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Friday, March 14, 1890.

GENERAL SIR C. P. BEAUCHAMP WALKER, K.C.B.,
Vice-President, in the Chair.

THE SHOEING OF HORSES FOR MILITARY PURPOSES.

By GEORGE FLEMING, C.B., LL.D., F.R.C.V.S., Principal Veterinary Surgeon.

AN apology would appear to be almost necessary for now venturing to introduce such a subject as the shoeing of Army horses; inasmuch as it may seem to many to be of too trivial a character to merit notice among the many very important topics which should be, and are, brought here for observation and discussion. If any apology is needed, I would remind those who may imagine that such a matter as this is undeserving of the attention of all who desire, or who are occupied with the efficiency of the Army, that nothing in the way of details can be neglected in order to ensure thorough efficiency; and, in fact, that this rests entirely on details, the completing and perfecting of which must not be trifled with or ignored. Neglect of even one of them, and that perhaps apparently the most insignificant, may entail serious results, as the history of warfare amply testifies; and the immense importance of giving heed to every item upon which efficiency depends is well illustrated in the old Spanish proverb, which is pertinent to our subject: "Por un clavo se pierde una herradura; por una herradura un Cavallo, por un Cavallo un Cavallero." Or as Benjamin Franklin puts it: "For want of a nail the shoe was lost, for want of a shoe the horse was lost, and for want of a horse the rider was lost, being overtaken and slain by the enemy (another version adds that by the death of the horseman a city was lost); all for want of a little care about a horse-shoe nail."

But those who have had experience with mounted corps in the Field, will be ready to agree with me that the shoeing of Army horses is very far from being an unimportant or trifling matter, and that it sometimes makes itself a very prominent one, and one demanding much anxious care and attention. It is from this point of view that we shall to-day examine it; and I am hopeful that you will be able to arrive at the satisfactory conclusion, that among the many improvements which have been effected in recent years in the condition of the British Army as a fighting machine, the shoeing of horses may justly be included.

You will not expect a historical dissertation upon an art which, humble though it may appear, has yet had, indirectly, a vast influence

upon the destinies of mankind, in lending its aid to the restless wave of human action in the evolution of civilization. For it must be admitted that, without this humble handicraft, the value of horses would have been very small indeed; and the world without the full development of this animal's powers would have made but little progress.

The varied uses to which the horse has been subjected since taken from a wild state, and the willing and cheerful manner with which he has undergone fatigue—performing duties which are, one would think, quite foreign to his nature, have all been owing to his combined and unequalled qualities of strength, courage, speed, fidelity, and obedience; but though his great value depends essentially upon a just disposition of these, yet more especially is it as a living machine, capable of moving or producing motion, and communicating it to inert masses at all times and in nearly all situations, that he is to be prized.

The history of mankind abundantly testifies that every possible use has been made of the horse, whether in war, commerce, or pleasure; and the most ancient nations were as cognisant of his value as the most modern—proving the early sense and conviction of his importance. Those old-world nations which, long ages ago, most largely employed the horse, were the great centres of antique civilization; and it may be safely asserted that without him the human race could not have reached its present state of advancement and refinement, or have been able to contend against the numerous obstacles to the comfort and happiness which it now enjoys. Indeed, it has been said that next to the want of iron, the want of horses would have been perhaps one of the greatest physical barriers to the advancement of the arts of civilized life.

In the deployment of his good qualities, as a motor especially, the horse must rely upon the integrity of his feet in weight-sustaining and weight-propelling, and to maintain these parts strong and sound has been the object of horsemen from the earliest times—from the days of Xenophon—up to the present year. The aphorism of "No foot, no horse," was as obvious to ancient as to modern people, and unless his wonderfully constructed feet are maintained in a healthy condition, he is indeed valueless to man.

In a state of nature the hoof requires no protection, as its growth is sufficient to meet the demands of wear. And in certain parts of the world, the animal can even perform a fair amount of work without recourse to shoeing. But this is where the climate is dry and the soil soft and elastic, and where horses, firm and wiry in themselves, have dense, tough hoofs. Domestication and climate, no less than soil, have an immense influence on the hoof-horn; and horses brought from countries in which shoes can be dispensed with, to those which are moist and stony, or which have artificial roads, are no more exempted from the necessities for hoof protection than the animals native to these regions.

The necessity for preventing injury to horses' feet from undue wear of the hoofs must have presented itself at a very early period to

equestrian races, especially in unfavourable situations or humid climates; and though some kind of protection may have been introduced, yet it is only at a comparatively recent date that we find any mention of the present method of shoeing. True, some of the Roman writers allude to a kind of sandal made of sparteum, something like the horse-sandal of rice straw used by the Japanese until a few years ago; but there is no written evidence that an iron plate attached to the hoof by nails was known to either Greeks or Romans. Some years ago I was induced to undertake an investigation into the history of horse-shoeing, and the result, given in my work entitled "Horse-Shoes and Horse-Shoeing" (London, 1869), was that this art must be of great antiquity—probably extending beyond the Christian era, if the evidence afforded by a coin of Tarentum can be accepted.

Shoes of iron and bronze have been found with Gaulish remains at Alesia and elsewhere on the Continent of Europe; and in this country they have been discovered with Celtic and Roman articles which clearly indicate their remote age, and go to prove that among the Gauls and ancient Britons, horses were shod in much the same way as they are now-a-days.

These shoes, no matter from what source they were obtained, I noticed were small, indicating that the horses of those days were not much larger than ponies or small arabs; they are remarkably uniform in shape, being narrow and light; on each branch there is a calk, and a peculiar and typical feature is their undulating outer border, due to the three large cavities on each side intended to receive the base of the immense-nail-heads, which projected for some distance above the level of the shoe. These nail-heads and the calkins secured a good foothold for the animal; and, altogether, the horsemen of that time had a better notion of shoeing, and of preventing horses slipping, than would appear to be the case now-a-days.

It is probable that shoeing was introduced, or first practised, by the Gauls, and that their priests, or Druids, were the shoers and armourers. The strange superstitions which still attach to horse-shoes, and the legends connected with them, and the *faber ferrarius*—Wayland Smith and other mythical personages of Northern and Western Nations—would point to this. In Wales, long before the Norman invasion, the shoer was an important personage at Court, and enjoyed great privileges because of the importance of his art; and at the French and German Courts he was a high noble, with a designation from which is derived the title of Marshal. In France at the present day the shoer is still known as the *Maréchal ferrant*; in this country the names of Marshal and Ferrers are significant of horse-shoers; while horse-shoes formed Coats of Arms of families and Corporations, and during the Middle Ages the art of shoeing appears to have occupied a very elevated position indeed.

The simple but sensible shoeing of the pre-Norman times was followed by a more complicated and clumsy style with the introduction of large horses, clad, like their riders, in heavy armour; and when the anatomy of the animal began to be studied in the 17th and 18th centuries, extraordinary notions began to prevail with regard

to the functions of his feet—notions which, carried into practical effect, have been the cause of serious injury, even up to the present day.

It is needless to mention that, in early times, shoeing was chiefly resorted to for military horses; oxen, mules, and asses being mainly employed for draught and agricultural purposes in civil life.

Mistaken ideas as to the functions of the foot, and especially of its protection—the hoof, led to the latter being considered as something inimical to the animal's welfare; it was therefore barbarously mutilated, and only too often is so yet outside our Army; while the shoe attached to it was clumsy and damaging in the extreme.

The sole was unmercifully cut away until the blood was sometimes oozing through the horn, the frog—considered too sensitive to come into contact with the ground, and being soft and easy to incise, was artistically carved to please the fancy of the shoer, or the horse-owner or groom; while the wall, the most essential portion of the hoof, was perforated by far too many nails, and rasped and beautified until there was frequently little of it left to which the shoe could be fastened. The shoe itself was made to correspond with the fantastic and utterly erroneous ideas prevalent with regard to the physiology of the foot. It had to be made heavy and broad in order to cover the tender sole, and as this could not bear any pressure from the shoe after being denuded of its natural protection, the horse's weight had to be supported on the margin of the hoof. Consequently, there was a space between the shoe and the sole, while the ground surface of the shoe itself, being wide and plane, was well adapted for slipping. This narrow bearing of the shoe on the foot, the space between it and the sole, and the cumbersome weight of the shoe itself, necessitated a great number of nails to keep it firm on the hoof—a result seldom attained, especially in heavy ground, where the suction readily tore it off, and with it generally a large portion of the wall.

The shoer's art was overdone, and to shoe a horse whose hoofs had undergone such barbarous treatment at his hands required a great amount of skill and time; and even then the animal was only too often crippled by nails driven too near or into the quick, or by the shoes being fastened too tight on the morbidly sensitive foot.

For some years a much more rational system of managing the hoof has prevailed in the Army, owing to the shoeing being placed under the superintendence of the veterinary officers, who had not the ignorant prejudices of grooms and others to contend with, as had their colleagues in civil life. The excessive mutilation alluded to was not allowed, and the hoof-horn was looked upon as the natural protection of the foot, not as something alien to it and which must be cut away.

But until six or seven years ago, the Army horse-shoe was still faulty in shape, in being plane on the ground surface, and bevelled on that next the sole; so that the weight of the animal was borne on the margin of the hoof only, a cavity existing between the sole and shoe; consequently, the foothold was very insecure, and the connection between shoe and hoof was comparatively slight, especially on heavy ground. And until the last three years, the farriery arrange-

ments of the Army were faulty in the extreme, and quite unsuitable to meet the demands of war service—indeed, they scarcely sufficed for the requirements of peace. The shoers for very many years contracted with the Government to shoe the horses, receiving a certain sum—latterly a halfpenny a day for each horse; this in itself was bad, as it led to abuses. For this sum the shoer provided the shoes, nails, and tools; and as he had to make the two former, it took all the time of the sergeant farrier and shoeing-smith to keep a troop of cavalry horses—about forty—tolerably shod. A man required generally about three years' training before he could make shoes and nails, and shoe a horse fairly well; but it must be confessed that the shoeing was often very unsatisfactory, and it was impossible to obtain anything like uniformity. Not only this, but after men had been carefully trained, they not unfrequently took their discharge, as such occupation in civil life offered better prospects than the Army did.

Owing to the long time required to teach shoers, there were very few men in cavalry regiments, beyond those actually employed in the forges, who could shoe; in fact, it was sometimes very difficult to keep up the number necessary to maintain the horses in an effective state in peace-time. Consequently, there was no provision for war, and in the Crimea—which was a vast standing camp, with no marching—the trained shoers were soon expended, and had to be replaced by the waifs and refuse of the civilian forges. It is not easy to realize the condition our mounted forces would have been in, had there been any marching.

The introduction of short service rendered matters still worse, as there was not then sufficient time to properly train even the number of shoers needed for peace requirements—the demands of drill and other branches of a soldier's instruction making a serious inroad upon the comparatively brief period men were engaged for.

The unfortunate state of the farriery organization existing at that time was well exemplified in the Egyptian Campaign of 1882. The cavalry regiments were sent from this country with the ordinary complement of farriers for the actual requirements of each troop, scarcely any being in reserve. The marching was trifling and the campaign brief; yet at the end of a month, one regiment—the 7th Dragoon Guards, which had left England with seventeen farriers—was telegraphing home for more to be sent out at once, as the number was nearly expended, and the horses could not be shod. Unluckily, the regiments at home had no farriers to spare, so none could be sent to Egypt without causing these to be short of their complement. Not only was this want of shoers experienced in the cavalry, but the other mounted branches were little better off; while the Regimental Transport horses in Egypt were in a sorry plight. It was reported that many of these returned to England, after several months' absence, wearing the same shoes which they had on their feet at their departure, and which had never been removed. The Principal Veterinary Surgeon of the expedition stated, that "Infantry Regiments, being unprovided with shoeing-smiths, their Transport horses and mules were constantly left unshod, except when a man from the Commissariat or one of the mounted corps could be obtained. The

feet of the animals were therefore very frequently in a bad state." It was very fortunate that there was little marching, or the results might have been something akin to disastrous.

That campaign demonstrated, in a most unmistakable manner, the urgent need there was for amending or reorganizing the farriery system of the Army, so as to enable it to meet the altered circumstances of the times; and this task was the first imposed upon me on becoming Chief of the Veterinary Department. In my Annual Report for 1886, the scheme of reorganization I had proposed in 1883 is alluded to in the following terms:—

"It has for many years been evident that the system of farriery existing in the Army had become obsolete, and could no longer meet the demands even of peace service. In the field it always broke down in a few weeks, and then there was the greatest difficulty in keeping horses shod—a difficulty which was only partially met by engaging large numbers of civilian farriers, as during the Crimean War (men who were of little use, being the refuse of the shoeing forges of large towns); or by denuding the mounted corps at home of their farriers, which occurred only so late as in the Egyptian campaign of 1882. The introduction of short service into the Army made the defects of the system all the more evident.

"During the long-service period, when men served for many years, there was ample time to train farriers to make horse-shoes and nails, and to shoe horses; though even then it was impossible to secure uniformity in shoeing throughout the Army, it being good in some corps and sometimes very bad in others. And it generally required at least three years to teach a fairly intelligent man to become a good artisan; so that in each troop of cavalry, in addition to the sergeant farrier and shoeing-smith, there was always a man in training, being three men to shoe about forty horses. Owing to this large proportion of men, much trouble was often experienced in obtaining soldiers for training, and especially as the shoe- and nail-making, together with the shoeing of the horses, occupied nearly all the time of the farriers, and left scarcely any for other regimental duties. Hence, as a rule, there were no spare shoers in the ranks; and on active service, the farriers being in the fighting line and exposed to all the risks of the other soldiers, *plus* the fatigue of shoeing the horses while their comrades were resting, they were the first to succumb, and there were no others to replace them.

"With the introduction of short service, it was found impossible to allow three years to be devoted to training in farriery, when so much of the brief period had to be spent in drill and other instruction necessary for men of mounted corps; so that for some time there was the gravest difficulty in keeping the horses shod at all when in barracks, while there was an utter breakdown in Egypt in 1882, though the campaign was very short, and there was but little marching.

"To remedy this serious state of affairs, it had been suggested that there should be a special corps of farriers formed, and that men from this should be attached to regiments. But a very brief consideration sufficed to show that this proposal would meet with the strongest.

objections, not the least of which would be the heavy expense it would entail; and, besides, when carried into execution it would lead to dissatisfaction, and fail to meet all requirements."

The introduction of machine-made horse-shoes and nails a few years ago fortunately enabled me to devise another plan, which has none of the disadvantages and objections that would attend the institution of a Farriers' Corps, and which, while allowing us to provide a large and sufficient number of shoers in corps to meet the demands of war, simplifies and improves the art of shoeing, ensures uniformity throughout the Service, allows of more men for regimental duty, and increases the efficiency of the horses while at work, by affording them a better foothold (owing to a new pattern of shoe), at the same time maintaining their hoofs in a strong healthy condition.

This reorganization consists—

1. In abolishing shoe- and nail-making to the extent of three-fourths of the supply required, the remaining fourth being made by the farriers merely in order to keep them in practice; the three-fourths to be machine-made shoes and nails, all ready for immediate use. In recommending the discontinuance of shoe- and nail-making in the Army, I was only acting on the knowledge which everyone who has had experience of field service in mounted corps is possessed of: that it is impossible during a campaign to make shoes and nails, and that it is generally a matter for congratulation if the horses can be kept effectively shod when these articles are provided for the farriers. The absurdity of sending iron and coal into the field with which to make horse-shoes will be apparent, when it is stated that it requires 15 lbs. of coal and about 6 lbs. of iron to make a set of shoes which, when ready to be put on the horse's feet, will weigh only about 5 lbs. Then the manufacture of shoes in the field necessitates a lumbering field-forge with its heavy tools, drawn by two, four, or even six horses (as in Egypt, though that number was not always sufficient, as some of the forge wagons were left behind imbedded in the sand); and lastly, there is the time, the men, and the labour required to make the shoes. If it is highly inconvenient or impossible to make shoes on active service, then, even if short service allowed it, it must appear a waste of time and trouble to attempt to teach men to do this during peace, if all instruction of soldiers should be with a view to their effectiveness in war.
2. In having a number of men in the ranks taught to *put on shoes* as on active service, the number to be at least 10 per cent. in mounted corps; besides the sergeant farrier, and a reduced number of shoeing-smiths in training for the grade of sergeant farrier. This number of men will afford a good reserve of shoers, and as any man of ordinary intelligence can be taught to shoe sufficiently well in about three months, there ought to be no difficulty in keeping up the percentage.

3. In the sergeant farrier, instead of wasting his time, as formerly, in shoe-making, being now an instructor of men in shoeing horses with ready-made shoes; while at the same time, having been specially trained at the Army Veterinary School, he can join a Field Veterinary Hospital Staff at brief notice, without causing any inconvenience to his regiment, as the shoeing can be carried on independent of him. The men, when trained to put on shoes, return to the ranks until the 10 per cent. are taught, when they come back to the forge, in turn, for a certain period, to shoe the horses, and thus keep up their practice.
4. In having two men per battalion of Infantry, and a certain number of Marines, taught to shoe horses. The necessity for this measure is evident, as the requirements of Mounted Infantry and regimental transport have hitherto had to be met, when possible, by lending them Cavalry or Artillery farriers. But sometimes these could not be spared, and then the horses were left uncared for, so far as shoeing was concerned.

Official sanction to the proposed scheme had been anticipated, and instruction was commenced some time ago, and is now carried on as energetically as possible.

The machine-made shoes are so well-shaped and finished, and are made of such excellent iron, while the nails are so perfect and easily driven, that the labour of shoeing is immensely lightened and shortened, and men are soon taught. A moderately expert man can shoe a horse in half-an-hour, and it has been done in less than twenty minutes. On this system, and during an emergency, a shoer might easily keep 150 horses shod all the year round.

Another feature of the reorganization is the abolition of the contract system formerly existing between the Government and the farriers. This had for long worked badly, and its cessation will be advantageous to the public. I have estimated that, in the matter of cost alone, the adoption of the proposed system will effect a saving, in the Cavalry only, of about 4,000*l.* annually. But the problem of a farriery organization which will give a large number of skilled Veterinary Hospital assistants, and a supply of shoers sufficient to meet the demands of mounted corps and infantry during a long campaign, will, I hope, be solved when the scheme is fairly in operation. And even did it cost more, instead of less than the late most defective system, this would be as nothing when compared with the benefits which will certainly be derived from it, especially on active service.

The question of mobility has not been overlooked in considering the subject of farriery. I had suggested that, for cavalry, the heavy forge and forge-wagon should be dispensed with, and a small portable forge (weighing about 200 lbs.) be issued instead, one of these to each wing of a regiment. This forge can be carried on a pack-saddle and will meet all the needs of the shoers; indeed, with the new form of shoe a forge will rarely be required, as nearly all alterations in shape

can be effected without heating it. The experience gained in the expeditions to Suakin and Bechuanaland testifies to this.

The introduction into every-day service of shoes and nails ready for immediate use has another advantage which must not be overlooked. On every campaign since I entered the Army, serious complaints have been made as to the manner in which the Store Department issued these articles; sometimes they were deficient in supply, but more frequently, perhaps, they were issued in wrong sizes to corps, and there was generally delay and confusion; while occasionally the pattern, or the material of which the shoes or nails were made, was very defective. These faults were owing, in great measure, to store-keepers being unaccustomed to issue such articles in peace-time, and being therefore unacquainted with them; and to the shoes and nails being kept in store without being properly examined or tested before they were sent into the field.

By the constant issue of horse-shoes and nails from store in ordinary times, the issuers will be experienced in this important duty; while the pattern and material of the articles will be always under trial, and necessary improvements can be effected as the trial progresses.

Such was the reorganization I proposed, and I am pleased to say that, after ample trial, it was adopted, and came into operation for the whole of the cavalry in this country in April, 1888. It is now being tried in some batteries of artillery, with a view to its adoption in that arm, and it is also undergoing trial in the Army Service Corps and Royal Engineers; while it is altogether practised in infantry transport.

This "cold system" of shoeing, as it is termed, in contradistinction to making shoes and fitting them to the hoof while hot, has proved a great success on active service. In the Report of the Principal Veterinary Surgeon with the Suakin Field Force in 1885, we find the following allusion to it: "The horses and mules were kept fairly well shod up during the campaign, and the shoeing was, on the whole, good." "The system of 'cold-fitting' was, on my recommendation, generally adopted, and the new pattern machine-made shoes and nails were used, as far as was practicable, especially among the lighter horses. The superiority of these shoes over those of the old pattern has already been clearly demonstrated by the late experiments in the United Kingdom, but I believe this is their first trial on active service. Their principal advantages appear to be:—1. The ease and celerity with which they can be fitted cold; 2. The superior quality of the iron; 3. Their lightness, durability, and finish; 4. The fact that the heavy field forge, with the fuel and plant for shoe-making, can be dispensed with—the small pack forge being merely necessary in the few cases where heat is required. The immense advantages of the latter, especially in a campaign in the desert, where wheel-transport is impossible, can readily be understood."

Quite recently the Inniskilling Dragoons severely tested the system while on active service in Zululand, and the following extracts are made from the report of the Officer Commanding that regiment.

He says: "The regiment having been on field service in Zululand during the last six months, the new regulations as regards cold-shoeing could not be carried out in every particular; though, as far as was practicable and possible, every effort has been made to act on and carry out the instructions issued. Shoeing the horses with cold shoes has been done most fully, and I think very successfully.

In a standing camp there can be but little difficulty about the details of the system being carried out in their entirety. The material of the shoes is excellent, and if they are gently heated by slight blows from the hammer, they can be opened out or otherwise altered in shape, so as to fit the foot without injuring the shoe; though if they are opened out before being treated as above, they nearly always break at the toe. This arises from want of care on the part of the farriers, and will always be the case unless caution is exercised. . . . The nails are of good quality, well-made, and carefully finished.

"Owing to the regiment being in detachments, and constantly on the move from one place to the other, the horses were all shod with the ready-made shoes and nails supplied for the cold-shoeing, none being shod with the hand-made shoes and nails; as it was an impossibility, under the circumstances, to make them. . . . The shoes and nails are durable and last well.

"The conditions of service under which these shoes were used were exceptional, as the troops were on field service during the whole period. The shoes, therefore, were tried under severe conditions, and I consider that they bore the trial satisfactorily."

I may remark that the shape of the new pattern shoe conduces to—
1. Solidity of attachment to the hoof, with fewer nails than were required for the old pattern; 2. Security of foothold; and, 3. Soundness of the foot. The first and third points are secured by the upper or foot surface of the shoe being flat, which gives it a wide solid bearing on the wall and margin of the strong unmutilated sole, leaving no space between for the lodgment of stones or mud, as was the case with the old pattern, and therefore obviating the necessity for a hoof-pick; and the second advantage is gained by the concave ground surface of the shoe, which gives a grip in soft soil, and diminishes the slippery surface on hard ground. These advantages are of great importance to Army as well as to other horses; and not less are those related to preserving the foot and limb in their integrity, and which are ensured by the new system of shoeing. Particular attention is paid to keeping the hoof in as strong and natural a condition as possible; so that the art of shoeing is reduced to its primary object—the protection of the hoof from undue wear, while it is simplified to the utmost.

Though the system has been only about three years in operation, nearly 500 men have been trained in "cold shoeing;" of course, many of these have taken their discharge, while a considerable number have gone into the Reserves, and it may be hoped that they will be available when required. At present there are 380 men in the ranks who are competent to shoe, and 166 are in training; at the same

time the regular shoers in the forges are up to the regulation number. In infantry battalions there are 206 trained men. These numbers will be added to every year.

The adoption of this system of shoeing has permitted us to introduce another most beneficial novelty. By simplifying the shoeing and allowing it to be carried on by these extra men, the sergeant farriers, and those who are in training for this grade, are enabled to attend a special course of instruction at the Aldershot Veterinary School, so as to qualify them to act as veterinary assistants. The urgent need that existed for men trained with this object has often been alluded to by General Officers in command of troops on active service; as the losses among animals have been greatly increased from the absence of skilled attendance on the sick and wounded, either on the line of march, in the field, or in the veterinary hospitals. Veterinary Officers are too few in number, generally, to give the sick and injured animals all the attention they require, and until lately the difficulty in obtaining men, even unskilled, to aid them has been almost insuperable. So late as 1882, during the Egyptian campaign, a Base Hospital was attempted to be formed, but the Principal Veterinary there reported that the Cavalry Officers "disliked parting with their men for hospital work, and each battery was of course unable to spare its only farrier. At last a farrier major of the 4th Dragoon Guards was obtained, but for some time he had scarcely any men to assist him."

It was not until the dispatch of troops to Suakin and Bechuanaland in 1885, that trained farriers could be furnished for this purpose. Up to that time Veterinary Officers had no proper assistance in their arduous duties in the field, and especially in the field hospitals. Beyond a chance farrier, who perhaps had no training at all, there were no men for the duty. Consequently, animals did not receive that care in having their wounds dressed, or their recovery from sickness or debility attended to; the losses and delays in recovery were therefore all the more considerable.

A number of the farriers specially instructed in the Aldershot Veterinary School accompanied the expeditions to Suakin and Bechuanaland, and the benefits derived from their services were strongly dwelt upon in the reports received at home. And the advantages in having such assistance will be even more marked in future expeditions, as the organization under which it is created has not yet had time to become perfected. It has been decided that all the sergeant farriers who possess a third class certificate of education shall attend this course of instruction at the Veterinary School; in addition to these, it is desirable that as many men as possible who possess the same educational certificate, and who have been passed as competent to shoe horses, should also attend the school for the same purpose, so as to fill up vacancies among the sergeant farriers during peace or in the field. With the view of meeting the demands of mounted infantry and regimental transport on active service, it has, as already mentioned, been decided to teach two men per battalion of infantry to shoe horses, and when so instructed the most intelligent of the two is to undergo the above course of special instruction. The

Royal Marines are to be included in this scheme. After attending the school these men, of course, return to their corps.

In anticipation of the adoption of the new farriery reorganization steps had already been taken in this direction. Indeed, since 1883 the system of training referred to has been in operation.

Up to the end of last year, 568 men had obtained the school certificate of competency, and the names and corps of these are entered in a register kept in my office, and in another in that of the Adjutant-General, any changes occurring being reported every month; so that we may know whether the men are with their corps, in the reserves, or non-effective.

By this means we shall be able to lay our hands at once, in case of war, upon a large number of well-trained intelligent men, to form what may be called a "Veterinary Hospital Staff," whose duties will be similar to those of the Army Medical Staff Corps; and, in addition, they can be utilized in the Remount Depôts, and assist in the supervision of animals on the lines of communication, in order to prevent those injuries and losses which are usually so heavy there. When not required for these duties, their special training will be most advantageous to their own particular corps.

All this will have been effected at an expense which is almost *nil*, and without any of the heavy cost and serious disadvantages of having a special corps of trained men.

Winter Shoeing.

The shoes worn by horses should not only protect their feet from external injury, but should also afford them security of foothold. I have shown that the new pattern shoe adopted in the Army does this in ordinary circumstances, by its concave ground surface, which also prevents stones, mud, and to some extent snow, from lodging in the sole. But for ice or slippery pavement—such as granite, wood, or asphalt in damp weather—something more is necessary to afford a secure grip.

Though our war operations generally take place in countries in which the winters do not require any special provision against ice-travelling, yet with our Crimean experiences still fresh in our memories, and the experiences of other nations to refer to, the necessity for being prepared for such an eventuality as a campaign in an ice-producing climate must not be lost sight of.

The Russian Campaign of 1812 furnishes an instance of the need there is for providing armies, not only with shoes to protect the hoofs from wear, but appliances which will make them independent of the winter in northern and western climates. The reference to this is to be found in Thiers' "History of the Consulate and the Empire" (Vol. XIV). He writes: "Napoleon left Dorobourg on the 6th of November. The whole of the Army followed on the 7th and 8th. The cold had become more perceptible, and once more gave rise to painful regrets at having forgotten to provide winter clothing; and another regret yet more baffling—that of procuring frost nails for the shoes of the horses. The season in which the Army had left, and the belief

that it would be able to return before the setting in of unfavourable weather, explains this double omission. Our unfortunate soldiers marched along, wrapped up in every kind of clothing saved from the flames at Moscow, without being able to guard themselves against a temperature of 9° or 10° (Réaumur); and at each ascending portion of the road, the artillery horses, even when the usual number required was doubled and trebled, were unable to drag the guns of the smallest calibre. Flogged until they were covered with blood, and their knees torn with frequent falling, they were found incapable of overcoming ordinary obstacles, through loss of strength and want of means to prevent their slipping on the ice. The ammunition wagons were abandoned, and scarcely any ammunition was saved. Soon after, the guns had to be surrendered as trophies to the Russians, but not without pain and shame to our brave artillery. The carriages were thus greatly diminished in number, and every day saw the losses augmented, and the horses expiring on the road."

Another marked example is to be found in *The Times* correspondent's account of the Danish retreat from Schleswig to Sonderburg, during the Prussian-Danish War, on the night of February 5th, 1865. Immediately after it had been determined that the Danes should effect a hurried retrograde movement, bad weather set in with great violence. "The snow thickened and hardened on the ground, the road became smooth and bright as glass; horses and men slipped dreadfully, and fell at almost every step. Not one horse in the whole Danish Army was rough-shod that night; on the contrary, the shoes both of saddle and draught horses were worn smooth by the five or six days' incessant march on muddy ground, and the progress of the Army met with terrible hindrance at the outset. . . . It was not long before our march began to exhibit, on a small scale, some of the horrors of the famous retreat of the French from Moscow. The night was dark—the cold terrible; the thermometer, I daresay, did not mark more than four or five degrees below the freezing point—but the chill in our veins told a very different tale, and the slipperiness of the road was perfectly awful. The snow, which was falling thick and fast at frequent intervals, lay in the fields three or four inches deep, and fringed the trees in the forest with the most picturesque fretwork; but it was trodden to the thinnest layer by all the feet, hoofs, and wheels of a whole host, till it glistened like ice in the occasional gleam of some pale star. . . . Dragoons, artillerymen, all who travel on saddle, were dismounted; even led horses were put to the direst exertions to keep their footing; draught horses had to be held up, and cannon, caissons, and ammunition or baggage wagons had to be dragged by the sheer strength of men, whose tread was no steadier. The falling of men and of beasts, and the cracking of wheels and axletrees was prodigious. It took us full nine hours to go over the first Danish mile and a-half (less than seven English miles) of ground. Morning broke upon us long before we were half-way between Schleswig and Fensburg, and we reached the latter place about four o'clock p.m. on Saturday, having accomplished the whole distance of twenty-two English miles in eighteen hours. . . . We had not gone half-a-mile from Schleswig, before we found

a very heavy piece of siege artillery forsaken on the road. The eight horses which dragged it had become, owing to the state of the roads; as powerless as so many new-littered kittens, and all the efforts of the men to share the work with them were unavailing. In the same manner as we advanced on our dismal march, we, who were in the rear, came up with broken carriages, dismounted caissons, and horses fallen never to rise. The obstruction to our progress was indescribable."

Fortunately for the Danes, the Prussian Army was no better provided than themselves with the means to enable their horses to travel on the ice; otherwise, the entire retreating force might have been captured, or at least severely harassed and despoiled. Profiting, however, by this experience, the Germans soon after had a system of winter sholing introduced into their Army—that of steel pegs screwed into the shoes, and this proved of great value to them during the war with France in 1870–71, as the French were not so provided during the winter, and were, consequently, on many occasions placed at a serious disadvantage—at times, even, large forces were gravely imperilled. For while the Germans could move freely on ice-covered roads, the French mounted corps could scarcely stir. Numerous instances of this state of affairs were recorded at the time and subsequently, and one in particular was cited some time ago in a *Bulletin de la Réunion des Officiers*. "An officer to whom I was speaking of the necessity for having a good system of winter sholing (*ferrure à glace*), told me that he had been of that opinion for a long time. He was with the Army of General Bourbaki during the war of 1870–71, and had witnessed the unheard-of efforts of the men and horses, to save as much as possible of their provisions and materials of war, on retreating into Switzerland. For lack of any better appliance, rags and wisps of straw were fastened on the horses' hoofs, while the men pushed the wheels; but their efforts were in vain! . . . This Officer saw a Lieutenant of Artillery in a state of extreme despair, because two of the guns of his battery had rolled into a ravine dragging their horses with them, owing to the unfortunate animals not being able to keep their footing on the snow and ice. . . . In January, 1871, the retreat of Bourbaki's Army was converted into a veritable disaster in consequence of the absolute failure of shoes provided with appliances for ice travelling." The *Revue Vétérinaire* for October, 1876, corroborates these statements with regard to the misfortunes of the French Army of the East in 1870–71, due to this neglect. "Our Cavalry," says that Journal, "composed of good horses, partly obtained by requisition, was reduced to impotency by the obstacles which the snow and ice opposed to its progress; while the Cavalry of the German Army, furnished with steel screw-studs (*grappes d'acier à vis*) marched, as General Martinez, one of the unfortunate Bourbaki's Officers, informs us, with no more difficulty than if they were on the finest roads. This is a new instance," it adds, "for determining us to be provided for the future, and to discover the readiest and best frost-sholing."

These examples will, perhaps, be sufficient to illustrate the

influence the art of shoeing has in maintaining the efficiency of armies, and what grave calamities may ensue, when, from lack of foresight, or through ignorance or carelessness, any of its details are neglected, and soldiers are helpless at a time of grave emergency.

What can be more discouraging to an army in retreat, than to be compelled to leave its feeble, sick, and wounded men, and its guns, ammunition, baggage, and stores, to be destroyed by the weather, or to fall into the hands of perhaps a merciless enemy; when some simple device, suitable to the occasion, would have saved them? The destruction of the horse and its rider, or the loss of a city for want of a horse-shoe nail, as mentioned in the proverb, is a mishap not so improbable after all.

There are various appliances for securing a foothold on ice or slippery ground, but the majority of them do not meet all the requirements that must be provided for. The ordinary method of "roughing," by taking off the shoes, heating them, and turning up a sharp calkin—in some cases welding on a sharp toe-piece, is most objectionable; because it damages the hoofs, requires much time, is very expensive, and only lasts for a day, when the operation has to be repeated. It was the only method we had in the Crimea, but it had to be given up as impracticable, and our mounted corps there in the severe winter of 1855-56 were, it may be said, immovable—utterly helpless. The screw-pegs which the Germans used in 1870-71 are an old invention; but they have their drawbacks in being expensive and require much preparation, while if they are screwed too far through the shoe they are likely to lame the horse, and they are also liable to break at the neck.

Frost-nails, if driven through the hoof, damage it, and if only fastened through the shoe, are apt to wound the horse's legs; while they are soon worn away.

Seeing the necessity there was for having some fixed system of winter shoeing in the Army, for more than a quarter of a century I have endeavoured to introduce a method which would meet every requirement, having tried all the others. About fifteen or eighteen years ago, when with the Royal Engineers at Chatham, I used steel pegs of a pyramidal shape fitting into square holes in the shoes. These answered admirably, and during the winter months the mounted corps employing them were quite independent of the weather and the farriers, as every man could render his horse secure against slipping in a few minutes. To ensure greater accuracy in the peg fitting into the shoe, in recent years I have had the shank and hole round, and this change appears to have made the system perfect. A peg is placed at the end of each branch of the shoe for riding horses, and for draught horses one or two in the toe. The pegs are of three sizes, are of tempered steel, and can be removed or inserted into the shoes speedily and with the greatest ease, by the soldiers themselves. By their employment a whole army could be rendered capable of moving at any speed over the most slippery surface in a few minutes, without the aid of farriers—for I maintain that no system of winter shoeing is perfect which requires the intervention of the farrier.

While in the 2nd Life Guards, I had the horses shod with the prepared shoes all the year round, blunt pegs being worn in summer to prevent slipping on the London streets, and sharp pegs if there was ice.

And this leads me to observe, that considering the very slippery character of the street pavements in our towns and cities, and the danger to horses travelling on them, and especially if troops have to act in suppressing riots, the desirability of having the shoes issued for everyday use all the year round prepared for these pegs, is a matter for consideration. At any rate, shoes for winter use should be so prepared; as at present, during frost and snow troop horses cannot leave their barracks, whereas they should be able to travel at all seasons of the year in any climate.

As I have stated, all the ordinary methods of winter or frost-shoeing are more or less objectionable, either because of the time required to effect it, the damage done to the horses' hoofs, the expense, the inefficiency, or the complexity of the means. What is above all needed, is a method which is at once so simple that it can be immediately applied by every trooper without recourse to farrier or forge; and so durable and effective, as well as safe and inexpensive, that it will cause but little inconvenience in using, or cost in providing.

This method appears to fulfil these demands. It is so inexpensive, that for a few pence a horse can travel securely at any pace on ice for a month, and it is so simple and readily applied that the horses of a whole army corps can be prepared for marching on the most slippery roads within half-an-hour.

It has been put to severe tests by myself for many years, and it has been tried repeatedly and successfully at home in Cavalry and Transport. One of these trials was in the 4th Hussars at Edinburgh and Glasgow three years ago, during a severe winter. The report was: "The cogs (pegs) are easily put in and taken out; very few have been lost, and none need be if they are carefully put in. They are also easily sharpened when worn down, and they last well." The horses so shod travelled on the ice and snow-covered roads nearly every day without accident, and with absolute safety—the men putting in the pegs on leaving the stables, and taking them out on returning to barracks, without the intervention of the farriers.

I may add that the Swiss Army has adopted our new system of shoeing, pattern of shoes, and appliance for enabling horses to travel on ice and slippery roads; and from a letter received from the Director of Artillery, Colonel Schumacher, the results were very marked during a recent trial. He writes:—

"On February 18th we assembled at Burgdorf, the 4th Regiment of Cavalry (3 squadrons) and two companies of guides. All the horses were shod anew, cold, with newly-ordered shoes from London (Greenwich); the holes for the pegs (Fleming's) were drilled in Thun, and the pegs were furnished from Vallorlies—all on the shortest notice. The farriers shod about nine or ten horses each per day, and on the 21st all went off for three days through the lower mountains, with ice and snow a yard deep everywhere. All went well, and even the wagons

were able to follow. Our new shoeing is a success, notwithstanding that all of Dr. Fleming's ideas were not adopted by all the members of the Shoeing Commission. The French were, I hear, very much surprised at the system working so well, especially the winter-shoeing."

It is a matter for regret that in towns which have slippery roads all the year, advantage cannot be taken of a simple plan like this to economize horses' powers, and spare them distress, fear, and injury. It is very painful to pass along some of our streets, and witness the amount of horse-torture and loss of power that occurs during certain states of weather; and it certainly does not say much for the common sense or humanity of those who shoe the horses or construct the roadways. It surely would not be undignified or degrading to adopt a hint from the Army, and guarantee the poor horses who have to toil on wood pavement and asphalt from cruel injury.

The Rev. THEOPHILUS BENNETT: I am sure if a horse could speak, he would thank the worthy lecturer for the very excellent paper he has delivered on the present occasion, and I would like to be voice for the horse, and thank him from the bottom of my heart for it. I have often wondered why a horse-shoe,—in Ireland especially,—is generally looked upon as an emblem of luck, and I never knew the reason until I heard it to-day. We find that for want of a nail the shoe was lost, for want of a shoe the rider was lost, and for want of the rider, I suppose, the city itself might be lost. Hence, I think, it is that a horse-shoe is the emblem of luck. Then, with regard to shoeing, I think the farrier requires to be a very intelligent man. We often see that the veterinary surgeon requires to be a cleverer man than the human surgeon, and why? The human surgeon can ask his patient what is the matter with him, but the veterinary surgeon has to find it out for himself. I think it is the same with the farrier. If I go to my shoemaker and the shoe pinches me, I can tell him, but with the poor horse if the shoe is badly put on, if it is not a good fit, he cannot tell him, and, therefore, I maintain that the farrier requires even more cleverness than the shoemaker. And, then, I often wonder how it is that horses seem to like to be shod so much. I often have the treat myself of taking a horse to the forge. I like to take him and see him shod, and I have often wondered at the alacrity with which he allows himself to be taken to the forge. I think it is that he rather likes it, and, therefore, I think those who are horse-owners ought to shoe their horses regularly and not to care for removing a shoe, paring the foot, and all that, and putting on the old shoe again. If we shoe them regularly once a month, their feet require very little attention, except on the occasion when the horse is shod. I have also found that when horses have a tender sole, it is often desirable to shoe them with leather. I quite approve of everything that has been said with regard to winter shoeing. I think it is a very good plan to have the horse shod in winter in such a way that you can remove the screw, and put in an ice chisel; then you have no trouble all through the winter. Your own groom can remove the little thing that is put in as a spike, and in its place put in the ice chisel, and that ice chisel I have found very effectual in winter in keeping the horse from slipping. I quite approve of what the lecturer said about the steel pegs. There is only one other subject I wish to allude to, and that is as to whether india-rubber might not be introduced advantageously in horse-shoeing.

Mr. LANCASTER: Mr. Chairman, ladies, and gentlemen, I did not expect to say anything when I came here, but after what the Professor has said, I think I am in a position to say a few words. I am not a farrier, but I am an amateur horse-shoer, that is, I have seven or eight horses of my own, and for years I have turned my attention to improvements in shoeing, and have spent considerable time and money in this way. In the first place, there is no doubt that these spikes are very good things, but I am surprised to hear the lecturer say that the blunt spikes will

prevent a horse from slipping, because I have made inquiries of those who had used them, and find that after the edge has worn off, they slip as badly, or worse than the common shoe, because there is not that surface exposed to the road. I have had considerable experience in trying various horse-shoes. You know that Douglas in his horse-shoeing work recommends shoes with channels. I have tried various channelled shoes. A gentleman spoke about india-rubber. I tried india-rubber. It is a very good thing on the asphalt, but it is not so good on a wood pavement, and on a piece of macadam the india-rubber is all gone in half-an-hour. I do not think that india-rubber, or any composition of india-rubber, would stand an hour on macadam pavement; therefore, if you want something to stand on all pavements you must find something else. I came to the conclusion at last that wood cut across the grain is the best anti-slipping substance that can be. Four or five years ago I took out a patent for this. I had an office and tried it for three years. I had it on my own nag horse, which I drove early in the morning through the streets of London. I have been on the wood pavement, on the asphalt, and on the macadam on frosty mornings when it has been very slippery and scarcely a horse could stand, and I have invariably come through the streets without slipping at all. I had gone for nearly twelve months without slipping, and I congratulated myself upon the good fortune I had. I can say that I have driven my horse for twelve months and that it has not slipped once. I was, however, on one occasion surprised and disappointed to find my horse did slip. But when I got home and had him examined I found that, unknown to me, one of my new shoes had come off, and they had one of the old-fashioned shoes put on, and that was the cause of the slipping. Some gentlemen wished to see it tried, and I took a very heavy wagon of manure—I am connected with land—up and down Ludgate Hill, and then they wished to see it further tried, and I went to Tooley Street, and there I suppose is the worst hill we have about London, from Tooley Street up to London Bridge. It happened to be a damp day, and the wood pavement was very slippery, but the horses went up the hill and over the bridge without any slipping at all, and the gentlemen were quite satisfied. I may be asked, why has not this plan been adopted? Well, unfortunately I had got into the hands of what I suppose you may call schemers, gentlemen who having got the cow to milk have kept on milking it for their own interest, and the end of it was that the solicitors of the gentlemen who found the money put a stop to it—the fault was not in the shoe, but with those who were going to bring it out. I am sorry I have not a shoe here; but since then I have still persevered, and I have a shoe which I am now trying, and have been trying for two or three months—the same shoe with this addition, that it is put on without nails, and after four or five different trials I have got the thing as high perfection as it can be. I will not say that it is all perfection, but in the course of a fortnight or three weeks I hope to be able to exhibit this shoe, and to show that it is a real anti-slipping shoe, and one that requires no nails to fasten it. Although I have been very fortunate of late years, still I remember that I had three horses that got pricked and died within twelve months, and there is no compensation for it. Farriers are very often poor men, and if you go to law with them, you get the worst of it, so that you have to put up with it. I think it will be a good thing if we can do without nailing a shoe on. With this shoe of mine a handy man would learn to put it on in a day, and I do not see why the time should not come when each horse soldier shall be able to put his own shoes on, and I am sure you will acknowledge that it would be a capital thing in war for every man to be able to shoe his own horse. I intend to exhibit the shoe in the course of a few weeks, and you will perhaps be able to see it then—at the Exhibition of Horse-shoes at the Animals Institute, Wilton Place, Kinnerton Street, Knightsbridge.

Major TODD, Middlesex Artillery Volunteers: I think from the humanitarian point of view alone that this question is well worthy of discussion in this hall. It has been commenced by an admirably written paper by Dr. Fleming to-day, which might well lead us all to ask ourselves why we cannot use shoes without nails. From the very commencement of keeping horses I always found that accidents were happening by pricking horses' feet, and I have no doubt whatever that that was the cause, either directly or indirectly, of a great deal of disease in their legs. I must say that my

experience has been rather different to that of our friend, whose horses always liked to go and be shod. I have found that a horse has objected to enter the forge because it had been so badly used by putting on the shoe and burning the hoof, in order to make the foot fit the shoe instead of the shoe fitting the foot. I have had to get rid of two horses at different times, solely from the fact that they objected to go into the forge, and fought and kicked terrifically when they were there rather than be shod. I was very glad to get shoes on them again and send them up to the hammer. I cannot help thinking that a shoe fixed with nails must be a great bane to the horses' health, and I know it is a great bane to the horses' owners to find that they had had horses pricked, and consequently they had to send them to the salt marshes or out to grass for some months in order that they might recover to some extent. Therefore to get a horse-shoe adjustable without nails I thought would be the *acme* of perfection. For twelve months I have used my horses shod with shoes without nails. I saw the nailless shoes exhibited at a show, and took the opportunity of discussing the matter fully with the man who was showing the patent from almost every point of view, in order to hear what he had to say about it. Of course when one sees a new invention of that sort, one is apt to think that it cannot be perfect, but I have no hesitation in saying that I have found in the twelve months that I have used those shoes that they are simply perfect, and have borne out every statement that has been made with regard to slipping, and with regard to having no particular india-rubber patent pad to fill up the space that has been cut from the frog, &c., by the blacksmith. Further, I was at the Agricultural Hall last year at the Military Tournament, and my horse's feet, shod with the nailless shoes, were examined by military Officers, and they were surprised to see how beautifully the frog had grown down and how sound the foot had become, and that when the horse travelled, whether on asphalt or on soft stuff, there was no place left for snow to ball in, no place left for a stone to get under. To cut away the frog seems to me most ridiculous, if not worse, for if you take up almost any hoof with a patent shoe upon it you will see that the horse's hoof has been made by the hand of man a very different thing from what it was by nature. You can see no frog in many cases, and in some cases the horses through having a frog continually cut away have got terribly injured and never recover, and very likely have to be poleaxed from that reason alone. If my horses were to die to-morrow and their feet taken off you would see the natural horse's feet, with the natural soles and frogs, with grooves round the outside edge for the shoe. The best natural shoe fixed with nails I ever used before I adopted this nailless shoe was a shoe brought out by a veterinary surgeon, who called it the Rational Horse-shoe, because he allowed the frog to grow completely on to the ground, and there you have the advantage of non-slipping, because when the frog is on the ground, the horse does not slip. I proved it every day last week with a horse and victoria upon asphalt and roads of all kinds, and, though I saw horses down in all directions, my young horse, only five years old, travelled with perfect impunity. That is the best proof that you can have. I have two draught horses shod in the same way, and I should be very sorry indeed to go back to the old system of nailed shoes. I can only express my hope that we shall shortly be able to get the shoes at a reasonable price, and made out of a good metal. It is not a question of what kind of shoe you shall have; it is whether you can adjust the horse-shoe to the foot without the horrible hammering of nails into the beautiful hoof.

Mr. F. DUCK (Army Veterinary Department): Mr. Chairman, Dr. Fleming, and gentlemen, I should like to add a few words in corroboration of what Dr. Fleming has said as to the system of cold shoeing. In South Africa in the Jaika and Galeka and Sekukuni War of 1878, we always had great difficulty in keeping horses useful and efficient for want of proper shoes, and of farriers to put them on. The shoes and the nails of the old regulation pattern were too large for the small colonial horse, and we had to obtain shoes locally; those were of a very inferior quality. Then, as to the shoeing, the farrier gets in South Africa in private life perhaps 25s. a-day, and we never could persuade any of them to volunteer. The result was we were very much put to it to keep the horses going. For army horses it is always advisable to have them shod in the hind feet as well as in the fore feet. In the Sekukuni War we found this to be absolutely necessary. The colonial horses

never in their lives had shoes on their hind feet. Many of them at twelve or fourteen years of age would come back from a long patrol over hard ground, as tender as possible; the hind feet presented the appearance of having been rasped, almost ground away, and blood coming through in spots both at the frog and at the toe. In the Bechuanaland expedition in 1885 we took a supply of the new pattern cold shoes, and also a staff of trained farriers. For the colonial horses these shoes answered admirably; they could be worked either hot or cold. I have often seen a man alter the shoe on a wagon wheel and occasionally upon a stone, that is alter the shoe cold. Even the farriers could say nothing against them, and they are the most conservative of men. I remember asking a farrier, "What do you think of these shoes?" "He didn't think anything of them; they were bad." "Why?" "He did not know." "Did they work well?" "Yes, they worked well." "What fault do you find with them?" "Well, I don't know, except that they will hurt our trade, and therefore we are all dead against them." The trained farriers that were sent out were a most useful set of men, and in addition to the shoeing, they enabled the veterinary Officers to assume a very much larger charge; they gave them much more time to attend to the duties of the department, in fact, in the Orange River expedition we had always complete veterinary supervision. The casualties amongst horses, mules, and transport animals were very much less than they had been in any previous expedition in South Africa. In the Zulu and Boer Wars the losses were very great, I am afraid to quote them; but in Bechuanaland the percentage of loss was 6 per cent. horses and mules, and only 7 per cent. in the transport animals. Possibly for these small percentages, the veterinary staff may claim a little credit.

Mr. W. B. WALTERS, Army Veterinary Department: There are one or two points I should like to make a few remarks upon with reference to Dr. Fleming's lecture, and in support of what he has said with reference to the new system of shoeing, and the reorganization of the farrier's department. With regard to the new system of shoeing, Dr. Fleming has quoted from my report on the Suakin Campaign. That was the first campaign, I think, in which machine-made shoes were used. If I remember right, we had some little difficulty at first in procuring the shoes from the field stores, but afterwards, we had no trouble in keeping the horses properly shod. Had the campaign been extended, and the march across the desert to Berber taken place, it would have been impossible to have kept the horses properly shod up under the old system, because we could not have possibly dragged heavy forgo wagons, coal, nails, iron, and all the plant necessary for horse-shoe making through the desert. Consequently, I consider, for active service, the new system is as simple and perfect as any that could possibly be devised. I have had some experience in the trials that were made before and after the Suakin Campaign, because during the time I was in charge of my department in Ireland, I was entrusted with the experiments that were carried on in Dublin. These experiments were conducted by two regiments, the 18th Hussars and the 16th Lancers. Both regiments were ordered to shoe "cold" for a given period, and no fires were allowed to be used. Notwithstanding this, I think I may say that horses were never shod more perfectly than those of the two regiments I speak of. On one occasion the General Officer Commanding, Prince Edward of Saxe-Weimar, intimated that he should like to see the working of the new system, and on a given day one horse per troop of the 16th Lancers was paraded in the barrack yard; these animals were shod by their own farriers. The old shoes were taken off, the feet prepared, new shoes altered to fit, nailed on, and the whole operation finished in a very short space of time, the longest time occupied being thirty-five minutes, and the shortest fifteen minutes, from beginning to finish. When it was necessary to alter the shoes for the purpose of fitting, this was easily done upon the wheel tire of a squadron cart. The horses were carefully inspected by the General Officer Commanding, and also the Officers of the regiment, and the result was most satisfactory. I think this is quite sufficient to demonstrate the excellence of the new system. With reference to the durability of the shoes, I found that they lasted—with ordinary wear—from thirty to sixty days, but they were not put to any severe trial, and the shoes were allowed to wear out completely. The regimental farriers were certainly not in favour of the new method

of shoeing at first, because the abolition of the contract system represented a pecuniary loss to them, but that, I am glad to say, has been successfully tided over, and the very men who were opposed to the system are now the first to recognize its advantages. As Mr. Duck has already observed, farriers are a very conservative race and naturally object to any new system, especially when it touches their pockets. That is now, however, a thing of the past as far as cavalry is concerned. The system is to be extended to the artillery and other mounted corps, and I very much fear we shall experience the same obstacles from the farriers as we met with in the cavalry, but I feel convinced that if the matter is taken up in a proper spirit all dissatisfaction will as speedily disappear. I remember well the shoes sent out to South Africa for use during the Zulu Campaign. They were hand-made and very inferior, so much so that very few could be applied without heating, and in many cases it was necessary to entirely re-make them. The trouble and inconvenience thus caused can readily be conceived. The great advantages of machine-made shoes are the ease and celerity with which they can be altered and fitted without heating, their uniformity of make, and also their durability, from the mode in which the iron is manipulated during manufacture. As regards the second point—if I may call it so—of the lecture, the reorganization of the farriery system is a most important movement. The experience of former campaigns has taught us that farriers are generally the first class of men to succumb to the hardships of war service, and that under the old system it was simply impossible to keep the horses properly shod up, or to provide skilled assistants in sufficient numbers for hospital duty. Under the new system we shall have a number of trained men in the ranks available for shoeing purposes, and a staff of farriers efficiently instructed in the details of hospital duties. We know that in war-time corps are frequently formed such as mounted infantry or auxiliary cavalry, and these corps require farriers, but formerly they could not be provided without depriving the mounted corps of the Army of men which they could ill spare. The present system provides for this difficulty. Another point of importance is that as an army advances, veterinary hospitals must be established along the lines of communication, and for this purpose we shall now be able to place our hands upon a number of trained hospital assistants in whom every confidence can be placed. This is a very important point to look at, because we know perfectly well that without men who thoroughly understand the care and management of sick and lame horses, it is impossible for a veterinary Officer who has miles of country to travel over every day, to do his duty satisfactorily either to himself or to his commanding Officers.

Mr. QUERRELL (Army Veterinary Department): I feel sure you will all agree with me when I say that we have listened to a most interesting and instructive lecture from Dr. Fleming—interesting, because the question of shoeing must always be one of the greatest interest to everybody connected with the mounted branches of the Service; for what use would it be to have a good lot of horses, or if those horses were in good condition, if our system of shoeing were bad? Instructive I say, because the lecturer has brought very forcibly before us a new system—if I may call it new—a system of cold shoeing, which is now generally adopted in the cavalry. Five years ago, when in Dublin, serving under Mr. Walters, I had the opportunity of trying cold shoeing as an experiment in the Army Service Corps. The work of this corps in Dublin is hard, and moderately fast, and is over macadamized roads and pavements. What did we find? We found the shoes not only wore well, but were seldom lost. I think that then I was fully justified in predicting a grand future for cold shoeing. Years passed, and I had no opportunity of testing the system again, but when the opportunity did return it was on a very extensive scale. During the whole of the last drill season, while officiating as Inspecting Veterinary Surgeon of the Aldershot Division, I had six cavalry regiments, the shoeing of which I supervised. I could watch carefully the shoeing in all those regiments, and I can confidently say that no system could possibly have worked better. I could perhaps have spoken to-day from my own observations, but I had no certain data to go on. I could only have generalized, and therefore I thought it advisable to ask for some statistics with reference to the loss of shoes. Colonel Verelst, commanding the 11th Hussars, wrote to me that, including marching from various out-stations to Dublin, and from Bristol to Aldershot, going

through the whole set of manœuvres at Aldershot (and I must say that a drill season at that station includes fast work and hard work, often over rugged ground which would test any system of shoeing), he says, "No system of shoeing I have tried before has ever answered so well as this has done, and I am bound to say that from the 20th of June to the 9th of October, whilst we were doing such hard work, my regiment only lost forty-three shoes," that is, 10 per cent., reckoning one shoe to each horse. The 16th lost about thirty during the three months, and the 19th about the same, an average of four or five per troop. But there is one point with reference to the 19th I would like particularly to bring to notice, and that is that one troop during the whole drill season lost but three shoes. Now it is not because this certain troop had good feet (perhaps the feet were in good condition because the farrier was a good one), but if one troop could do that, why could not it be done generally through the Service? And I maintain that if the farriers and the assistants will only see that broken nails are replaced, and that the clenches are down before the troop starts away, very few, if any, shoes will be lost. I wish particularly to lay stress on this point, because Colonel Graves, in the discussion on a lecture delivered by Mr. Walters a fortnight ago, said that a very large number of shoes were lost by his regiment at Handoub, and if I gathered rightly, I think he attributed it to the fact that the clenches were rasped down for the purpose of making them look better. I think the cause must be looked for elsewhere, because I have never seen clenches rasped down in this way, and not only that, but if they are, it is against the Regulations. I think the cause must be looked for in the very peculiar ground over which the 20th had to travel. There is no doubt that they had to work over ground that tore the shoes off. There is one more point I would like to mention, and that is the issuing of shoes in time of war. To make this system a success, it is of paramount importance that all those who are connected with the issuing of shoes should be thoroughly acquainted with the number of sizes of shoes and the nails that should be issued with them. Now we all know the multifarious duties that devolve upon the Ordnance Store Department in time of war, and I ask, is it feasible to expect that everyone in that Department should have a knowledge of horse-shoes and nails? I say, No; therefore I would strongly recommend that an Officer of the Veterinary Department should be attached to the Ordnance Store Department, in order that he might be held responsible for the issuing of these stores. I know perfectly well how short-handed we are in time of war, and perhaps an Officer could not be spared, but still there is always an Officer at the base to issue veterinary medicines, instruments, &c., and the issue of shoes and nails might also form a portion of his duties. It would obviate what occurred during the River Column of the Nile Expeditionary Force, 1884-85. I was in veterinary charge of this column, and attached to it was a squadron of the 19th Hussars. I at once set to work to make myself acquainted as to whether they were well supplied with shoes and nails, and you may judge how horrified I was to find that they had brought 6 shoes and 200 nails per troop, 12 shoes and 400 nails for a squadron, perhaps for three months' work. The shoeing, therefore, of that squadron was always a source of the greatest anxiety to me. There I saw those plucky little Syrian ponies, not more than 14 hands high, carrying heavy weights, galloping over solid rock without a shoe on their feet. Of course this want of shoes had to be accounted for, and the Veterinary Officer, in his final report on the splendid work done by the horses of this regiment, said that he had asked for 400 sets of No. 1 shoes to be issued, but that they were not forthcoming. At the last moment locally made shoes and nails were given, but they were so thoroughly bad, being too large and the nails also, that they were handed back to the Ordnance Store Department on the first possible occasion. I can only add one thing in conclusion, and that is, that I shall hail the day with delight when I see this system of cold shoeing generally adopted throughout the Service, for I am perfectly certain that those corps who do not adopt it in time of peace will fare very badly in time of war, for the great advantage of this system is that it assimilates the system in time of peace to that in time of war, and therefore makes everybody connected with shoeing acquainted with the duties that they will have to perform on active service.

Colonel COLVILLE:—I should like to ask whether since the introduction of these

shoes more horses have been pricked, whether they have suffered in a greater percentage from quitters, because it is maintained by some that where you have fullard or berelled shoes you cannot direct the nail with the same accuracy into the hoof, and that consequently there are more pricks. Has Dr. Fleming any experience on that point?

The CHAIRMAN (Sir B. Walker): I am sorry that I cannot see a cavalry soldier on his legs. One would almost have thought, after a lecture like this, we should have got somebody up to give us their experience. A more important lecture as regards that branch of the Service could hardly have been given. To-day, as I read over the lecture, I thought of the old story which was told, I believe with perfect truth, of 1818, when a timorous Minister rushed to the Duke of Wellington to tell him that 100,000 Chartists were going to march from Birmingham on London, and dictate terms to the Government. The only remark that the Duke allowed himself was a grunt, "Who is going to find them in shoes?" I think we may say the very same of our mounted services, cavalry and artillery, and I am very sorry that so few of those who might profit by the lecture have been here to-day to listen to it, and have left it to an old fossil like myself to say a few words on the subject. A great many years ago, when I was a Captain of cavalry, I was brought into communication with a gentleman named Miles, living in or near Exeter, who taught me instead of using seven or eight nails to use only five. I was very much impressed with what Mr. Miles said, and although I did not agree with all his theories, I adopted the system of shoeing with five nails. I had a very good farrier in my troop, and there was a particularly good farrier-major in the regiment. I hardly like to say what my memory suggests to me. I hunted for five consecutive winters in Ireland. I did not ride very light, and always rode pretty hard, and I only remember one occasion on which I lost a shoe. I took my horses out to the Crimea, where I still shod with five nails, and I perfectly remember during the short time I served with the cavalry there I only lost one shoe. Therefore, as far as my memory carries me, shoeing with five nails, shoeing with great care, which was necessary with the fewer number of nails, gave results which we certainly could not have previously looked for. I was in hopes Dr. Fleming would have told us something about nails, and I think he told me before we came into the room that at present they shoe with only four nails, and that the change is successful. I think that is a most valuable fact. There is no doubt that the late barbarous system of driving an immense number of nails into the horse's foot was most hurtful. And another barbarity of my early days with horse-masters was that the frog was always cut away in a *beautiful* manner. As well as I remember, I never allowed my farrier to use anything but a pair of scissors, he was never allowed to do more than trim off the rough edges. I do not know whether Dr. Fleming will support me in that. I think we have had a most instructive lecture. Most of the speaking has been, I might almost say unfortunately, from those who agree with Dr. Fleming, and I should have been certainly happier if we had had one or two speakers from those who do not altogether agree with him, because we should probably have drawn from him even more valuable observations than we have had in the lecture. I certainly do not differ with him. I entirely agree with him in all that he has said, and I must confess that I have seldom read, having much interest in this very subject, a more valuable and profitable lecture than the one we have just listened to. Dr. Fleming will answer some of the remarks that have been made, and he will then show and explain to those who take interest in the matter some of the instruments that are on the table. But I am confident that I am justified in asking you to empower me to tender to him a very sincere vote of thanks for the lecture he has given us.

Dr. FLEMING: The replies which I shall have to make to the remarks will be brief. The necessity for horses wearing leather soles has been mentioned. There is not a horse in the British Army shod with leather soles, simply because it does not require them. If the horse's foot is left in its natural condition un mutilated, it requires no artificial sole: and if the frog is left uncut and sound and strong, no protection for it is required. No doubt india-rubber will, to some extent, prevent slipping, as the horse's frog itself will; but it must be remembered that on asphalt and wood in certain conditions that substance will not do so. When there is a layer of greasy mud on such pavement, you must have something to bite

through it, or you will have slipping. A horse shod with india-rubber, if the pavement is slippery but clean, will not slip. Besides, india-rubber will not answer for draught horses. Horses which have to move heavy weights must have a firm grip of the ground. And I may remark that there are no horses in the three kingdoms worse shod, with regard to slipping, than those in the streets of London. If you go to Glasgow, Manchester, Newcastle, any one of our large cities, you will find their horses more reasonably shod, draught horses especially: these have projections on the ground-surface of the shoes in order to bite the ground. Nowhere out of London, perhaps, will you see horses labouring under the same painful conditions in moving loads that you will here. I therefore think the farriers of London, although they have a Farriers' Company of great antiquity, are greatly to blame for allowing horses to travel on slippery streets with shoes perfectly smooth on the ground surface: in fact, nothing could be better devised for facilitating slipping than the shoes the horses wear. For cavalry and for a horse which has to travel on slippery roads or ice, it is necessary to maintain surety of footing, and especially for those that have heavy weights on their backs or to draw, you must give the shoe rough sharp surface, such as we obtain by short projections from the shoes. We have found that out, and therefore our aim in the Army has been to give the shoe such a grip. We allow the horse to work with an ordinary shoe when there is no slipperiness, but provide every horse with means for enabling it to travel with safety when there is. The great object has been to introduce something which is at once simple, effective, and cheap. Anything which is complicated, like this shoe of Professor Domenick's, which is here before you, which has been used in the German Army, will not answer. This is a very cumbersome piece of mechanism: it will gather snow and retain it, and it requires a special shoe to fit it, while it is very heavy. I do not know that anything simpler has been yet devised than the system which is now introduced into our Army. Every soldier, on commencing a march in winter, can put a few pegs in his pocket, and he is secure against the weather. At Chatham, many years ago, the transport used to leave the garrison with ammunition for Gravesend, Maidstone, and Sheerness. The men had a few pegs with them, and were absolutely independent of the weather. We had some very severe winters then, but the men had no accidents. When the roads were slippery, they dismounted, cleared out the holes in the shoes, put in the pegs, and started on their journey. That is the kind of winter shoeing we want. Whenever you come to apply india-rubber shoes, or make a composite shoe of any kind, you have a great deal of trouble. In the first place, the farriers in London will not put on such shoes. Civilian farriers generally belong to Unions, and anything likely to interfere with their business they will oppose. Not only that, but when you come to put india-rubber, wood, or other material in the body of the shoe, the shoes will be very insecure on the horse's feet. The material, being soft, will not retain the nails. I have tried almost everything which has been invented, and have always had to fall back upon the old-fashioned nailed shoes. Shoes which are adjustable or fastened without nails have hitherto proved a failure. They have been tried for the last fifty years at different times; I have tried several myself, but they have all been very cumbersome, sometimes dangerous, and very expensive, or very apt to leave the horse. After all our experience, we come back to the old fastening with nails. I may remark that the man who invented horse-shoeing was one of the greatest benefactors the world has ever seen. He must also have been a bold man, because, to drive a nail into a horse's foot, without understanding the anatomy of that organ, must have been a very hazardous experiment. The immense value that shoeing has been to the human race entitles the inventor of horse-shoeing to a large amount of gratitude from us. With regard to horses being pricked in shoeing, such a thing is unknown in the British Army. The horses are allowed to retain their feet in a natural condition. So strong are the hoofs that we can teach an amateur quickly to shoe a horse in a few minutes and without accident. I think from year's end to year's end we do not have a case of injury in shoeing, judging from the reports which reach my office. But if the hoof is cut away and scarcely a y horn is left, then it requires a very skilled workman to shoe a horse, and there is great danger of the animal being pricked. Yet such a thing as a horse being pricked in shoeing should be one of the rarest events. I think there are 15,000

horses in the Army at home, and I do not think in any reports we shall find a single case of a horse pricked in shoeing. I am extremely sorry that some of the mounted corps Officers are not here to assist us in the discussion, because the opinion of those either for or against the new system would be valuable. It has had a great amount of opposition to overcome, but I am glad to say, so far as the cavalry is concerned, that opposition has entirely ceased. Cavalry Officers see the advantages of the system; and I think some of its very warmest advocates are to be found in the cavalry. I trust it will be found the same in the artillery and the other mounted corps. The supply of farriers in the field is a most important business, for in all the expeditions of which we have records, and those in which I have been myself, the farriers have been the first men to succumb to the fatigue of the campaign. Not only that, but by some bad luck in action they get knocked over in a most extraordinary manner. For instance, the 19th Hussar, in the action of El Teb, left two farriers on the field out of a very small number. Farriers are always coming to harm, therefore, unless we have an excess force beyond the actual requirements of the corps, we shall be in a bad fix. This number of extra men to be taught has been fixed at 10 per cent.; if these men go into the Reserve and others are constantly taught, in future campaigns we shall have no difficulty whatever in meeting all the demands for shoeing—we shall have a large number of men in the ranks able to shoe—the number, in fact, will be so large that it will be pretty well equivalent to every man being able to shoe his own horse. I do maintain that a man who rides, or who owns a horse, ought to know something about horse-shoeing. Every man who has to ride a horse day after day, and whose life may depend upon its efficiency, should know how to shoe the animal. I am a strong advocate for every Officer being able to shoe a horse. I will not venture to detain you longer, but return you my hearty thanks for your patience in listening to my lecture.