact, on emergency hold the full field kit. On the outside of the bag (as already stated) two pouches have been placed for additional ammunition. The plan, as far as the yoke is concerned, is identical in principle with the valise proposed some years ago by Sir Thomas Trounbridge, and in fact we have closely trodden in his footsteps, although we have largely altered all the details.

How the weight should be distributed.

The weight of the bag is distributed in no less than three directions. By means of straps passing to studs fixed on the yoke strap in front and to the yoke at the back of the neck its chief weight is brought on the yoke. It rests, secondly, in part on the sacrum, a strong connecting bone of the hips, and at pleasure it may almost be carried there to relieve any pressure of the yoke. It is also strapped to the waist belt in front, and is thus partly borne by the belt, partly by the yoke.

Carried with great ease.

If filled with only the articles we have named we are confident that no man would feel distressed or tempted to throw away his kit, even in the heat of action. It contains all a soldier can want in war time, and at the expense of a slightly increased weight he might carry in it a portion of his food.

Suggested that surplus articles be carried in squad bags as at present. Great coat, &c.

During peace we would also advise that he should not carry more than the above-mentioned articles except on special occasions; and that the remainder of his kit should be carried for him in accordance with the present system of squad bags.

The balance system of great value.

We have not yet spoken of the great coat and canteen. We have placed the great coat folded on the back, and attached it to the yoke by a strap, which will also carry the canteen.

One advantage of the system we have proposed is that when the two front pouches are full of ammunition the principle of balance is brought into play, and a considerable increase of weight can be carried behind.

We have already stated that Colonel Tidy at Colchester, and subsequently General Hay at Hythe, have practically tried this system.

They report as follows:—

MY DEAR GENERAL,

Colchester, March 1st, 1867.

THE yoke bag had not been here a week before I became aware that a solution was at hand of how to ease the soldier's burthen, and relieve him from a great danger of which he was entirely unaware.

After several trials I requested the commanding officer of the 4th battalion to make a longer march than usual, and on its return to camp I questioned a soldier who carried the experimental pack closely. His answers were very satisfactory,—“I can not only march with ease, sir, but I can run and jump with this pack.” I put it on myself and found it very easy of carriage; and I very sincerely hope that it may replace the present pack, for which, to my own personal knowledge, we have been trying for nearly 40 years to find a substitute. I was met here by remarks (theoretical) of those who do not carry packs, that it would never do, it was not like a British knapsack, it was too low on the back, &c. I am only too glad to find that such prejudices are likely to be overcome, and that I may yet live to see the soldier carrying his kit in a way that is not dangerous to his vital functions. All honour to the man who first thought of the plan.

Believe me,

My dear General,

Most truly yours,

T. H. TIDY.

General Eyre.

MEMORANDUM on the subject of the YOKE BAG sent to me by MAJOR-GENERAL EYRE for trial.

SEVERAL weeks trial of the comparative merits of the yoke bag and the present knapsack, pouch belt, and pouch, have most fully confirmed the opinion I at once formed of its value the day I first saw it.

The advantages are so various and striking that I am much surprised they have not long since forced themselves on our attention; the importance of the subject as regards the efficiency of our infantry in the field can hardly be over estimated.

I have allowed the yoke bag to remain in the barrack room to be tried by any soldier who wished to put it on. Many of the sergeants of the staff of this establishment—men who have for years been invited and encouraged to reason and think for themselves—have also tried it; both sergeants and privates are unanimous in its favour, and speak in the strongest terms of the comparative ease and comfort it affords. Sergeants have worn it several days at position drill.

The perfect freedom given to the arms and shoulder blades, the absence of pressure from pouch belt, and the admirable principle by which the weight is suspended are peculiarly apparent in this drill. The shooting, both individually and in platoon firing, must be improved by its adoption. The pouches are not in the way of the loading, which should be effected from a bag or expense pouch which I have recommended, and which should hang like a pocket from the waist belt or right side. The arrangement of the pouches and pocket in bag, together with this expense bag, admit of 90 rounds of ammunition being easily carried.

A sergeant who has worn the bag for several days at drill declared to me that he would rather drill in the yoke bag with full light marching order kit in it than in the present knapsack without said kit, and this I can quite understand.

There is ample room at each side of bag (inside) to carry a small oil bottle and cleaning rags, jag, &c.; the arrangements to carry a canteen and water bottle require some consideration, but there can be no difficulty in effecting this. The canteen and water bottle, particularly the latter, which appears to me to be too heavy, are of the worst possible shape, require alteration.

I consider the waterproof capote* which was sent with the bag would be of great advantage on service; it is light, and would keep both great coat and blanket dry, and in heavy rain would be valuable to wear or to lie down on.

The advantages possessed by this yoke bag, with its pouches, &c., are so manifest as affecting the comfort and efficiency of the infantry soldier on service, that I venture to hope a practical trial of it on an extended scale may be authorized.

C. HAY,
Lieutenant-General.

School of Musketry, Hythe,
1st March 1867.

N.B.—The yoke bag, with pouches, &c. complete, with light marching order kit, weighs 6 lbs. less than the present knapsack with pouch belt and pouch with same kit.

C. H.

We have not yet settled how the havresack can be best carried; we consider the present plan objectionable, as the strap crossing the chest somewhat impedes respiration. We believe that if made a little smaller the havresack might be suspended from the waist belt; or possibly good pockets in the front of the tunic in time of war might do away with the necessity of the havresack. Havresack.

The present water bottle is objectionable in every way; it is heavy and very inconvenient; a better contrivance ought to be substituted. Water bottle.

Believing that (subject to minor alterations in detail) we have succeeded in finding a serviceable, easy, and, as far as health is concerned, an unobjectionable mode of carrying the field kit, great coat, canteen, and ammunition, a question arises as to material.

We have employed good black bridle leather for the yoke, as we fear that buff would yield too much after rain. For the pouch we have also used good soft bridle leather, and for the bag enamelled leather. The straps are also all black. The question of material is, however, one which can be hereafter considered. The advantage of black leather is that it can be well dyed from time to time at small expense, and thus the regiment is kept in uniform tint, which is not the case with the brown leather; and the inconveniences of buff, so great on service when pipeclay cannot be procured, are also avoided. Material.

* The capote alluded to by General Hay has not been forwarded, as we consider it a separate subject from the one before us.

Concluding
suggestions
about
making up
and fitting.

In conclusion, should our recommendations be approved of, and should any sets of the equipment be made up for use according to the pattern now submitted, we advise that only one pouch be given out, and that we be allowed to examine the first sets before they are distributed.

We shall be very happy to give Commanding Officers and others engaged in making the first trials, or afterwards, every assistance by explaining to them the manner of fitting the appointments and the reasons for everything in the proposed arrangements. When the accoutrements and bag have been once fitted to the man (which is done easily), he will have no further trouble, and can put them on and take them off without assistance.

"Field Com-
panion" of
the Medical
Department.

In addition to the Infantry equipment, a question was referred to us connected with the Army Hospital Corps. The serjeants of that corps carry in the field a box containing bandages, splints, medicines, and medical comforts. At present some difficulty is experienced in carrying these articles, in addition to the framed knapsack. Whenever the knapsack question is finally settled we think that the adaptation of the said field box may then be more usefully considered by experienced members of the Army Medical Department than by our Committee, at the same time we shall always be ready to consider any question respecting it to the best of our judgment, if required.

HENRY EYRE, Major-General, President.

T. G. LOGAN, Inspector-General of Hospitals.

R. RUMLEY, Major-General.

A. H. HORSFORD, Brigadier-General.

E. A. PARKES, M.D., F.R.S., Professor of Hygiène.

J. J. FREDERICK, *Secretary*.

War Office, March 16th, 1867.

APPENDIX.

Horse Guards, S.W.,
November 10, 1866.

Sir,

I AM desired by H.R.H. the Field-Marshal Commanding-in-Chief to transmit, for your information, the accompanying reports which have been received from the General officers commanding the brigade of Guards and the troops at Aldershot on the experimental Knapsacks, &c.

I have, &c.

Maj-General Eyre, W. PAULET, A. G.
President of the Committee
on Knapsacks, &c.

P.S.—The report of the officer commanding at Colchester has now been received and is enclosed.

REPORT on FOUR EXPERIMENTAL KNAPSACKS and ACCOUTREMENTS issued to the GRENADEER GUARDS.

On the 9th June four different descriptions of knapsacks, four of each description, were handed over to the 1st Battalion Grenadier Guards, in order that a trial should be made of their merits.

Sixteen men have worn these knapsacks, changing them with each other at fixed periods, so as to compare the merits of the various systems.

No. 1.

Is carried by means of a leather yoke upon the shoulder, and the front straps are attached to irons fitting round the waist so as to keep the pressure off the shoulders. The men complain that the yoke presses upon the neck, and that the pack, after long wearing, hangs away at the top, and therefore cuts into the lower part of the back. The irons are a defect, as if broken or lost on service it would be difficult to replace them.

The man's chest is left free, and the tunic may be thrown open without difficulty.

The mode of lengthening the waist belt, although it gets rid of the buckle, is not so simple or secure as the present method. The pouch, which is made to hold 40 rounds, is not well supported, and hangs heavily, but it is moveable, and can be slipped to one side when required. A small expanding pouch in front on the waistbelt can hold 10 rounds.

This knapsack is preferred to the regulation one.

No. 2.

Is carried by means of straps passing over the shoulders hooking to irons attached to the knapsack. In addition to the objection already made to irons, these are so fixed to the pack that they have become loose from wear, and do not support the pack at all, which therefore falls on the small of the back.

At the request of the wearers I have discontinued the use of these packs.

Colonel Carter has an improved system of fixing the irons by means of a nut and screw, which seems to make them firmer, but the nut is liable to be lost, and the pack thereby rendered useless.

The belts belonging to this pack are very good; they carry the pouch and bayonet easily, and are very simple. The pouch is a large one, as there is no front pouch.

The soldier is able to open it from the side and take his cartridges from it with ease.

The kettle is an improvement upon the present kettle, from the mode of fitting the tins.

During the time this pack was worn, before the irons gave way, it was preferred to the regulation pack.

No. 3.

Is the most popular with the men, who prefer it to all the others.

The shape of the pack fits the back; it is easily carried, the straps passing over the shoulders, and being attached to the waistbelt so as to prevent the pressure on the arm.

The specimens sent for trial are not made of the best leather; they are rather small for grenadier guardsmen, and being narrow, the straps are too close for men with thick necks; the mode of lengthening the waistbelt is not so good as the present, and the frog for the bayonet is fixed instead of sliding.

All these are defects that may be easily remedied.

There is a small space for ammunition at the top of the pack. If all the ammunition were carried in the pouches, this space thrown into the knapsack would make it large enough, or it might with advantage be made two inches wider.

The ammunition is carried in two front pouches, only one of which is carried on ordinary occasions, as the left pouch interferes with the movement of the rifle in our present drill.

These pouches might be expanding, and therefore take no room when empty. If the ammunition be removed from the pack, it must be placed in a third pouch behind, made something like No. 2 pouch, to open at the side.

The great coat is best carried rolled on the top of the pack.

No. 4.

Is the smallest of the packs, and does not appear to sit easily. The wearers prefer the other packs, and even the regulation pack, to this, which cannot contain their whole kit, and is uncomfortable to carry.

The wooden bar at the top presses against the back, and the small strap that passes under the arm cuts it worse than the regulation pack strap.

The straps leave the chest free, and permit the tunic to be opened, but they are somewhat complicated.

There is a pouch behind, and two in front, which, when full, are intended to balance each other, but as in ordinary cases only one-third of the ammunition is in a man's possession, the front pouches are empty, and the belt slips up, unless fitted inconveniently tight.

The pouch is not easily reached, and the ammunition not easily abstracted.

The knapsack cannot be taken off without all the belts being taken off at the same time, and it takes longer to put this pack on than any of the others, and requires assistance.

HENRY F. PONSONBY,

Major and Colonel-Commanding 1st Batt.
Grenadier Guards.

London, September 5, 1866.

I have inspected the four knapsacks on the men who have worn them, and spoken to them on the subject. They unanimously prefer their present knapsacks to any of the four experimental ones, and I fully agree with the men that none of them, as a whole, are superior to the knapsack now in use. It still remains to hit on some expedient to ease the pressure of the strap of the present knapsack under the arm.

(Signed) J. YORKE SCARLETT,
Lieut.-Gen. Commanding, Aldershot.

To the Adjutant-General,
Horse Guards, 1st November 1866.

North Camp, Aldershot,
October 11, 1866.

SIR,

I HAVE the honour to forward herewith the reports on the knapsacks which have been tried in Horse Guards Letter of 21st May 1866.—two regiments of the Clothing, &c. (S.S. 1862) C. 59. 3rd Brigade (together with the enclosures marginally noted.)

The Officer Commanding 71st Hd. Lt. Infantry founding his judgment on that of the men who have worn the packs, and from his own observations, has formed an opinion unfavourable to the four packs.

He condemns decidedly Nos. 1, 2, and 4.

The irons in patterns Nos. 1 and 2, "rub the clothing," "injure the stocks of the rifles," are easily lost, and the pack then becomes useless, "and the irons hurt the men's sides."

No. 4 is too cumbersome, and has far too many straps.

No. 3 Colonel Hope considers to be the least objectionable, but of this pattern the wearers report, "That it hurts them across the chest," "in small of back," "sides."

Colonel Hope advocates a lighter kit; the residue, if necessary, to be carried in waggons.

The Officer Commanding 89th Regiment reports that Nos. 1, 2, and 4 are undesirable.

Nos. 1 and 2, for reasons as given above by 71st Regiment.

No. 4. Too many straps.

No. 3 is the best, but requires alterations about the pouches and shoulder straps before it could be adopted.

I also enclose charges for alterations, repairs, &c. to the packs in question, and request the favour of their speedy settlement.

I have, &c.

(Signed) A. HORSFORD,
Brig.-General,
Commanding 3rd Brigade.

The Assist. Adj. General,
&c. &c. &c.
Head Quarters.

SIR, Aldershot, August 27, 1866.

I HAVE the honour to report, for the information of the Brigadier-General, that the experimental knapsacks and accoutrements issued to the regiment on the 4th June have been regularly in use since that time.

There are eight sets of accoutrements and eight knapsacks, of four patterns, and each set has changed hands four times.

I enclose the opinions of the men as noted from time to time. It will be perceived that they are not very favourable to any of the equipments.

While fully aware of the defects of the present regulation pattern knapsack and accoutrements, I am forced to concur in opinion with the men with little exception.

I do not approve of the knapsacks cut to the shape of the back as in patterns Nos. 1 and 2.

The straps and fastenings of No. 4 are objected to as too complicated and requiring assistance in putting them on.

The small pouches (as in pattern No. 4) are inconvenient in two things; they move about when the wearer is in motion, and they are in the way when performing the rifle exercise.

The large pouch of this set is extremely good, fitting as it does close to the body. I think small pouches might be made not of the same but of a similar pattern.

The irons (patterns Nos. 1 and 2) which passing under the arm are used for fastening the knapsack I consider very objectionable. They rub the clothing, injure the stocks of the rifles, and if lost on the line of march, there are no means of carrying the knapsack.

The men also complain of these irons as pressing their sides.

It appears to me worthy of consideration, whether it will not be necessary to reduce the load carried by the soldier, the less he carries the fresher he will come into action, and light carts could easily follow the regiment wherever it goes, conveying the men's kits.

Should such a system be adopted, a small sack, easily slung, would be sufficient to contain all that a soldier actually requires for daily use.

I have, &c.

(Signed) WM. HOPE,
Colonel Commanding 71st L. I.

The Major of Brigade,
3rd Brigade, Aldershot.

No. 1 Pattern.

1. Private JAMES SMITH.—Cuts the small of back, straps press on the top of shoulders, the irons press on sides. Would much sooner wear his own.

2. Private JAMES BROWN.—Very bad knapsack; cuts small of back and top of shoulder. Would sooner wear his own.

3. Serjeant ANDREW FIDDES.—Hard to carry; hurts him in small of back, the rods press against the side; the whole weight of ammunition in large pouch presses against the stomach.

4. Serjeant CHARLES MCPHAIL.—Hurts the small of back, no support for the ammunition pouch in rear. Would sooner carry his own.

5. Lance-Corporal HUTTON.—Hurts him in the small of back; whole weight of accoutrements lie on the stomach on account of back pouch lying so badly; the rods interfere with shouldering arms, and wears the clothing.

6. Corporal DUNCAN M'COWAN.—Likes the knapsack well; it would be easier if it was closer to the shoulders. The large pouch hangs badly in rear, too loose from the waist-belt; the iron rods wear the clothing, and interfere with the shouldering.

7. Private EDWARD PICKETT.—Straps hurt the shoulders, knapsack hurts the small of the back, the accoutrements uncomfortable, weight on the side. Prefers his own.

8. Private AITKEN.—Very sore across the shoulders and on small of back. Very awkward in running, and waist-belt very sore on stomach. Prefers his own.

No. 2 Pattern.

1. Lance-Corporal WILLIAM HUTTON.—Hurts small of back, the irons wear the clothing; the knapsack, when doubling, moves about and does not lie steady; the buckle and irons prevent shouldering arms.

2. Corporal DUNCAN M'COWAN.—The knapsack and accoutrements very tiresome to carry; the iron bars wear the clothing. Would much sooner wear his own.

3. Serjeant CHARLES MCPHAIL.—Would sooner carry his own, but thinks the new one better than any of the others. Does not like the accoutrements.

4. Private AITKEN.—When doubling the knapsack falls back, and the whole weight comes on the small of the back; the iron rods most objectionable, they hurt the sides and wear the clothing; the buckle on the strap impedes the rifle in shouldering.

5. Private EDWARD PICKETT.—Same remarks as above.

6. Private JAMES BROWN.—The iron rods hurt the sides and impede the rifle in shouldering; too many straps; very unhandy. Prefers his own.

Private JAMES SMITH.—Rods destroy the rifle; accoutrements too complicated; very awkward in skirmishing. Prefers his own.

No. 3 Pattern.

1. Corporal DUNCAN M'COWAN.—Rather small for kit; the knapsack light and easy to carry. Would sooner wear his old one.

2. Lance-Corporal HUTTON.—Too small to hold kit; a little easier to carry than any of the others. Would sooner carry his own. Does not like the accoutrements.

3. Private A. AITKEN.—Too small for present kit; the waist-belt hurts him on sides; no place for caps in accoutrements; the bayonet liable to fall out of belt in kneeling position.

4. Private EDWARD PICKETT.—Large enough for field-kit; hurts him across the shoulders; when skirmishing, small pouches hurt him by jogging up and down; can only hold his rifle as a rear rank at position of "ready," on account of small pouch; in kneeling the small pouch on left side presses the brass of belt into the stomach. Would much rather wear the old knapsack.

5. Private JAMES BROWN.—Hurts him across the chest, and is too small for his kit; hurts him also on the small of the back.

6. Private JAMES SMITH.—Same remarks. No place for caps in accoutrements; bayonet not secure in its place, liable to come out when kneeling or doubling.

7. Serjeant ANDREW FIDDES.—The knapsack easy to be carried; accoutrements are troublesome; pouch in front awkward; knapsack too small for present kit.

8. Serjeant CHARLES MCPHAIL.—Likes it better than his own; sits easier on back; accoutrements not good, hurt the side.

No. 4 Pattern.

1. Corporal DUNCAN McCOWAN.—The knapsack is easy to carry, but there are too many straps, and it requires assistance to put it on; the accoutrements are easily carried.

2. Lance-Corporal HUTTON.—Too complicated in straps; requires assistance to put it on; accoutrements good.

3. Private J. AITKEN.—Very hard to get on and off; all the weight on small of back; too small for kit. Would sooner wear his own.

4. Private EDWARD PICKETT.—Inconvenient; requires two men to put it on; weight on small of back; the two pouches inconvenient in front. Would much sooner wear his own.

5. Private JAMES BROWN.—All the weight lies on small of back; very unhandy in placing on; takes two men to harness him every morning; too many straps. Would sooner wear his old one.

6. Private J. SMITH.—Too many straps; uncomfortable to wear. Would sooner wear his old one.

7. Serjeant ANDREW FIDDES.—The knapsack lies comfortably; rather complicated in straps; does not come off and on easily; would rather carry it than his own; side pouches in the way when shouldering arms; large pouch good, lies close to the back, and does not shake about when running.

8. Serjeant CHARLES MCPHAIL.—Does not like it; hurts his back and shoulders; considers the large pouch the only good thing about it.

SIR, Aldershot, August 29, 1866.

I beg herewith to forward the report on knapsacks, and beg to state that Dr. Galbraith will send in his report himself this evening.

I have, &c.

(Signed) J. A. GORE,
Major 71st Regt.,
Commanding 71st Regt.

The Major of Brigade,
3rd Brigade, Aldershot.

North Camp, Aldershot,
August 29, 1866.

SIR, I HAVE the honour to offer a few observations for the consideration of the Brigadier-General, on the 17585.

new pattern knapsacks which have been lately tried in the regiment.

The chief objections to the present regulation knapsack are the weight being thrown on the collar-bone and the large muscles of the chest, and the compression of the nerves and vessels at the armpit, benumbing and sometimes swelling the hands.

In the knapsacks numbered 1 and 2 these faults are tried to be got rid of by a balancing of the packs by means of iron side rods, so as to throw the weight on the top of the shoulder, and so relieve the chest and armpit. They are found, however, to be very uncomfortable, the men complaining much of the great pressure on the shoulders and in the small of the back. In moving quickly they sit unsteadily, and with No. 2 particularly I observed that the adjustment of the knapsack to the back was very apt to become disarranged, so that the upper part falls backwards, and still more of the weight is thrown on the loins. The iron rods are awkward additions to the knapsack, inconvenient in various ways, and particularly objectionable for active service, when, in the case of an accident to the wearer, they would be liable to distortion or fracture, which might cause him serious injury. The pouch worn with No. 1 evidently occasioned painful counter-pressure in the pit of the stomach.

No. 4 appears to sit comparatively easily on the back, but owing to the complication of straps and buckles, and the consequent difficulty of putting on and taking off, I should think it would not be suitable for ordinary use.

No. 3 is, in my opinion, the best of the four, and I think an improvement on the present knapsack, in so far as it sits comparatively comfortable on the back, and is retained there without compressing the armpit. The men object, however, to the pouches attached to the waist-belt, as being extremely in the way.

With respect to the knapsack question generally, my opinion is, that instead of exercising mechanical ingenuity in trying how most conveniently to suspend a heavy weight on the soldier's back, which, particularly with the framed knapsack, I consider it impossible to effect so as to give sufficient ease and freedom of chest and arms to the wearer, the question ought rather to be whether it is really necessary for the soldier at any time to carry the weight he is now required to do—a weight which, in not a few instances, prematurely breaks down men who, more carefully used, would for years have proved useful soldiers. I believe, in fact, that the large framed knapsack ought to be done away with, and replaced by a small soft valise, in which a certain number of articles considered the most indispensable might be carried on the back, while the rest of the soldier's kit would be stowed in some serviceable kind of bag, to be conveyed for him when on the march. By disencumbering the soldier of at least great part of the burden which now sits on his shoulders, like the "Old Man of the Sea," it seems plain that he would last longer and be more serviceable for all the purposes for which he is required, both in battle and in times of peace.

I have, &c.

(Signed) GEORGE T. GALBRAITH, M.D.,
Surgeon-Major 71st Ft. L. I.

The Officer Commanding
71st Ft. L. I.

North Camp, Aldershot,
October 9, 1866.

SIR, I HAVE the honour to enclose remarks on the merits of the several patterns of new knapsacks and accoutrements which have lately been tried in the regiment under my command, as I have taken them down from the lips of the wearers.

I am myself collating these remarks of the wearers, and from my own observation inclined to agree generally with their estimate of Nos. 1 and 2 patterns as undesirable for adoption. I would, however, remark

that the man who found most fault with No. 1 is a fine young man of 5 feet 11 inches nearly in height, and good width of shoulders, with a large chest measurement, therefore it is possible that pattern No. 1 may suit middle-sized men better than what we call "Grenadiers."

No. 3 pattern of both kinds seems to be a general favourite with the men, and I think it combines many advantages and improvements. I have great doubts, however, of the durability of the material of either kind, especially of that with the magazine outside; this last seems to me to be the better way of carrying ammunition in the pack; the method of carrying the great coat rolled round the top and sides of this pack seems to me the easiest and best, but it is not easily reconcilable with our present "touch" in the ranks. There seems some objection to the mode of joining the supporting strap by a black strap to the pack, as a kind of knot there is, might, it seems to me, hurt a man who was under arms for several hours.

The back pouch of No. 4 pattern seems much liked and very good, and a combination of it with the waist-belt of No. 3 pattern would be popular, I fancy, with the men.

I have, &c.

(Signed) W. BOYLE, Colonel,

Lieut.-Colonel Commanding 89th Regt.

The Brigade-Major,

3rd Brigade, Aldershot.

REPORT FROM 89TH REGIMENT ON EXPERIMENTAL KNAPSACKS.

1st Wearer, *Lance-Corporal Haurahan* (5 ft. 11 in. in height), states, after wearing all four patterns:—

No. 1 pattern.—Found it too narrow, and that it hurt the ribs, and that the large pouch with 50 rounds in it is not sufficiently borne up, and the whole weight is on the hips; does not like it so well as the present pack and belts.

No. 2 pattern.—Considers that it is not preferable to the present pattern knapsack, the weight being thrown into the small of the back; the triangular brass fastening on the belt supporting the pouch, which fastening comes a few inches below the neck, above the middle of the back, is highly objectionable, as it is pressed into the back when the pack is full, and bruises it; pouch not steady enough when the man runs.

No. 3, with the magazine outside.—This is a very comfortable pack, with freedom to the chest and arms; but the shoulder straps are too broad for firing, and the two pouches interfere with the present system of manual exercise (and platoon too). No. 3 pattern, with magazine inside, is also a comfortable knapsack; the great coat is worn in this rolled round the pack; the material of this is better than that of the first No. 3.

No. 4 pattern is not preferable to the present pattern; the straps are complicated; the supporting straps lift the waist-belt up, which throws the weight of the knapsack back; the pouches in front are of too slight material.

2nd Wearer, *Private A. Hartney* (nearly 5 ft. 8 in. in height), has worn all, and states:—

No. 1 is a very severe pack on a soldier's back; (this man corroborates most of Haurahan's statement as to this pattern).

No. 2 pattern.—Has almost precisely the same opinion as Haurahan of this pattern.

No. 3, with magazine inside.—The most comfortable pack he ever wore; found this by experience at divisional field days; but the supporting straps are too broad when firing; the great coat is easier rolled round and quicker than the present folding method; it is easily put on and taken off.

No. 4 pattern.—The stick or board at the bottom of this pack hurt his back; there are too many straps; there is more to keep clean about it than in the present pack, and it is not to be preferred to it.

3rd Wearer, *Private J. Powell* (about 5 ft. 7 in.), has worn all, and states:—

No. 1 pattern.—Opinion same as the two preceding men.

No. 2 pattern.—Same fault as the first man as to weight being thrown back; but did not find the pouch unsteady when doubling. A very good mess tin is with this pattern.

No. 3 pattern, magazine inside.—A very good pack, and to be preferred to the present one; does not think the pouches should both be worn in front, as they are in the way; butt of the rifle also slips off the shoulder strap, which it would probably not do if it was narrower.

No. 4 pattern.—This knapsack has a tendency to slip down on the back and touch the pouch; does not prefer this pattern to the present regulation one; but the waist-belt and hind pouch are superior to any he knows.

4th Wearer, *Corporal J. Catling* (under 5 ft. 5 in. in height), has worn all, and states:—

No. 1 pattern.—Objectionable, the weight being on the small of the back; pouch is not kept steady, and the belt is not strong enough for its purpose.

No. 2 pattern will not sit properly, straps cut the front part of the shoulder, pouch also he found unsteady.

No. 3, with magazine inside.—Approves of this pattern, and would prefer it to the present; has similar doubts, however, to the other men, about the two pouches in working with arms, although they are very good for marching.

No. 4.—As in No. 1, the pack leans into the hollow of the back; and, except the pouches, he does not like this pattern.

Makes this remark, that none of these new patterns, when worn, cause the numbness to the arm and hand which the present regulation pack does.

6th Wearer, *Private G. Brooker* (height 5 ft. 8 in.)

Speaks specially of No. 3 magazine inside, as the only one affording real ease; has, however, the same objection as others to the breadth of shoulder straps; could not speak favourably of any of the others.

7th Wearer, *Lance-Corporal Munro* (5 ft. 6 in.)

Does not like No. 1 pattern (for same reasons as others); fired at the butts wearing No. 2, fired well enough with it, but considered it heavier than the regulation pack; pouch he found unsteady; the mess tin has an improved handle.

No. 3, with magazine outside, is the best of the lot, and better than the present pack, easily put on, easily taken off; he does not complain of the breadth of the straps, but admits he did not fire wearing it; two pouches rather in the way; this man wore the great-coat folded flat behind within the flap, and preferred it so to the present pack.

No. 4 pattern.—It takes a man to dress the wearer of this; does not like it at all; the pouch, however, is a good one.

8th Wearer, *Serjeant Montgomery*, 5 ft. 6½ in. (19 years 9 months' service).

Wore the whole of these patterns (that is, Nos. 1, 2, 4, and 3, with magazine inside), and considers the last-named as the only really easy one of the lot; but does not prefer the whole equipment to the present one; finds that the waist-belt has a tendency to be dragged up in front, but is not supported behind; the knapsack is good, the belts not so desirable.

W. BOYLE, Colonel,

Lieut.-Col. Commanding 89th Regt.

Aldershot, October 1866.

REPORT ON KNAPSACKS.

SIR, Colchester, November 10, 1866.

WITH reference to the knapsacks, four descriptions of which were sent to Colchester for trial, I

have the honour to report to you that a careful trial has been made of the whole of them; this trial was interrupted by the move of several depôts during the summer, and the report has been delayed in consequence. I cannot think it necessary to trouble you with the opinions of the individuals who have worn the knapsacks, which of course have been frequently changed. I have seen and frequently questioned each soldier; their answers are most perplexing, but this much is certain, that there is no universal feeling that a change from the present to any of the four experimental packs would be entirely satisfactory. Of the four packs, the Prussian, or No. 3, indubitably found most favour. I do not think there was a single man but confessed that this pack was a little easier

than his usual one, and that but for the pouches in front he could handle his rifle better with this pack on his back than any other. This particular advantage of handling the rifle arises from the pack being narrower and giving the soldier more room in the ranks.

I should say, therefore, that the Prussian pack is the best of the four which were submitted for trial; as to the pouches, a modification from solid to soft leather would be a simple matter.

I have, &c.

(Signed) T. H. TIDY,
Col. Commanding E. Dist.

The Adjutant-General,
Horse Guards.



