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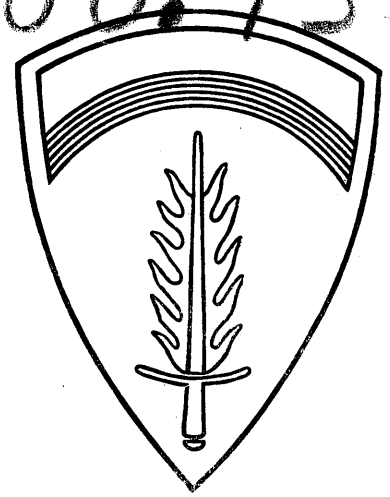

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# HORSES IN THE GERMAN ARMY

## (1941 – 1945)

HISTORICAL DIVISION
HEADQUARTERS, UNITED STATES ARMY EUROPE
FOREIGN MILITARY STUDIES BRANCH

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# HORSES IN THE GERMAN ARMY

# (1941-1945)

By

Generalmajor Burkhart Mueller-Hillebrand

Historical Division
HEADQUARTERS
UNITED STATES ARMY, EUROPE

FOREWORD

In preparing this study the topic leader has drawn upon the experiences of an imposing number of experts. Its large size along indicates the many considerations necessary to cover the subject. The numerous contributions have been well organized and convincingly evaluated to produce a valuable work.

Any nation faced with the possibility of waging ground warfare in Eastern Europe must consider the material contained here in the light of its own industrial and manpower potential, for it will readily be seen that much of Germany's experience in Russia was shaped by her lack of resources and inability to commit sufficient motorized forces. Experience has made it clear that only motorized armies are able to bring wars to a quick conclusion. Modern armies must be organized for rapid movement, for which technology must provide motors adapted to every possible theater of war.

The question is asked whether the forests and swamps of the East might not be by-passed, thereby avoiding operations in terrain not suited to motorized movement. If the Wehrmacht could have forced a military decision by sweeping northward from southern Russia, with its right wing roughly along the Volga, the extensive swamps and forests of the north

would have been avoided and experience concerning the value of horses might have been different. Moreover, recent progress in atomic warfare now makes it possible to deny the enemy exploitation of sparcely populated areas. If an army can mobilize the motorized combat and supporting forces necessary for offensive operations in the East, the use of horses will be limited to only a few occasions, such as during the muddy season. The indispensable preparations for such employment are described in detail on the following pages.

The use of cavalry in the East will never be worth the expense. Mountain forces also seem to be unjustified, for no military decisions will ever be made in the Arctic or in the Caucasus.

I personally favor a solution without the use of horses. Certainly the problem must be considered in all of its command and organizational aspects. Much will depend on whether science can develop new techniques to improve mobility. If the motorized forces necessary for operations in the East are not available, perhaps a decision could be forced by other means of war, especially those provided by a modern air force.

Ultimately the decision whether to include horses as a regular means of transport in the East must depend on the

nation's war potential. Any attempt in the course of a campaign to employ large numbers of horses without advance preparations can only lead to failure.

Generaloberst Franz Halder

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---

[1] Armored infantry

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## PREFACE

The study follows in general the form suggested by the Historical Division. Only in the final chapter were remarks extended beyond the scope of the original outline. Those pages concern the particular difficulties which arise when a fully or largely motorized army, owing to the size or primativeness of a theater of war, decides in the course of operations to employ large numbers of horses.

No particular section is devoted to the varying conditions met along the Eastern Front. In general it can be said that the terrain and climatic difficulties, whether for horse-drawn or motorized movement, increase from south to north and from east to west. The western buffer states are more highly cultivated, have a closer knit and better road net, are more thickly settled, have more numerous cities, and superior rail and signal communications systems. In the south (Rumania and the Ukraine) the climat is milder, there are fewer wooded regions, and no large swamps. Moving northward large swampy areas become more frequent; this is characteristic of the Pripet River Basin, the region between the Minsk-Moscow Railroad and the southern border of the Baltic States, the area south and east of Leningrad, and the Finnish-Karelian border region. The Balkan Mountains in Yugoslavia and Bulgaria,

the Carpathians, the Transylvanian Alps, and the Crimean Mountains are secondary chains, so accessable by means of roads and passes that they can be traversed and held by motorized forces. Other than the western Caucasus, which attain alpine proportions, there are no high mountains in the theater.

The appendixes, which comprise a sizeable part of the whole study, are concerned with (1) material not properly included in the main text, (2) separate studies complete in themselves, and (3) specialized material of less interest to the general reader.

The terms "Motorized," "horse-drawn," and "mounted" as used in this study are defined as follows:

1. A "motorized" unit advances solely by means of motor vehicles: armored divisions, reconnaissance battalions of cavalry divisions, antitank battalions of horse-drawn infantry divisions.

2. A "horse-drawn" unit consists predominately of horse-drawn elements and may include some motorized equipment in the infantry and artillery.

3. A "mounted" unit is identified by its mounted elements and may also be equipped with horse-drawn and motorized equipment: cavalry divisions and regiments, reconnaissance battalions of infantry divisions.

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# CHAPTER 1

## THE HORSE IN THE GERMAN ARMY

### I. ORGANIZATION OF THE ARMY UP TO 1941

The German Army never considered completely replacing horses with motor vehicles. Under the Versailles Treaty the 100,000-man army, which provided the nucleus of the later Wehrmacht, was only sparingly equipped with motor vehicles upon its organization in 1920. This capsule army comprised seven infantry and three cavalry divisions, and its entire motorized force included less than 500 men, or not even 5 percent of the whole. Motorization theory was studied and limited experiments with tanks and other motor vehicles were conducted with the aid of the Soviet Union. Restrictions of the Versailles Treaty, however, made any extensive motorization impossible.

After 1935, when the reconstruction of the army was begun, iron and steel remained in short supply in Germany despite a considerable increase in production. This increase accompanied the vigorous economic revitalization that started to develop at that time. The economic crises of the preceding years had left the railroads badly in need of new equipment and the large-scale municipal and party

construction programs initiated by Hitler also reduced the share of iron and steel available for armament production. The Army, the Navy, and the newly-formed Luftwaffe engaged in a constant struggle over the allocation of vital raw material.

The greatest part of the iron and steel available to the Army was used for constructing new barracks and other installations, for expanding the armament industry, and for high priority fortifications along the western frontier. The remainder was divided among the manufacturers of weapons, ammunition, equipment, and motor vehicles.

Because of the restricted production of motor vehicles, even the limited expansion plans permitted the Army could not be fully completed. Even by 1939 only a small portion of the Army's motorization program had been realized.

The problem was not confined, however, to the procurement of sufficient steel. The designing of military vehicles, such as tanks, cross-country trucks, and prime movers, had recently entered a stage of rapid development after a period of stagnation. Consequently the Army had to exercise caution, for it could not afford to order tanks and other specialized vehicles in large numbers if they would soon become obsolete. Germany's dependence upon foreign sources for motor fuel also had to be considered in deciding to what extent motorization was feasible.

Since Germany's industrial centers in Upper Silesia and the Saar were dangerously close to her borders, it was necessary for reasons of defense to attain a status of complete war readiness as quickly as possible. As the wartime army was to be three to four times larger than the active peacetime army, sufficient vehicles to meet the expanded need could hardly be held ready in depots. Once hostilities had opened, there was no choice but to acquire the necessary motor vehicles from the domestic economy wherever possible. This meant requisitioning a large number ov civilian-owned cars and trucks, even though they were a doubtful substitute for specially designed military vehicles.

An even more important source of transportation was the horse, which, while slow, was not dependent on fuel imports or internal fuel stockpiling. Quite apart from this factor, the horse was considered indispensable by the infantry and by all other arms in close contact with the infantry in the field. The necessity to control wide areas by means of motorized forces or to engage in far-reaching operations never occurred to the Army, whose mission was only the defense of the Reich.

Such conditions determined the extent of motorization in the German Army. Expressed in figures the picture is as follows: The Army, which in 1933 comprised ten

obsolete divisions, had grown by 1939 to fifty-five divisions, fourteen of which were fully motorized; the activation of an additional fifty-one infantry divisions within a period of a few days was contemplated in the mobilization plan. Most of the OHQ forces were fully motorised. The demand for vehicles by all arms, however, could not be fully met, despite the increased efforts of industry.

Each infantry regiment, comprising about 3000 men, included some 640 horses, 55 motor vehicles, and 45 motorcycles; each infantry division, comprising about 17000 men, included some 4700 horses, 1000 motor vehicles, and 500 motorcycles. After mobilization at the beginning of the war in 1939, the Field Army, with a strength of 2,740,000 men (106 divisions, of which 14 were fully motorized), possessed 514,000 horses, 183,000 motor vehicles, and 94,000 motorcycles.

With the exception of one cavalry brigade stationed in East Prussia, the cavalry was reorganized into armored divisions. At the same time, mounted reconnaissance battalions still existed within the infantry divisions.

As the war grew in scope far beyond what had been envisioned in Germany, further reinforcement of the army became necessary. Although vehicle production had increased, it was still not possible appreciably to improve the Army's

motorized equipment, owing to the very large number of civilian cars and trucks requisitioned. During the French campaign, for example, many units used ordinary civilian passenger cars to pull antitank guns on the battlefield. At that time of the 45,000 tons of heavy truck transportation capacity available to the army group commanders and agencies of the Army High Command, only 2400 tons were provided by regular military vehicles. Later this proportion decreased even further as heavy trucking capacity increased to 80,000 tons.

Before the German Army began its advance into the East, the conditions which it expected to encounter were studied in detail. Three factors in particular presented new problems: (1) scarcity of paved roads and bridges, (2) condition of the soil in various areas and at different seasons, and (3) vast distances, which led to isolation of forces and new supply problems.

In launching the eastern offensive, the same principles used in previous operations were retained. While the infantry divisions, which composed the bulk of the army, advanced at the speed of its horse-drawn vehicles, decisive thrusts were to be made by several strong armored spearheads, tactically supported from the air. These mobile elements were to split up and encircle the enemy by means of rapid, fluid movements.

The German command expected sufficient opportunities to employ motorized forces during the favorable seasons and believed decisive operations could not be conducted during the winter months and the muddy period. Although the first supposition proved correct, it was not true that effective operations were suspended during the winter. Fighting more or less stopped during the spring thaws, but the Russians chose to continue operations during the coldest part of the year, using forces equipped for winter mobility. During the first winter campaign the enemy presented the Germans with many unexpected situations, which the latter had to meet with all their strength to avoid annihilation.

The increasing width and depth of the advance led to the conclusion that a closely connected front could not be maintained. The result was a situation in which mobile forces capable of rapid movement became even more important. At the same time it was necessary that all combat forces in the field be effectively mobile. While motor vehicles provided the chief source of mobility, by providing horse-drawn units with lighter equipment and additional pack animals their mobility could also be improved.

The number of motorized units was increased as far as possible. By decreasing the number of tanks in each

armored division, their number was almost doubled, although the total desired by the high command was never realized.

The greatly extended supply routes required a considerable increase in the motorized supply services. Stringent centralization of command was designed to utilize all supply transport facilities effectively. The sturdiest types of motor vehicles were assigned to the East, although many types planned for commitment proved unsuitable.

Because motor vehicle production could not approach the demand, special attention was paid to maintenance. Production of spare parts was increased and maintenance facilities were greatly enlarged -- projects attended by great difficulties caused by the large number of vehicle types and the unusually long overland supply routes. The excessive strain on all vehicles in Russia was far beyond expectations and all installations had to devote more personnel and materials to maintenance, from factories in the zone of interior to maintenance units at the front. Still, many thousands of motor vehicles were lost in the course of the campaign through lack of spare parts and service.

The bulk of the Army continued to move at the speed of its horses and foot soldiers. To increase mobility the weight carried by the infantryman was lightened by increasing the baggage train. Several of the infantry divisions were converted into light infantry divisions; they retained their horses and were issued special, light vehicles designed to improve mobility in swampy, forested, or uneven terrain.

In Poland thousands of lightweight local farm carts and sturdy farm horses were requisitioned for use in Russia. These replaced motor vehicles where terrain difficulties prevented their movement.

It was expected that cavalry forces could be used to advantage in the East. The single cavalry brigade existing at the start of the war was expanded into a cavalry division in the winter of 1939 - 1940. No further increase was undertaken at that time, however, for the advantages were not considered to justify the cost. In addition to its valuable horses, the cavalry division included a number of motorized elements. Moreover, cavalry units required a high degree of training if they were to prove effective in engagements against modern armament. The use of cavalry was restricted to only a few situations because of its limited shock power.

As a result of efforts to adopt army organization to conditions expected in Russia, the 136 divisions which invaded the country in 1941 were constituted as follows: 31 panzer and panzer grenadier divisions, 99 infantry divisions, 4 light infantry divisions, 1 cavalry division and 1 mountain division.

## II. VALUE OF HORSES IN THE EASTERN CAMPAIGN

The preparationsmade for the summer offensive of 1941 in general covered actual needs. Operations proceeded smoothly and effectively, even though in some instances horse-drawn units had difficulty in following the advancing armored spearheads.

The muddy period in the fall produced consequences which were not entirely expected. Rather than curtail operations, as was done later in the campaign, the high command attempted to maintain the tempo of the advance, thereby consuming the strength of men, horses, and vehicles beyond justification. At the time this action seemed warrented by the situation, but in retrospect it appears as a costly error.

With the onset of winter the German Army suffered its setback before the gates of Moscow and Leningrad. The exhausted and overburdened troops received a severe blow to

their morale. In many respects the motorized forces were in a more perilous position than were those with horses, for the boundless mud followed by bitter cold, ice, and snow presented new technical problems, some of which could not immediately be overcome.

While motors easily stalled, horses could adjust themselves to the changing conditions and did not leave the troops completely without transportation. Even though horse casualties were high, they occurred over an extended period and so were less crippling. Moreover, captured horses and, in emergencies, local animals could also be pressed into service.[1] It must be remembered in considering the value of horses, however, that many of the types of motor vehicles employed in Russia were not suited to extreme conditions.

After the first winter, conditions were no longer so bleak. The troops had grown accustomed to the extreme climate. Vehicle design improved and the drivers learned more about the operation and care of their engines. Motorized forces crossed terrain in 1944 that they never would have dared in 1941.

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[1] See Appendix A, Part I, for examples in which horses proved superior to motor vehicles in Russia.

An added handicap in the first winter was the personal intervention of Hitler, for once the enemy had seized the initiative along the entire front he forbade the motorized forces to use their mobility to advantage. Instead, the front was stabilized over a distance of 2000 kilometers, from Rostov to Leningrad. The over-all scarcity of troops made necessary the inclusion of motorized as well as horse-drawn elements in the front line, where they sacrificed their mobility to a stationary role.

The horse-drawn forces were better able to adjust to the task of defending a rigid front than were the motorized units. Horses proved valuable in maintaining a stationary line even in the most unsuitable terrain, and many armored and motorized divisions turned to horses as better means of transportation under the unnatural situation in which they were now forced to fight.

Many officers and men of the armored divisions had a short time before been part of the cavalry of horse-drawn forces. Such men could quickly make good use of horses captured in combat or requisitioned from the rear or from adjacent units. Often the Russian farm horse proved useful, although only in conjunction with care and a suitable vehicle. Only the local harnesses, wagons, carts, and

sleds could be used with Russian horses, and most of such equipment was in very poor condition.[2]

The opinion that warfare in Russia could not be conducted without horses gained wide acceptance during the winter of 1941 - 1942. The increasing shortages of motor vehicles and fuel in the course of the campaign helped to sustain this view. Again and again units that had formerly relied on motor transport resorted to the use of horses, as the conduct of the war became increasingly influenced by Germany's lack of resources.

In spite of many cases in which horses appeared superior to motor transport on the Eastern Front, the writer is unable to share the opinion that horses are indispensable to the conduct of operations in Russia. Owing to high mobility and hard striking power, motorized forces are able to determine in large measure the terrain in which decisive engagements will be fought. Of course, much depends on how nearly industry, in producing specialized military vehicles, is able to meet the stringent demands of conditions in the East.[3] A strong air force

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[2] See Appendix A, Part I, Examples 2, 3, and 5

[3] Russian motor vehicles are notable for being confined to a few basic types, for wide use of interchangeable parts, for sturdiness, and for a preference for diesel engines.

and ample sources of fuel are further requirements for successful motorized operations.

Supply lines must be efficient and well secured for motorized armies are more dependent on supplies than are horse-drawn armies. The threat to supply routes, whether from partisans or atom bombs, must be met by utilizing the widest practicle network of rail lines and highways as well as by taking the fullest advantage of air transport.

While the writer maintains that horses are not absolutely necessary for operations in the East, it is not denied that horse-drawn forces are more suitable than motorized for engagements in terrain such as that found in the forest and swamp regions of central and northern Russia and the forest and lake country of Finland. The decisive actions of a war, however, are not conducted in such terrain.

In accepting the view that horses are unnecessary to warfare in Russia, however, it is essential to understand the requirements of a completely motorized army when subjected to Eastern conditions. The expanses of Eastern Europe swallowed whole armies and primitive roads and facilities greatly increased the strain on all equipment. The population easily adapted itself to guerilla warfare,

which required the employment of strong security forces behind the front to maintain order and to protect the long supply lines, upon which success at the front depended.

During World War II Germany and her allies committed in Russia alone about 230 divisions, of which 35 were armored or motorized. These proved insufficient, even though the campaign never extended beyond the western portion of the country, the base of German operations lay along the Vistula, and Russia was badly weakened by the early German victories in 1941.

What will be the result if a motorized army again undertakes a campaign in the expanses of the East, if operations finally bog down, and if the initiative passes to the enemy, who by utilizing horses has made use of areas in which motorized transport is impossible? Certainly both sides would then require the use of horses. Even though many reasons favor discontinuing the use of horses, such a decision is taken only at a risk which the responsible authority would do well to consider.

It must be made clear that a fully motorized army which does not provide for the use of horses is not in a position to organize horse-drawn combat forces on short notice, if it is suddenly faced with a situation requiring them.

# CHAPTER 2

## SUITABILITY OF DIFFERENT BREEDS

### I. CHARACTERISTICS OF DIFFERENT BREEDS

As mounts and as light and heavy draft animals, the German Army required horses of varied size and temperament. Horse-breeding in Germany had produced many special-purpose types, so that a suitable breed could always be supplied. Before the war horses were also imported from other countries, particularly Hungary and Eire. After the collapse of the West in 1940, French, Belgian, and Dutch horses were also made available to the German Army.

The cavalry mounts, which were light breeds, included horses from East Prussia, Hanover, and Lithuania (warm bloods) and a small number from Eire and Hungary. The Noric cold bloods, native to Bavaria, were used both as mounts and as draft horses. The Russian and Polish "panye"[1] horses, also found in East Prussia, were used as draft animals. Pack horses included the Hafling, a breed which migrated into the Alps, and the various breeds of Balkan

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[1] See Section III of this chapter. "Panye" is a German Army adaptation of a Polish word applied to the common, small Russian and Polish farm horses and the vehicles and sleds which they pulled. (Editor)

mountain horses. Mules were bred in Germany, although only on a limited scale, and were assigned to the mountain troops, as were the few available Haflinge and the light Balkan breeds.

Medium breeds of horses included the German Holsteins, the East Frisian and Wurttemberg warm bloods, the Boulonnais cold bloods, and the lighter types of the French coach horse, a breed especially desirable for military purposes.

The heavy cold blood breeds were used for heavy tasks, and included the Rhenish horse, the Belgian Ardennes, and the heavy French breeds, especially the heavy coach horses.

Under peacetime conditions and in the early part of the war all breeds allocated to the Army were carefully separated. Wartime conditions, however, resulted in an increasing intermixture.

In general all breeds proved effective so long as they received proper care, sufficient grain and forage, and were distributed according to suitability. Proper care, of course, depended upon the men who handled the horses, their training, discipline, experience, and character. It was found that Central and Northern Europeans were more qualified to handle horses than were, for example, Spaniards or Italians. The Russians were not well suited to handle

German horses. The importance of proper handling can be seen from the fact that enemy fire caused relatively few casualties among the horses, most losses resulting from overexertion or lack of fodder. Both of these causes were aggravated in part by lack of understanding on the part of handlers, commanding officers, and administrative authorities.

Although few cavalry mounts were required, both warm and medium cold blood draft horses were needed in great numbers to transport loads at a fast pace. At times these horses were required to move for long distances at a trot and for shorter distances at a canter. At the same time, all horses had to be able to serve as mounts.

In general it was found that horses should not be too large; preferably they should be small, low-slung, broad, compact, and have a good rib structure. They should have strong bones and an energetic, spirited movement. Besides having absolute balance and good temperament, horses should be sinewy and hardy, capable of great endurance, and should not sweat too readily.

Although the heavy cold bloods required the most care, they were also able to pull the heaviest loads. If they were not to lose strength, they required regular daily

rations of from twelve to eighteen pounds of oats and dry fodder. Performance also diminished if heavy breeds were coupled with medium weight horses in the same team. Often it was impossible to carry along sufficient fodder, and to let the horses graze was impracticable, for to maintain health without eating oats, a horse must spend eight hours each day on good grazing land. Therefore, under the conditions of the Russian campaign, the heavy cold blood breeds were hardly suitable.

Experience in Russia showed that the lighter the breed, the less forage and care necessary. On the other hand, the lighter and more spirited horse required more experienced and better trained attendants and was more sensitive to rough treatment than was the less highly-bred horse. The panye, while demanding less care and fodder, could also not pull such heavy loads. Mules proved particularly tough when treated with love and patience, although there were not many in the German Army. In addition to qualifying as a pack animal, the South African mule was suitable as a mount, while the Argentine mule could double as a draft animal.

The above section is supplemented by two appendixes. Appendix B, Section I, written by a German horse-breeding expert with knowledge of both military and civilian

requirements, describes in detail the present breeds in the German Federal Republic. Section II, based on experience of the war, treats from a breeder's viewpoint the demands which the army makes on horses. Section VII describes German attempts during the war to develop special breeds through experimentation.

Appendix C comprises a study by a veterinary officer with wide military experience. He discusses in detail the suitability of various breeds as shown by an investigation made by the writer when he was attached to the 1st Cavalry Division on the Russian Front during the summer and fall of 1941. The study concludes that breed was a less important factor in horse casualties than the age of a horse and the amount and quality of its food.

## II. HORSE REQUIREMENTS OF THE CAVALRY AND MOTORIZED ARMS

Greatest endurance under conditions of the Russian Front was shown by the light breeds, specifically the East Prussian, Hungarian, Lithuanian, Polish (half-breds based on Arab stock) breeds, and Hanoverian and Russian pure-breds. The ideal breed, particularly for the cavalry, would therefore be a highly bred horse, small and sturdy, with short legs and broad ribs.[2]

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[2]For details, see Appendix C.

It is recognised, of course, that German experience in handling horses cannot always be applied by other nations. An example can be seen in the Cossack Division, which except for German cadre was composed of Russian volunteers from the Ukraine, the Caucasus, and southern Siberia. After its cavalry regiments were equipped with horses from the Don, Hungary, and East and West Prussia, it soon became apparent that only the Russian horses suited the Russian riders.

The Cossacks are natural horsemen to whom the German school of riding is completely foreign. They are accustomed to riding over rough ground and usually travel at a fast trot or a Cossack gallop, a gait which frequently caused injury to the legs of German horses. The Cossack is extremely interested in the welfare of his horse and makes it his inseparable companion. But while he gives it plenty of forage, he does not appreciate the value of grooming. In the case of the Cossack Division, however, the Russian horses were the best of all the mounts, for they were suited to the Russian way of riding and were the most hardy. Next in value were the Hungarian horses, which excelled in a firm, brisk gait. The East and West Prussian horses demanded more care and grooming and were often too large.

Medium and heavy horses were used by the artillery as draft animals. Despite the frequently hilly terrain of France and Belgium, it was possible to pull the 105-mm howitzers, weighing 2400 kilograms, with a team of six horses. This number, however, was soon proved to be inadequate in the East, where there were almost no paved roads. During the summer of 1941, when the horse-drawn artillery of the infantry divisions regularly covered thirty or forty kilometers per day over hot, dusty roads, the guns often sank into sand or swamp almost to their axles. The effort of such work was more than could be asked, and after a few days the teams had to be increased by the addition of captured or requisitioned horses. This was also done in the case of infantry and artillery teams pulling supplies.

The extra horses, of course, were not working to full efficiency, and would have been more helpful if harnessed in a single span. When teams of four, six, or more horses are used, total pulling power does not increase in direct ratio to the number of horses, since each horse will pull less than if he were working alone.

In Russia the Army used a solid, roomy, steel combat vehicle, usually heavily loaded and requiring a team of powerful heavy or medium horses. Teams for these vehicles were difficult to obtain in Russia, where lighter horses

were favored, and often the armored personnel carrier were not able to follow the infantry into every type of terrain. Many infantry divisions retained their personnel carriers throughout the entire campaign, even if they sometimes served only as supply wagons. The suitability of the panye cart, which was the other extreme in weight and capacity, will be discussed in the following section.

## III. HORSE REQUIREMENTS OF THE SUPPLY AND REAR SERVICES

At the beginning of the Russian campaign, the combat trains of the infantry divisions were motorized, but in 1942 part of these became horse-drawn. The main reason for this change was the growing scarcity of motor vehicles, in some cases, however, it was made necessary by the existence of swamps and forests along much of the front in the central and northern sectors. It is true that cross-country vehicles could have negotiated such terrain, but the German supply columns were composed largely of ordinary civilian trucks. None of the trains were uniformly equipped; an average of about 120 tons of the division's 300 ton supply train were drawn by horses.

In general, all breeds could be used effectively to haul supplies, always provided that they were handled with understanding. Even the more sensitive heavy breeds stood up

well if not subjected to exorbitant demands on their capacity.

Polish and Russian panye horses were employed as temporary expedients. As an integral part of the country-side, a product of Eastern climate and culture, the panye horse came to the aid of the hard-pressed German forces under every sort of situation and quickly earned a reputation for reliability.

The panye horse is the common farm horse of the east and as such is especially hardy and robust. They were capable of great endurance, sometimes covering up to 150 kilometers in a single day without sign of exhaustion. One and a half kilograms of oats daily were sufficient to insure top performance. Other grains, like corn or barley, could also be used. In summer most of the horses received nourishment only from grazing, while in winter they fed on mildewed hay, straw, or foliage and, when necessary, bark and thatch. While this diet naturally caused a drop in efficiency, the panye possessed a strong resistance to disease. Even such contagious diseases as glanders, strangles, or contagious pneumonia, which usually caused death to central and western European horses, were usually present only in mild, chronic forms.

The panye horse was a willing and tireless worker and could be handled after only slight experience. Only the stallions sometimes exhibited bad temper, but only infrequently.

Certain disadvantages appeared, however, when the panye was used for military purposes, largely owing to its small size. Their slower gait and shorter steps were tiring for the rider. The length of their stride reduced the march tempo to about four kilometers per hour when walking and eight to ten kilometers per hour when trotting, compared with six and fifteen kilometers per hour respectively for other horses. Without the military saddle, which for the panye was too large and heavy, they could also be used as mounts. Equipped with native saddles or simply with blankets, they were sometimes used to carry messengers or footsore infantrymen.

The size of the panye also limited its use as a draft animal. On normal roads and trails their load should not exceed 150 kilograms. Only local carts and wagons could be used with the panye, since the shafts, traces, and centers of gravity of military vehicles, except for two-wheeled carts, were too high, thereby greatly reducing pulling power.

Because of its slower speed both when walking and trotting the panye horse could not be incorporated into regular

horse-drawn columns without growing exhausted. When organized into separate columns and allowed a longer working day, it could cover a distance equal to other horses, since it was able to trot at its own pace for longer periods.

When the panye was introduced into horse-drawn columns, a much larger number of accompanying troops were required to accomplish the same end. This problem was discussed at some length by the Army in the summer of 1943. Owing to unfortunate experiences in the past, the field forces understandably desired long term security against all possible interruptions in regular supply. They requested the systematic allotment of additional panye vehicles in order to double the supply of emergency rations, to increase the amount of ammunition that could be carried with a given unit, to bring forward weapons and ammunition, and to transport wounded to aid stations. To have satisfied these demands, an infantry company, for example, would have had to employ at least fifteen additional men to escort the supply columns and to abandon certain other work. If all units concerned had increased their supply trains with additional panye vehicles, about 70,000 additional men would have been involved. Conferences and experimental loadings led to a rejection of the proposal to provide panyes for

combat units by altering their tables of organization and equipment.

The organization of panye horses into supply columns was similarly uneconomical. A motorized supply column carrying thirty tons required about forty men and in closed formation was only about 200 meters long; a panye column carrying the same load would have required 240 vehicles and 300 men and would have been 2000 meters long.

While the high command rejected all proposals to incorporate the panye horse as a regular part of the field forces, the fact remains that the panye was and is a valuable means of transportation under certain temporary conditions. Such conditions are certain to exist in varying degrees for any foreign army operating in Russia. If the panye is to be effectively utilized, preparations must be made in advance. Chapter 10, Section 3 of this study contains a discussion of measures to be taken.

The temporary use of panye horses on a stabilized front, primarily for hauling supplies, is conceivable during the muddy periods in spring and fall, in swamps, forests, and deep snow, and in case of fuel shortage. At such times the panye becomes a valuable, indeed practically irreplaceable aid in the regular supplying of the units of a division. Usually there will be sufficient enlisted men available to assume the care and handling of the horses.

It has been pointed out that the panye neither requires great care nor demands skill on the part of the rider. This, of course, increases its value especially for units without experience in handling horses. The panye is accustomed to move in single file formation. It is unnecessary to assign a rider to each horse, except to the extent necessary for the protection of the column. With the start of the lead horse the entire column begins to move, and it is only necessary that several riders be present in the middle and end in case a vehicle gets stuck or other difficulties arise.

Experience has shown that the panye horse and wagon can go almost anywhere that an unburdened horse can go, including all but the most hazardous forests and swamps. However, the only vehicle or sled suitable is the local type or a copy. The sleds built in Germany for use in the East were not suited to the deep snows of Russia and were quickly turned into firewood. The poor condition of the vehicles and harnesses found in Russia made their frequent replacement necessary.

As the condition of the Army's motorized equipment grew steadily worse, many units independently so organized their combat elements that they no longer relied on motor

transport. Infantry divisions found it entirely satisfactory for one or two companies of the reconnaissance battalion to be mounted on panye horses.

IV. PERFORMANCE RECORDS

1. Influence of Terrain. While the panye horse was suitable only for pulling light loads, the German horses were capable of heavier work. When handled by understanding and experienced drivers, the German horses were able to pull loads over the worst sort of roads. In deep snow or marshy terrain, however, the heavier breeds could never match the performance of the lighter panyes.

Although the terrain of European Russia is largely flat or gently rolling, difficulties to movement were presented by the soil, which in the northern and central sectors is sandy and in the south is composed of loam-like black earth. Rain greatly increases the difficulties posed by such ground. During a rapid movement, such as the campaign of 1941, the horses frequently were overexerted and often developed heart conditions which made them unfit for further use. This was the most frequent cause of horse casualties in the first year of the campaign.

The panye horse never becomes overexerted, because it stops when it is tired and cannot be made to move again

until it has drawn sufficient breath. In this respect it resembles the mule or donkey.

The crossing of river and stream beds, which in Russia are often deeply incised, also demanded a great deal from the horses. Additional horses or teams were usually employed where the unpaved approaches to bridges or fords became bottomless mud-holes.

2. Influence of Climate. Horses which were first employed in summer and became gradually accustomed to the growing cold managed to last through the winter without great strain. Of course, it was essential that they keep their long manes, tails, and winter coats.

Inexperienced drivers and even units sometimes believed that good grooming was not a necessity but was merely for appearance. This view was based on the fact that wild horses retain their health without being groomed and are able to stand both heat and cold. Wild horses, however, are not an apt comparison, for they do not sweat as much as horses which pull heavy loads. Running about on the grassy steppes, wild horses do not become as encrusted with dirt as do draft horses that must work under all kinds of weather and terrain conditions. The saying "Well groomed is half fed" again proved its validity, for the well-cared for horse could be employed for a longer time than one which

lacked grooming. Care of hoofs and fetlocks was especially important in preventing malanders and other diseases.

It did not prove necessary--and was usually impossible--to quarter the horses indoors. Where no other shelter was available, windbreaks could be constructed from branches and boards. In Russia the woods were often too marshy to offer protection, and in summer myriads of insects made forests unbearable for horses unless a smoldering fire could be built. In winter snow huts or snow walls offered almost as much protection as did the Finish tents. Above all, care had to be taken that the horses, especially when sweating, were not unduly exposed to wind or placed in drafty stalls. In isolated cases the genitals of stallions froze in the severe cold.

3. Susceptibility to Disease. Heart disease caused by overexertion resulted in high casualties among the horses in Russia. Highly bred horses were more susceptible because of their spirited temperament. The cold bloods, especially the heavier German breeds, suffered severly when their fodder was not adequate. The warm bloods, however, were in general more easily overexerted than the cold bloods.

With the above exceptions, the health of horses which received careful and understanding management remained good. The sun and dry air was healthful and strengthening, and

diseases such as glanders and strangles were rare among horses in the field. Exposure to strangles, scab, and similar diseases were more likely to occur in the huge collecting points and depots. The utilization of every opportunity for grazing was of great aid in maintaining health. Scab appeared readily in horses not properly cared for and at times it assumed such widespread proportions as to affect the operations of the combat forces.[3]

An example will illustrate the general situation in the northern sector of the Eastern Front. In the period between 20 November 1942 and 10 March 1943 a corps with several attached infantry divisions was committed to the defense of a prominent salient, against which violent attacks were being launched. Movements on the German side were limited to reliefs. Under these circumstances the horses were not worked unusually hard. Grain and fodder were in short supply, but the timely establishment of rest camps for horses and the collection of hay harvested by the army improved the situation. The number of horses assigned to the corps totaled 39,000, of which 20 percent were regularly rotated to rest camps. Casualties for the above period numbered 3523, of which 1513 died of exhaustion,

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[3] See also Chapter 6.

1149 from enemy fire, and 861 from other causes. Sixty percent of the horses suffered from scab.

V. OTHER DRAFT AND PACK ANIMALS

Animals other than horses were used in isolated cases, but they were never of any great significance.

Camels were used as both pack and draft animals. They could carry 120-150 kilograms on their backs, and general performance was that of a medium-size horse.

Oxen were employed in the Ukraine and the Balkans. Because they were much slower than horses, they could not be incorporated into horse-drawn columns.

Reindeer and dog teams were reportedly effective in the polar regions. The use of dogs for guarding and tracking is referred to in Appendix C, Section V.

PLATE 1: RUSSIAN PEASANT WITH PANYE HORSES.

PLATE 2: A PANYE COLUMN.

PLATE 3: INFANTRY COLUMN USING PANZE HORSES ON THE CENTRAL FRONT. THESE TROOPS WERE NORMALLY MOTORIZED.

PLATE 4: TRUCK WITH LIGHT FIELD HOWITZER STUCK IN SNOW ON THE CENTRAL FRONT. JANUARY 1942.

PLATE 5: LIGHT ANTI-TANK GUN ON SLED RUNNERS.

# CHAPTER 3

## EMPLOYMENT OF HORSES

### I. CAVALRY

#### 1. Cavalry Missions 1941 - 1945.

a. Employment of the 1st Cavalry Division in 1941. Except for mounted reconnaissance battalions within certain infantry divisions, the only cavalry force participating in the campaign of 1941 was the 1st Cavalry Division. The division's training and personnel were excellent. Assigned to the 2d Panzergruppe[1] as its sole non-motorized force, the division took part in the advance through the northern Pripet Marshes. In this terrain cavalry was admirably suited. It was the division's mission to secure the deep right flank of the rapidly advancing panzergruppe. The swamps provided natural tank barriers protecting the cavalry from armored attack. At the completion of offensive operations, which extended to the Bryansk sector, the 1st Cavalry Division was withdrawn before the onset of winter and converted into a panzer division. As such it remained a highly regarded force until the end of the war.

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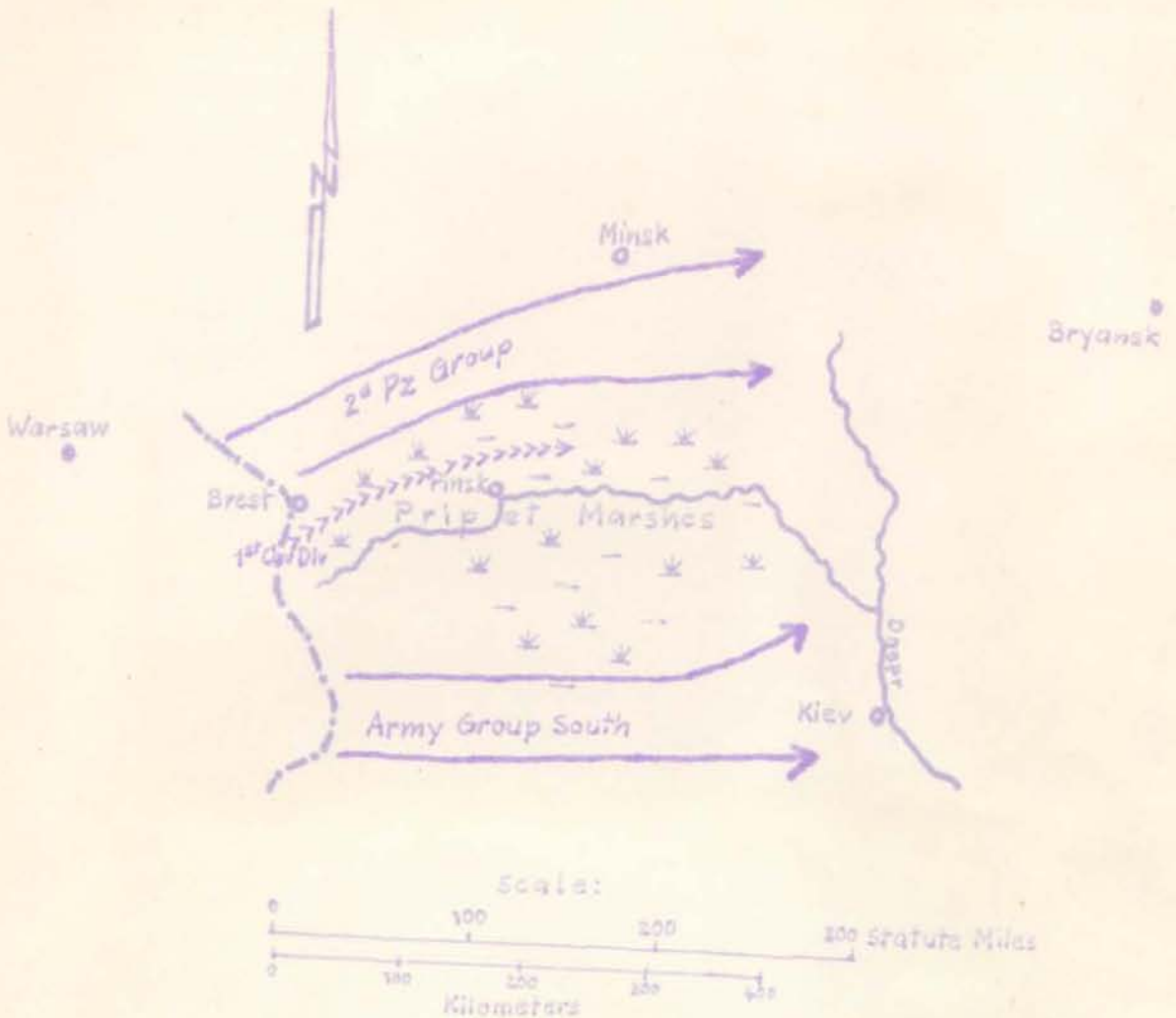
[1] Panzergruppe: An armored force of army size operating in conjunction with an army.




Sketch 1

Mission of the 1st Cavalry Division in the Summer Campaign of 1941

The conversion of the 1st Cavalry Division to armor did not result because of its failure as cavalry. It was a matter either of increasing the number of cavalry units or of disbanding them altogether, for as special units they had many special requirements that were not easily fulfilled. Because any great increase in the cavalry would have created organizational and training problems and because cavalry cannot develop strong offensive power, the Army High Command decided to disband the only existing force rather than meet the special requirements necessary for its upkeep.

b. Employment of individual cavalry units up to regimental strength in 1942 - 1944. After the disbandment of the cavalry division, fighting on the Eastern Front underwent a marked change. Heavy defensive fighting occurred during the German withdrawal from the gates of Moscow in December, as the initiative more and more went over to the Russians. At the same time, partisan warfare began to flare up in the German rear. Severe winter conditions coupled with the growing scarcity of fuel resulted in many vehicles having to cease operation in order that others could still be available at the focal points of the fighting. On more quiet sectors, consequently, the horse

was given greater prominence. Cavalry could be used effectively on secondary fronts and to secure sectors in which the terrain was not well suited to motor vehicles. It could also serve as a mobile tactical reserve and as a force especially suited to conduct small-scale operations against partisans.

Out of necessity, therefore, several improvised light cavalry forces ranging up to regimental size were created, usually by utilizing elements of the already mounted division reconnaissance battalions. During the 1942 summer offensive on the southern front, for which nearly all of the armored and other motorized forces of the army in the East were assembled, a cavalry regiment of the Waffen-SS and various smaller cavalry formations were employed on the northern and central fronts.

c. The activation of a cavalry corps and the Cossack Corps in 1944 - 1945. After motorized equipment had been depleated at Stalingrad and in the retreat and as operations in the East grew increasingly influenced by lack of men and materiel, the Army High Command decided that conditions now warrented the reactivation of cavalry divisions. Two cavalry brigades, later expanded into divisions, were formed and subsequently combined into a cavalry corps, which was committed on the central front in

the summer of 1944 and later in Hungary. The difficulties in activating cavalry forces on short notice soon became evident. Although the task was made easier by the presence of numerous division mounted reconnaissance battalions and the aforementioned cavalry regiments, the activation of the corps was not yet completed by the end of the war.

An attempt was also made to activate a cossack corps composed of Russian volunteers. Its cadre comprised the Russian volunteer troops that had been active on the Eastern Front since 1942. A cossack division was first employed in the Balkans against the Tito partisans, and later it was expanded into a corps of three divisions.

2. Evaluation of Cavalry. The main advantage of cavalry is its ability to conduct mobile operations in areas where there are no roads. It is true that its ability to cover great distances quickly is much less than that of motorized forces. Still, thickly wooded or marshy terrain hinders the cavalry less than it does motorized forces and at the same time provides protection against armored attack. The fact that artillery and heavy weapons, which may be decisive in pressing an advantage, cannot always accompany the cavalry is, of course, a serious drawback.

As to the mission and organization of cavalry, opinions vary widely. One former cavalry corps commander still favors the organization of such a corps with several cavalry divisions for future combat in the East. Except where rapid movement over long distances is necessary, he holds that cavalry can be assigned the same missions allotted to motorized infantry. He reasoned, however, that an armored battalion and other motorized elements would have to be assigned to each cavalry division. The only essential difference between a cavalry division and a motorized infantry division, therefore, would be that infantrymen would be mounted on horseback. It would seem, however, that infantry could be transported more effectively on armored personnel carriers, which at the same time would not be a drag on the speed of armored elements.

Other former cavalrymen point out that, since the cavalry's strength is in its ability to move over terrain too difficult for motorized forces, it should be freed of all heavy burdens and if possible all motorized equipment. Such a force, of course, would have relatively little striking power and in normal terrain would be helpless against enemy armor.

Probably cavalry can exist in the East only as a special force, if at all. It should be confined to such tasks as

reconnaissance and security (especially in forested and swampy regions), flank protection, and combating partisans and other enemy groups in areas difficult to penetrate. The cavalry should be organized and equipped with such missions in mind and limited to brigade or division size.

The single German cavalry division that existed in 1941 was later slightly enlarged. It included the division headquarters and two cavalry brigades, each composed of two cavalry regiments, which in turn comprised two battalions. The division also included a motorized reconnaissance battalion, a bicycle battalion, a mounted artillery regiment of three light battalions, a motorized engineer and a motorized antitank battalion (three companies), a semi-motorized signal battalion, and the division supply train, partly motorized and partly horse-drawn.

The cavalry division's commander during the Campaign of 1941 made the following remarks in retrospect:

> The division still contained too many motorized elements, which hindered maneuverability. The engineer battalions should only have been semi-motorized. The bicycle battalion proved valuable but it should have been provided with better, special-type bicycles. The motorized reconnaissance battalion, composed of a reconnaissance

company, a motorcycle company, and heavy weapons elements, was absolutely essential. The light recoilless guns of the artillery regiment were excellent and could follow the regiment everywhere. Motorized heavy artillery should be available for emergencies. Antitank battalions should have armored guns on self-propelled mounts rather than horse-drawn guns. It was necessary that most of the combat train and part of the supply train be horse-drawn in order that the division could separate itself entirely from its motorized elements.

The cavalry divisions and the Cossack Division activated in 1944 were organized similar to the 1st Cavalry Division. At first the cossack division was organized into six cavalry regiments, without bicycle battalions. Because this proved unwieldy, when the division was enlarged into the Cossack Corps each division contained only three cavalry regiments.

3. Experience with Cavalry.[2] In 1941 the 1st Cavalry Division fought as part of the 2d Panzergruppe, which was subordinate to Army Group Center. The panzergruppe advanced eastward, just north of the Pripet Marshes, a swampy region 350 kilometers long and 150 kilometers wide.

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[2] See also Appendix A, Part Two.

It was the cavalry division's mission to cover the panzergruppe's deep right flank by advancing through the northern part of the marshes. Initially there was no contact on the right, for the left wing of Army Group South was moving eastward south of the Pripet in order to avoid the swamps. Within the limits of its mission and during the continuation of the advance as far as Bryansk, the 1st Cavalry Division was occupied with such tasks as flank protection, enveloping pursuit, security of wide areas, and mopping up in large forests. The division proved effective as a connecting link between the spearheading armor and the slower infantry divisions and, as such, crossed terrain which would have been hardly passable to motorized equipment. Several examples from this action are contained in Appendix A, Part Two.

Although the performance of the 1st Cavalry Division was exemplary, Examples 16 to 18 in Appendix A disclose that its missions could have been performed by a motorized division with equal chance of success.

A further example of cavalry in action may be taken from the employment of the Rumanian 8th Cavalry Brigade on the Crimean Peninsula at the end of 1941 (Appendix A, Example 23). The brigade's ability to move rapidly, 100 kilometers in twenty-four hours, was effective in protecting

the coastline. The cavalry officer who describes the action concludes that a motorized force could have carried out the first part of the mission but not the second part, which required a further advance of 100 kilometers over roads suddenly turned muddy by a rapid change in weather.

The non-divisional cavalry battalions and regiments scattered along the Eastern Front proved especially effective against partisans, particularly when the fighting involved rugged terrain. The cavalry corps, on the other hand, found few suitable opportunities for commitment, for the enemy employed his superiority to more or less determine the areas in which fighting was to occur. For that reason, the cavalry corps headquarters was also assigned motorized elements and infantry divisions in addition to its cavalry forces.

Only limited experience is available concerning the vulnerability of cavalry to air attack, for the Russian Air Force never appeared in the same strength as did that of the Allies in Western Europe and Italy. Evidence is that the cavalry could quickly elude air attacks by dispersing. The Hungarian cavalry division that was attached to the cavalry corps for a period in 1944 - 1945 could never learn to disperse rapidly enough or to avoid the roads.

Air attacks were naturally more effective during the winter, when deep snow prevented dispersal. Horse-drawn vehicles of the cavalry were also less easily set on fire by air attack than were motor vehicles. Partisans seldom attacked cavalry formations, for they knew them to be especially dangerous.

Late in the war the Cossack Corps was committed in the Balkans against the Tito Partisans. Its primary mission was to secure the valleys of the Sava and Drava Rivers against attack from the mountains. Attempts to eliminate the partisans by invading the mountains were never successful. The precipitous, chalky terrain was not favorable for deployment, and the long columns of cavalry and horse-drawn vehicles were easy targets for surprise attacks by enemy forces familiar with the country. Moreover, the Cossacks, like all Russians, preferred fighting en masse rather than as individuals, in which case they were likely to panic. The fact that the bareback-riding Cossacks were expert horsemen was not enough to compensate for the unusual ruggedness of the terrain. Consequently the cavalry moved too slowly to prove effective against the well-entrenched partisans.

The Cossack Corps thereupon determined to meet the partisans on the plains. When the efficient mounted

reconnaissance forces discovered the enemy leaving the mountains on a raid, they cut off retreat by a surprise maneuver and forced the partisans into open battle. This same procedure was used effectively on several occasions. The chief problem was in outwitting a clever foe, who had many sources of information among the native population.

A commander of one of the Cossack divisions believes that the same mission could have been carried out by armored forces with better results. The success of the 1941 Balkan Campaign, in which the Yugoslav Army was quickly destroyed by German panzer forces, would seem to argue against the necessity of cavalry. Even though armor was not able to penetrate every hiding place, its rapid action sharply limited the areas over which partisans were able to hold control. This was particularly true because there were no large forests of swamps such as exist in Russia.

4. Cavalry Equipment.[3] The cavalry mount should be relieved of as many burdens as possible. All opportunities for decreasing the weight of equipment carried by horse and rider should be examined. It is important that riders be selected by height and weight, a consideration not always heeded by German cavalry units.

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[3] See also Appendix D.

German experience shows that in Russia only light carts and wagons should be used, even though this results in longer columns. The cavalry corps in Hungary, on the other hand, desired heavy wagons and four-horse teams as well as a large number of motor vehicles in its supply train. Both preferences are explained by the denser network of good roads in the Balkan Peninsula.

II. INFANTRY

1. Combat Units. Within the German infantry division the horse was the primary means of transportation in the combat zone. Motor vehicles were generally used for transportation outside the combat zone and for staff messengers. The divisions also included motorized antitank battalions and companies and motorized engineer companies.

Infantry regiments possessed a number of motorcycles in the regimental and battalion staffs and motor trucks in the supply train to carry ammunition, explosives, and equipment. All combat vehicles and heavy weapons as well as the field kitchens and part of the supply train were horse-drawn. Officers in command of these columns were mounted. A very effective mounted platoon was organized for reconnaissance and liaison.

The degree of maneuverability in open country, the division's rate of speed, and the functioning of the supply services within the combat zone were all dependent upon the horse. An infantry regiment of three battalions was normally assigned 641 horses and 204 carts and wagons.

Each of the reconnaissance battalions of the infantry divisions were organized differently. Their core consisted either of two cavalry troops or two bicycle troops or one cavalry and one bicycle troop each. Each of the battalions also included an armored reconnaissance platoon and heavy weapons elements. In mounted reconnaissance battalions the heavy weapons were horse-drawn and in bicycle reconnaissance battalions they were motorized.

The artillery regiment consisted of three horse-drawn light battalions, each with three batteries of 105-mm field howitzers, and a heavy battalion with three batteries of 150-mm field howitzers, which were usually horse-drawn owing to the lack of motor trucks and prime movers. As to the light battalions, not only were the gun and ammunition sections horse-drawn but also the combat trains, the field kitchens, and part of the supply trains.

In the engineer battalion one of the three engineer companies, the bridge column, and the light engineer equipment

columns were motorized while remaining elements were horse-drawn. The antitank battalion was completely motorized. The signal battalion was partly motorized and partly horse-drawn. The division headquarters was motorized but included a cavalry section of six mounts.

Where motor vehicles were lacking, certain normally motorized elements like the antitank and engineer companies were horse-drawn. The light infantry divisions were equipped with lighter combat vehicles and one-span carts for the transport of heavy machine guns, motors, and ammunition, in order more easily to negotiate difficult terrain. Their stock of horses was correspondingly larger.

In general the organization of the infantry divisions proved effective. The growing shortage of manpower, however, forced either the dissolution of one of the three infantry regiments or else their reorganization to include two instead of three battalions. To compensate for this change, the reconnaissance battalion was usually reinforced to full battalion strength and reorganized into a headquarters battalion (Fuesilierbatallion), which became a reserve of the division commander. This was possible after the creation of a continuous front left little need for a reconnaissance battalion. During the muddy seasons the bicycle elements had to turn to wagons or trucks; in

some cases they were supplied with light trucks such as the wartime Volkswagon.

Despite the weight of its guns, the light artillery was always able to complete its mission. The heavy horse-drawn artillery, on the other hand, was always a problem, because the guns were too heavy for the horse teams.

2. Supply Services. It is inconceivable that a modern army operating deep in Russia could be supplied solely by horse-drawn trains. Moreover, because of their different rates of speed horse-drawn and motorized supply vehicles cannot normally take part in a common mission. Horses, however, were well-suited to hauling supplies over short distances, such as were involved in relaying supplies between depots close to the front and the units fighting in the lines.

The shortage of suitable motor trucks, however, encouraged the use of horses even further in the rear, particularly during periods of deep mud and snow. In isolated cases, horse relay systems were even used to cover great distances. Horses were also used for short hauls by rear area supply depots, when no motor vehicles were obtainable. In general, horses proved satisfactory for hauling supplies wherever they were employed to cover short distances.

As the campaign continued and as more suitable types of motor trucks arrived at the front, the drivers learned better how to drive under Eastern conditions and how to keep their vehicles in running order. Except where fuel was lacking, complete paralysis of a motorized supply column was rare. A truck creeping painfully forward was still far superior to a horse-drawn vehicle. Eventually the fuel shortage became chronic, however, and the horse grew in significance.

In southern Russia there was no question whether horses or motor vehicles were better able to carry supplies, even during the winter. In central and northern Russia, Finland, and Karelia, however, terrain and weather conditions were such that the division supply trains were sometimes forced to abandon motor trucks and turn to horses as a temporary expedient.

The combat vehicles, light artillery columns, and ammunition sections of infantry divisions were also horse-drawn for practical reasons, for they had to follow the troops into battle positions at any time. It is true that well-designed cross-country motor vehicles could also have served this purpose, but then they would not have been used to full capacity when accompanying the slow-moving horse-drawn elements of the division. Moreover the noise of

engines near the front was always a disadvantage, for the Russians reacted quickly to such warnings at night.

Motor vehicles should have been assigned to the infantry divisions not as they were available only when they constituted an essential advantage; otherwise they should be concentrated to form the largest possible number of fully motorized divisions. That this could be done is shown by the following example: When in the war began in 1939, the infantry divisions in East Prussia were equipped with fewer motor vehicles and more horses than were the infantry divisions in the rest of the Reich, yet their maneuverability was equal since all of the divisions necessarily moved no faster than their horse-drawn elements. Infantry divisions in East Prussia were equipped with 6800 horses and 393 trucks, infantry divisions in Germany proper with 4800 horses and 668 trucks; thus 2000 horses replaced 275 trucks in each East Prussian division. Since a motorized infantry division at that time possessed 1700 trucks, six or seven infantry divisions provided with a larger number of horses released enough motor vehicles to equip one additional fully motorized infantry division.

The necessity of using local horses and local carts and wagons during periods of unfavorable weather caused the field forces to accumulate excessively large trains. At

the same time, if supply shortages became evident, the troops grew suspicious that they might not receive everything they needed and began hoarding scarce items. This accumulation of equipment diminished the flexibility of the divisions and had to be checked by strict supervision.

3. Equipment.[4] Too much stress cannot be placed upon the necessity to limit the weight of equipment accompanying forces in Russia. Strict weight limitations must be established for both horse-drawn and motorized vehicles. The German horse-drawn vehicles used in Russia were basically too heavy for the unusual terrain and weather conditions that are inevitably encountered. The local vehicles best suited to the terrain were the panye carts for use with small horses and the Russian military wagons for use with normal size horses.

It was shown at once that no advantage was gained by overloading a vehicle. Two vehicles with normal loads were preferable even though additional personnel and longer march columns were thereby created. It was also necessary that all vehicles be allowed extra time to negotiate steep defiles.

Considerable difficulties were presented by the necessity of using sleds in winter. German models were usable

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[4] Appendix D includes a more detailed section on equipment.

only on traveled roads and therefore practically worthless in Russia. Only the panye sleds with wide runners could be used in the deep Russian snows.

The German 105-mm howitzers were designed on the principle that fire-power is more important than mobility and were consequently rather heavy for use in the East. The light artillery were sufficiently mobile, although fresh horses and additional manpower were often required.

Harnesses especially designed to fit the small panye horses had to be manufactured, since the Russian harnesses were seldom strong enough or in condition to meet military demands. The panye horse performed farm work unshod but military service made shoes necessary. Since there were no horseshoes small enough in the German Army, they had to be specially made in the zone of interior.

4. Protection against air and Partisan Attacks. Horse-drawn vehicles were seldom subjected to air attacks. Where they occurred, casualties remained low because the light vehicles could easily deploy off the roads.

Where danger from partisans was present, columns were provided with additional escorts. Cavalry and other mounted units composed of Russian volunteers proved especially effective for escort purposes. It was important that the columns be well armed, especially with machine guns.

The men of the supply trains had to be reliable and fit for combat. The practice common early in the campaign of assigning misfit personnel to the supply services soon produced disastrous results and had to be abandoned.

III. MOUNTAIN TROOPS

1. Missions. The only area encountered during the Russian Campaign that demanded commitment of fully trained mountain troops was the Caucasus. The Balkan, Carpathian, and Crimean Mountains and Lapland were accessable to regular infantry. Apart from the Caucasus, the only mountains requiring the use of mountain troops would have been those along the southern border of Asiatic Russia.

As part of a fully motorized army, mountain division had to transport its pack animals by motor vehicle. The large amount of motorized and special equipment necessary prevented the wider use of mountain troops. It was found that only small units for special missions could be profitably transported by motor vehicle.

Especially in the mountains, fighting is apt to break out initially along or near roads. The combatant with a road behind him possesses an advantage. Not until later does the fighting usually penetrate roadless terrain, at which time the advance will be slowed. The larger the unit, the sooner will this stage be reached.

Since major combat tends to take place along roads or in areas to which access is not difficult, infantry divisions are generally capable of conducting all necessary combat missions, mountain division being necessary only in the case of extreme terrain or climatic conditions. The larger the mountain force, the greater are the difficulties likely to occur, for the command must control four means of transportation -- foot, motor vehicle, and pack and draft animal. So many types of movement lead to a splitting of forces and weakening piecemeal commitment. Where roads are inadequate, the great number of pack animals (which every ten days consume fodder equal to the weight of their load) become an intolerable burden.

On the basis of German experience, a reinforced mountain infantry battalion is the largest sized unit practical for operations in European Russia. Such a unit might be composed as follows: a battalion headquarters with signal and reconnaissance platoons, four mountain infantry companies, a mountain artillery battery or heavy mortar company, a mountain antiaircraft company, a mountain transportation company, and a supply section.

The unit should be fully motorized for normal movement; the use of motor vehicles specially designed for mountain conditions should hold the number of necessary

pack animals to a minimum. As OHQ reserve the unit would be assigned by the Army High Command according to theater-wide requirements. Several brigade staffs might be provided for use both as training and operations staffs, the latter in case several mountain units were combined for a larger mission.

2. Animals with Mountain Troops.[5] Since normal size horses were not suited to use in the mountains, the mountain troops were provided with a special stock. Only small, powerful horses with calm dispositions and suited to carrying heavy loads could be used as pack horses. Breeds which were used successfully were the Hafling, a native of the alps, the Norwegian mainland fiord horse, the Hunsul, the Bosnian, the Mur Island horse from the Balkans, and the Kabardinians from the Caucasus. In emergencies the less-suited Russian or Polish panye horses were sometimes used. Crosses between stallions and female donkeys were weak and unreliable, whereas the best pack animals proved to be crosses between male donkeys and mares, especially when they originated in countries where the climate was similar to that of Russia.

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[5]Concerning mountain cavalry, see Appendix E, Section V.

Pack animals could also be used to draw carts or wagons, although that task was usually assigned to heavier horses. To maintain a reserve of pack animals and to protect them from overexertion or pack sores, it was often practical to employ them as draft animals.

Both the pack animals and their drivers must be specially trained in order to secure maximum efficiency.[6]

3. Equipment.[7] If the light, four-wheeled horse-drawn vehicles broke down, the local light farm and rack wagons could nearly always be used instead. They may also be utilized when the terrain or the tactical situation requires an increase in the number of vehicles.

Of particular importance was the systematic equipping of units with specially-built carts. The best model was the Austrian wooden mountain cart, which could easily be altered to suit different needs. Metal carts of the Swiss Furgon type were less practical.

The German breast harness proved excellent in all cases, for use with both wagons and carts. The collar harness was a poor substitute, because it was less adjustable and its use depended on the physical condition of the horse. The

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[6] See Chapter 4, Section I and Appendix E.

[7] See also Appendix E.

pack saddle was the most important single piece of equipment; the German model was satisfactory although somewhat heavy.[8]

In winter carts and wagons were replaced by sleds. The local types always proved to be most suitable. Sleds should be non-rigid, curved high in front, and should have fairly wide runners. The question whether a single pole or twin shafts are better is not easily answered. Good experience was had in both cases or even with none at all, in which case the horses were harnessed directly to the sleds. Sleds can very quickly become overloaded. Care must also be taken that loads are tightly fastened.

An excellent device, a kind of drag copied from the Russians, was constructed for transporting materiel over marshy ground or during periods of thaw. The trunks of two medium-size saplings were cleared of all but their top-most branches to serve as shafts, between which a horse was harnessed. The central sections of the saplings were connected by cross-boards, which formed a platform for the load. The top branches provided a natural spring action, allowing the vehicle to sweep over ground obstacles. These devices proved especially useful for carrying casualties.

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[8] See Appendix E, Section III.

Large wheeled vehicles and guns were systematically equipped with sled runners, which could then be installed when necessary. This helped to save the strength of the horses, for the runners could be used as soon as conditions made wheels no longer practical. Effective, standardized sled runners were developed for many guns, including those of the mountain infantry. Runners did not interfere with the firing of the weapons.

Snowshoes for horses were used only in rare instances, so that little experience was gained. When pack animals sank into the snow up to their stomachs, there was no alternative but to shovel them out. Storm driven snowdrifts could put an end to all activity.

In winter horses were equipped with cleats that screwed into the horseshoes. Pack animals were fitted with sharp, H-shaped cleats, which afforded good stability. When icy stretches were crossed by pack columns, the horses' cleated hoofs cut up the ground so as to improve the traction for motor vehicles following behind.

4. Organization. Because under many circumstances animals restrict the division's mobility and because they require care by trained personnel, animals should be replaced by motor vehicles wherever possible. Small vehicles specially designed for use in mountainous terrain can bring

about sharp reductions in animal quotas. In Germany the Austro-Daimler Supply Train Vehicle, the Stoewer and Hanomag mountain motor vehicle and the half-track motorcycle were all developed for use in difficult terrain. Except for the latter, however, there was no sufficient industrial capacity to permit mass production.

In certain cases each of the elements of the mountain forces were both motorized and non-motorized: artillery was organized into motorized artillery and mountain artillery; engineers into motorized engineers and mountain engineers. Where this was not the case, it was advisable to have semi-motorized arms (communications, medical companies), which could be easily divided into motorized and non-motorized or mountain units. For supply purposes the strictly mountain elements of several arms were sometimes combined under a uniform command. The formation of task forces was also facilitated by the ease with which the various arms of a mountain division could be split into motorized and non-motorized or mountain elements.

Forces employing pack animals will find these suggestions useful:

a. Each unit should have a feed supervisor, whose chief function is to act as responsible non-commissioned officer for all horse matters. In addition to the horse

attendants, several non-commissioned officers may be appointed solely as section commanders (mountain sections, valley sections, supply train sections). One non-commissioned officer should be responsible for from nine to fifteen animals.

b. Pack animals should not be utilized for more than one type of load at a time. Weapons, ammunition, water, fodder, and other items are best carried separately.

c. The German mountain troops did not use pack animals to carry rucksacks and other individual equipment, except in the case of officers. The additional animals necessary would have made the mountain troops even less flexible. Moreover, it is clear that each man must have his own equipment close at hand, for to a great extent the mountain infantryman is an individual fighter.

# CHAPTER 4

## SELECTION AND TRAINING OF PERSONNEL

### I. SELECTION

1. General Requirements. The rural population of Germany provided an inexhaustable reserve of personnel fitted for service in mounted or horse-drawn units. Among urban dwellers were many who knew how to handle horses because of their occupations or sport activities. There were also those who asked for service in mounted units only because of their affection for animals but who otherwise lacked training or experience.

Consisting predominantly of horse-drawn units, the German Army in World War II required some five thousand veterinary officers, or about half the total number of German civilian veterinarians. The practical country veterinarians were more suited to military demands than were those from the city, who treated mostly house pets. There were always enough elderly men available to serve as assistants to the veterinary officers.

The fear that an increasing mechanization of agriculture would result in a shortage of qualified personnel was unfounded, for even the farmer who has converted to motor power will retain an understanding of horses from the

nature of his occupation and from his familiarity with other animals. At the same time, the increasing motorization of the armed forces will lessen the demand for men experienced with horses.

2. Physical Requirements. While physical requirements normally vary between the different arms, the harsh conditions of the East demanded greater physical vigor on the part of all personnel. Men in the service arms who were not able and eager to perform their duty in all weather and under the most trying billeting conditions only undermined the striking power of the tactical forces.

Cavalry personnel must be selected with special care. They must be small and light, well coordinated and mentally alert. They should be able to swim and should not wear glasses. City dwellers are often especially well-suited to riding. The light weight of the cavalry horses makes it necessary to fit rider to mount.

In the infantry the personnel required for horse management were drawn from within the units. Selection of horse and rider was determined by the mission. The horse was selected for the rider and his equipment, whether it was the battery commanders binoculars or a radio.

As in the infantry, artillery horses and riders must be selected according to the individual task to be performed.

Drivers must see that sturdy horses are chosen to draw the heavy guns, and the men that lead these horses must themselves be capable of great strength. The riders on the lead horses should be well trained to choose the proper route. Drivers should be older men with even temperaments and love and understanding of horses.

The mountain troops should be assigned special personnel as animal handlers.

Civilian ferriers can be selected to serve in the veterinary service but they must first be given thorough military training, including cavalry training.

II. TRAINING

1. Peacetime Training. Wartime experience demonstrated that training in peacetime had not yet sufficiently broken away from the time when cavalry took an active part in combat and artillery was wheeled into position without regard for cover. Valuable time was lost in the later training of personnel in the methods of modern motorized warfare.

In the interest of weapons training, which is of primary importance, instruction in riding and driving should be limited to the following objectives:

a. Horse handlers should develop an attitude of devotion toward their horses and should be imbued with the necessity for giving them proper care even under the most trying circumstances.

b. Regard must be had to the proper methods of saddling and harnessing and to the care of equipment.

c. The driver must have the fullest possible control over his horse and vehicle under all conditions. He should be especially trained to surmount terrain obstacles. Show riding is important only to the extent that it helps to attain the above goals.

Horse breaking and training, when combined with a constant effort to gain and retain the horse's confidence, is more important than has commonly been realized in peacetime.

The driver must learn that some of the worst terrain difficulties can be overcome by maintaining a steady pace and constant pulling strength. In a military operation, horses normally advance at a walk and attain their goal by a slow and steady pace. Progress should be achieved less by a rapid gait than by adhering to a carefully planned time schedule.

Particular attention must be given to the training of pack animal drivers. Because of the more difficult terrain in which they must operate, the drivers must receive more detailed instruction in loading and unloading techniques, determining performance records, and care and use of specialized equipment. Each pack animal should be

assigned a driver, whose only other task is that of defense. Attempts to save on personnel by tying animals together in a column were never successful in the combat areas, where sudden enemy fire or such terrain obstacles as mine fields were likely to be encountered.

Appendix E contains more detailed information about the training of drivers and pack animals.

2. Wartime Training.

a. The Field Army. Even with the best peacetime training, new experiences will be gained in war which must be introduced into training programs as quickly as possible. While this was done, however, the German Army found that its training standards sank rapidly, especially during the Russian Campaign, owing to casualties and the need for rapid replacements, the transfer of personnel, and the activation of new and reorganization of old units. Consequently a constant training program was necessary to insure a continued supply of qualified drivers and cavalrists, for the army was growing increasingly dependent upon horse power for mobility.

To insure adequately trained driver personnel in the newly-activated divisions, a training detail from one of the Wehrkreis riding and driving schools was attached to each of the new divisions for a limited period. Each of the

Wehrkreis schools was always to have a detail available for such assignments.

All training concerning horses must be continued in the field, and intensified during periods of position warfare and between campaigns. Experience showed that some German commanders did not realize the importance of continued training and failed to give it the attention it deserved. Increasing motorization will further obscure the need for training with horses, even though their use might become necessary. Immediately after the beginning of World War II the Army High Command found it necessary to establish a special organization to care for horses. This organization, which was enlarged at the beginning of the Russian Campaign, is described in Appendix D, Section II.

b. The Replacement Training Army. The fact that each field unit of the German Army had its own replacement unit in the zone of interior made it easy to transmit front line experience to the Replacement Training Army. This was accomplished by the direct transmission of reports, by visits of the reserve unit commanders to their corresponding front line units and by regular exchanges of training personnel between field and replacement units. The front line commanders desired high-quality personnel in

their replacement units and even released some of their own men to serve as instructors in the zone of interior.[1]

c. Indigenous Personnel. Some system must be devised for training local personnel that are enlisted as auxiliary labor. This is comparatively simple, since usually a peasant and his team are enlisted for service together. To guard against spread of contagious diseases among these horses, the owners must be encouraged and instructed in giving them proper care commensurate with military standards. Drivers must be taught to move in columns, to disperse in case of danger, and to group according to signals. Once indigenous laborers have learned their jobs, the cadre personnel can be decreased in number. It is desirable that auxiliary labor be given some degree of freedom and responsibility. Rather than create an impression of hard-handedness, it is better to risk the chance that a few individuals may shirk their work or disappear, for the Russian peasant showed himself very sensitive to unjust or disrespectful treatment. By displaying a fair and

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[1] Appendix F includes the general directives for rider and driver training in the Replacement Army and in newly-activated units. Sample training programs for two and twelve week periods are also included. Training was later altered only in that curb bits were no longer used, except by the cavalry.

friendly attitude, much can be learned from the local inhabitants, such as how to overcome the obstacles of winter without technical aids and where to find locally known winter trails. In general, where the proper treatment was offered, local auxiliary personnel proved equal to their tasks and were often of great value in times of crisis.

d. Eastern Volunteers. As with indigenous labor, those Russians who volunteered for service in the German Army were sensitive to rigid discipline. It was important to create mutual confidence between German cadres and volunteer personnel by giving the latter a feeling of freedom and responsibility.

## III. INSTRUCTOR TRAINING

As the war progressed and casualties mounted, more and more personnel had to be trained in the care and use of horses. On the initiative of both the High Command and the lower command echelons, new training courses were established and information and instruction pamphlets were distributed. Examples of the actual courses are included in Appendix G.

# CHAPTER 5

## SUPPLY IN THE FIELD

### I. FORAGE

Daily forage rations of oats and hay varied according to breed. The oats ration in 1941 (one ration equaled one day's requirements) was five kilograms for cavalry mounts and light draft horses, six and one half kilograms for heavy draft horses, and eight kilograms for very heavy draft horses. The hay ration varied from four to five kilograms.

A field unit began operations with a forage supply of oats: one ration carried by the horse or on his vehicle, one ration on his vehicle, one ration on ration supply train I (horse-drawn) and one ration on ration supply train II (motorized). All horse-drawn vehicles were loaded with one bale of compressed hay.

Because of the transportation difficulties expected to occur in the East, the field forces were directed to utilize local animals and to obtain forage from the occupied areas. The ease with which forage could be supplemented was overestimated, however, for farm animals in Russia were not regularly fed grain and few oats were planted.

Even green forage and grazing land were rare in large parts of the country, especially in the central and northern fronts.

The rapid German advance in 1941 did not allow time to collect and distribute even what forage could be found. Not until 1942, when the front became more stabilized, was the problem of obtaining local forage adequately solved. The situation was made even more serious by the breakdown in rail transportation during the first winter. As an item of lesser importance, forage was transported to the front only in minimum quantities, resulting in an enormous loss of horses.

Describing his experience with forage supply, the then assistant chief of staff of Ninth Army, later of Army Group Center, stated as follows:

> Regulations provided that each horse should receive four kilograms of oats and hay daily. It was thought at the beginning of the Eastern Campaign that a large part of the requirements could be taken from the land. At the most it was considered that oats might have to be carried in.
>
> This was hardly the case, for even in such fertile regions as the Ukraine requirements could not be fully met. In the sectors of Army Groups Center and North, characterized by swamps, forests, and steppes, not only oats but, even more important, hay was lacking. In summer and fall green forage offered a partial substitute for oats in the central sector, where horses fed well on grass and clover and occasionally

even on green grain. A mixture of oats and rye, whole or chopped, or rough ground corn, and even black oats to which salt and calcium were added were eaten without ill effect.

The emergency began with the approach of winter. Horses were soon dying en masse, especially on the central front. There was no forage stockpile then, and the few supply trains that were still running could only carry essentials, primarily ammunition for use against the Russian winter offensive...

Very occassionally some oats and a little preserved fodder would arrive, the latter being especially nutritious but not in sufficient quantity to warrant mention. The first carload of hay and straw arrived at the beginning of 1942. Ninth Army was forced to issue only a portion of the authorized oats ration, at times only one half kilogram, and to use roof thatch as green fodder. Hay could not be taken from local farmers, for they too had to keep their animals alive. During the 1941 advance oats were rarely found, and then in negligible amounts.

The reversal before Moscow and the extreme cold presented endless difficulties. The horse devoured wooden hay racks, thick branches, and whole saplings, gnawed at beams and wooden walls, and even consumed sawdust, wood shavings, and cardboard. Thousands of horses died daily of starvation and exhaustion.

Even in more fertile regions forage requirements could not be fully met. In mid-February 1942 one corps reported that its authorized strength had been maintained by utilizing local farm horses. Only 11 percent of its more than 16,000 horses had had to be assigned to light farm work or be put out of service, 34 percent could be returned to good health in six to eight weeks if given proper care, and 55 percent were still combat worthy. Of the oats ration 35 percent was requisitioned from the occupied territory and 45 percent was transported by rail through supply channels. Roof thatch was substituted for course fodder, which was not otherwise supplied.

The sole means of alleviating the situation on the central front was to send all animals not absolutely needed to areas where forage was more plentiful. The larger horses were intended for such transfer but only if their complete recovery could be expected; otherwise they were slaughtered and their meat used to supplement human rations.

The horse replacements which arrived in late spring of 1942 included animals of divergent qualities. Owing to the continued scarcity of forage, however, the best animals were transferred to pasture for use later in the year.

The number of horses sent to winter quarters was determined by the tactical units, while the supply and administration branch set up the depots and provided forage. Summer hay crops harvested by special details were stockpiled in rear areas. The horse depots also served as resting places for horses en route to veterinary stations and particularly to or from the zone of interior.

To increase local farm production horses requiring rehabilitation were occassionaly turned over to the peasants who provided forage. It was least difficult to feed the local farm horses. They were very frugal eaters and usually had never been fed oats, being turned loose to graze in the woods and meadows where even pine needles were not unusual fare. One half kilogram of oats added daily to their diet produced a visible benefit.

In the warm periods of the year it was relatively simple to provide adequate forage. Every opportunity for grazing was fully utilized. Horses which had grown emaciated during the winter soon recovered in the warm sun. Unfortunately the gnats and horse flies were so thick at times that opportunities for grazing were restricted.

After 1941 hay production was stimulated as much as possible in preparation for winter, and winter quarters with adequate forage stockpiles were established. Concentrated oats and hay were used to the extent they were available. Food bags, while widely used, were apt to rot or crack in the severe cold. Wooden racks wide enough for two horses were a good substitute. Horses were seldom fed forage from the ground.

Good drinking water was always available, even though requirements were unusually high, especially during the 1941 offensive. No ill effects from water were suffered.

The supply of forage for mountain units must be planned as a long-term procedure, for alpine regions or such areas as the tundra of northern Norway will offer little

forage. The mules and small horses used by mountain troops are heavy consumers of hay, which is bulky to transport.

II. SHELTER

Since shelter is seldom readily available in the field, some type of protection should be improvised, for a horse exposed to the elements will expend a considerable amount of energy to compensate for loss of body heat. In summer rest is impeded by insect plagues, especially in marshy, wooded, and river areas. Units not full aware of the importance of sheltering horses often failed to exploit all possibilities for affording protection, particularly if the men themselves were exhausted.

Farm sheds and storage buildings could often be used as animal shelters. The actual stables were frequently inadequate, for they had been built for the small panye horses. Moreover, many of the stables belonging to the kolkhozes and sovKhozes, the Russian collective and state farms, were infected by local horses suffering from chronic glanders. In extremely cold weather horses were occassionally even sheltered in houses. Local stables always had to be examined for protruding nails or other sharp objects that could cause injury. Whenever possible the straw beds

in Russian stables were removed, for they were found often to harbor infectious bacteria. Some of the stables were unbelievably filthy. On one occassion soldiers removed a three-foot layer of rotted straw, dung and debris to find a good stone floor, of which the owners of the stable knew nothing.

Shelter from the wind could be obtained by hitching horses between the houses of a village, or by protecting them with blankets or canvas or by a wall of underbrush. In summer such shelter was often preferable to damp, disease infected stables.

Once the front line had become stabilized, houses and farm buildings became particular targets for fire from the ground and air. At such times animals should be dispersed in woods, if possible on dry, sandy ground.

In the following manner, stables housing from ten to fifteen horses can easily be constructed on the south slopes of low hills or in valleys. Each horse should be allowed space measuring 1.60 by 3.25 meters. Posts fifteen to twenty centimeters thick are dug into the hillside to support the roof and sides. These posts are connected laterally by two poles, to which are added wooden feed racks for each horse. Two posts are then added in front, also to support the sides and roof and on which

harnesses may be hung. The roof, constructed of slender poles placed close together, rests on cross beams secured to the corner posts and is allowed to protrude over the front. Either shingles, which are available in even the poorer villages, or leaves or pine boughs covered with roofing paper may be used to cover the roof poles. On each side double walls at least four and one half to five meters high should be built from poles about ten centimeters in diameter. These double walls are then filled with soil. As winter sets in, the rear of the stable may be closed off by another wall of poles, although there must be a window at least at every other stall and two doors. Such a stable has a floor area of about five by twenty meters and a height of at least three meters at the lowest point. The floor should slope six centimeters for every three meters of distance. Slabs of wood, available in the villages, may be used for flooring and will assure a dry stable. A ditch dug around the stable will drain away rain and melting snow.

Other types of stables can be built, of course, and those dug more deeply in the ground provide good protection against artillery fire. Deep stables, however, may not allow air to circulate freely and may become too hot, encouraging respiratory illnesses.

In marshy terrain or during the muddy seasons, of course, stables must be built above ground just as must combat positions. While this requires more construction, it is justified by the clear necessity for protecting the horses.

While tents may be used as shelters there is danger that they will not offer sufficient protection against cold and that in summer their interiors will become unbearably hot.

In many parts of Russia all available straw was needed for forage and none was left for bedding. The horses usually stood on bare ground or on wooden poles or planks. Ferns, heather, other foliage, shavings, paper, or sand can at least be used in the rear of stalls. Damp stalls can easily lead to injuries to hoofs, skin, and hair.

Foxholes large enough for horses were effective protection in the combat zone. One foxhole was built large enough for two to three horses, approximately three and one quarter meters long, from three and one half to four and one half meters wide, and one and one half meters deep. An inclined entrance is built in the rear and the excavated soil thrown to the front and sides of the hole. It was said that horses soon learned to enter the holes themselves whenever they heard artillery fire.

III. REPLACEMENTS

There are three ways to replenish the supply of horses: (1) Requisitioning from occupied territory (usually local farm horses); (2) Employing captured horses (largely panye and small Cossack horses and the excellent Russian artillery horses); (3) Supplying replacements from the zone of interior.

The requisitioning of horses from occupied territories is a stop-gap solution which if carried very far can have undesirable economic repercussions. The feelings of the Russian peasant also must not be disregarded, for he loves his horses as much as does the farmer of any other land. Usually it is his most valuable possession. The requisitioning of pregnant mares or those that have not yet weaned their foals and horses under four years old should be prohibited. All requisitioned and captured horses should be examined for disease before being placed among the regular teams.

When a large number of horses was captured, they were collected in division or army horse depots, examined, classified, and finally distributed according to need.

The systematic supplying of horse replacements from the zone of interior is the responsibility of the veterinary officers of higher headquarters.[1]

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[1] Compare Chapter 8.

Each mounted and horse-drawn unit included in its combat train a small reserve of horses. In the infantry divisions the horse reserve was supervised by the supply section of the veterinary companies. In 1939 the reserve for the 5000 horses of a division comprised thirty-five cavalry mounts and eighty light and fifteen heavy draft horses. These numbers were insufficient for conditions in Russia and should have been increased at least 30 percent. From time to time the reserve was supplemented by replacements usually brought in by truck or rail. Long distances marches were avoided wherever possible, for they involved the expenditure of both time and energy and usually were conducted under great difficulties. With the breakdown of rail transport, however, the High Command decided to have thousands of horses driven to the Eastern Front in order to replace the large numbers which died during the first winter. In some cases the march involved distances of over 1000 kilometers.[2]

Although contrary to German Army regulations, experience showed that horse replacements should be sent to the front directly from the zone of interior, for army horse depots were too often breeding grounds for infectious

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[2]See Appendix C, Section IV.

diseases. Inspection in such depot was nearly always lax owing to the shortage of personnel.

It proved very effective to join the horse replacement convoys to the personnel replacement sections of the mounted and horse-drawn units, so that each man in the replacement section could care for one or two horses while en route. Each horse was equipped at least with a bit, march halter, saddle blanket, surcingle, and feed bag, every other horse with a saddle, and every fourth horse with a complete breast harness with traces.

Replacement convoys carried with them extra horseshoes, nails, grooming utensils, and similar equipment. All replacements should be reshod before their assignment to the field forces, although in practice that was seldom done.

Pack animal replacements were trained in the zone of interior prior to their assignment.[3]

Full understanding of the many problems involved in supplying replacements in Russia can only come with first hand experience. The veterinary officers responsible for replacement supply had no difficulty getting such experience, for they were constantly faced with new situations and often even found themselves in combat side by side with the line officers.

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[3] See Appendix E, Section IV.

# CHAPTER 6

## THE VETERINARY SERVICE

At the head of the Army Veterinary Service was the Veterinarian General of the Army High Command, who received his technical directives from the Chief Veterinary Inspector of the Replacement Training Army and his military directives from the Chief of Army Supply and Administration. The Veterinarian General proposed to the latter the employment of the veterinary troops within the army groups and armies. The veterinary units included clinics, horse depots, veterinary depots, mobile research stations, and horse transport columns. In the order of battle the veterinary companies were organic parts of the infantry divisions.

The veterinary officers on the staffs of army groups, armies, corps, and divisions were subordinate to the Veterinarian General for technical direction but to their immediate unit commanders for tactical purposes. The veterinary officers belonged to the supply echelon of their respective headquarters. Tactical and technical instructions to veterinary personnel were issued as "special directives." Each horse-drawn unit had its own unit veterinary officer.

# HORSES IN THE GERMAN ARMY

## ZONE OF INTERIOR

Veterinary Hospitals

Remount Depots

Veterinary Depots

## ARMY GROUP

One or two army group veterinary hospitals

## ARMY

Installations: two army veterinary hospitals, partially motorized; one army veterinary park, motorized; two horse transport columns, motorized--one horse transport company as of autumn, 1943; one army remount depot; one or two mobile veterinary test stations, motorized.

Army veterinary clinics: Organization similar but larger than veterinary company, without supply section but with horse transport motor trucks. Authorized capacity of 550 horses but often increased in the east to 2,000 or 3,000 horses; reinforced by voluntary auxiliaries and prisoners of war. During advance hospitals moved forward alternately; during combat or position warfare see below.

Army remount depot: Authorized capacity of 500 remounts, usually many more; supplemented from the zone of interior, recuperated horses from hospitals, and captured horses.

Army veterinary depots: Although motorized is dependent on rail transportation because of 500 tons of equipment including medical and dressing equipment, instruments, horseshoeing equipment, cleats, and gas protective equipment.

Veterinary test stations: Well-equipped mobile laboratory for all bacteriological, serological, and chemical testing. Tests foods of animal origin from the butcher companies, tests fodder, and systematically tests all army horses for glanders.

Horse transport column or horse transport company: For employment see below.

## DIVISION

Authorized one veterinary company per infantry, mountain or Luftwaffe field division and two veterinary companies per cavalry division.

Veterinary company until 1943: 233 men, two horse-drawn and six motorized transport vehicles.

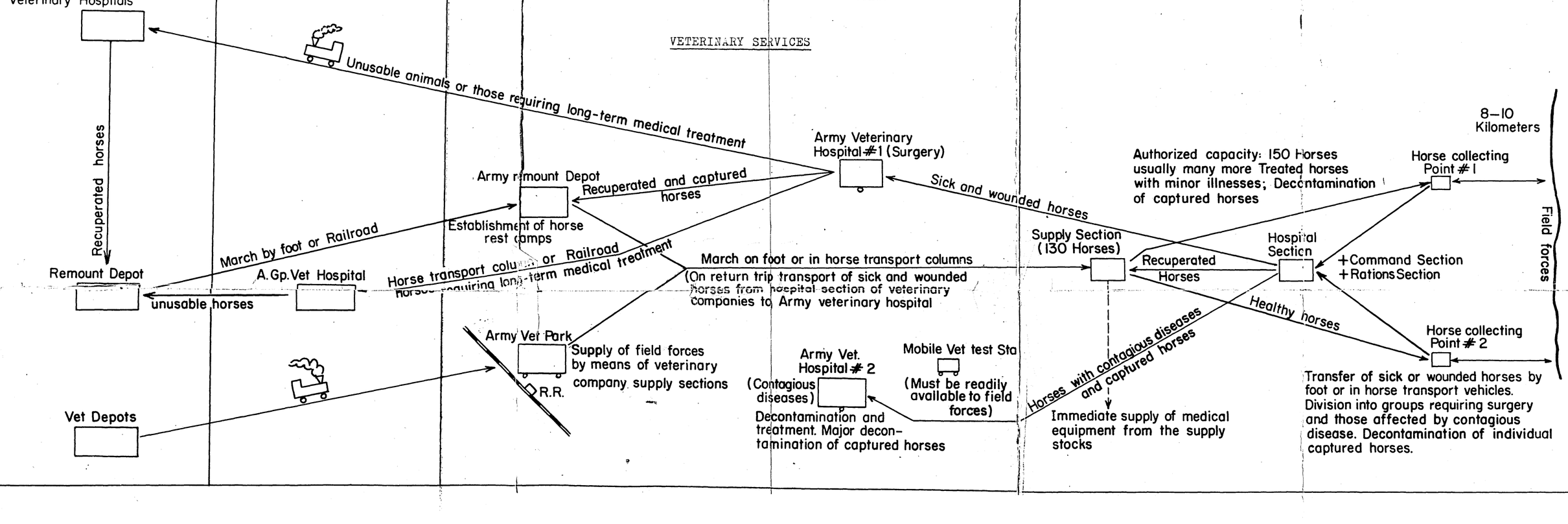
Organization: one command section, one collecting section, one hospital section, one supply section, one rations section.

Equipment: Excellently equipped with instruments, x-ray and portable motor driven dynamos.

Mission: Transfer sick and injured horses from combat areas; treat simple cases in hospital section; for others see below.
Advances with the supply forces.
Assigned to the administrative forces and not to veterinary units, but received technical instructions from the latter and were commanded by veterinary officers.

Butcher company: one per division, fifty men; provided fresh meat and sausages for 19,200 men; protected the unit against trichina and bladder worms.

## VETERINARY SERVICES



Veterinary troops were commanded by veterinary officers except in the case of horse transport columns, which were commanded by line officers assigned to a senior supervising veterinary officer.[1] Veterinary officers, however, retained command over horseshoer personnel of their own units in technical matters.

Toward the end of 1944 the veterinary companies of the infantry divisions were combined with the administrative and medical services into the administrative battalions of the new supply regiments. This measure was occasioned by the shortage of personnel and motor vehicles and is probably not advisable under normal conditions. It may be, however, that the veterinary officers, were better placed within a service unit than a line company, for they were largely reservists with little general military knowledge or training. Compare Appendix C, Section VI.

Just as a farmer calls a veterinarian only in more serious cases, an experienced column leader or driver was able to diagnose and prescribe treatment for many minor ailments. Losses can be limited if the driver knows his animal and gives it proper care, examining it for sores

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[1] Supervising veterinary officers were the senior veterinary officers on the headquarters staffs of army groups, armies, corps, and divisions.

and wounds at every halt and readjusting the harness to prevent excessive chafing. If possible tired horses were led by hand. Horses suspected of infectious disease were kept separate and brought to the veterinary officer for examination.

For further information on the operation of the veterinary service, see Appendix C, Section VI. Information on the functioning of the veterinary service in mountain units is contained in Appendix E, Section III.

The assignment of non-veterinary officers to supervise the training and care of horses in division and higher headquarters was often viewed by veterinary officers as an unjustified interference with their own functions. This was hardly the case, however, for the veterinarians were properly concerned only with the health and medical treatment of horses while non-veterinarians were charged with the handling of horses, care of accompanying equipment, and training in horsemanship. Even though these two missions may have overlapped, divided authority was still justified by the fact that the fighting personnel were almost never given sufficient instruction in horsemanship during the war. With its limited facilities the veterinary service could never have been given responsibility for all aspects of training. Moreover, the field experience of

most veterinary officers was far too limited to permit them an understanding of training requirements.

Information on common diseases and preventive measures is found in Appendix C, Section VII and for horses assigned to mountain troops in Appendix E, Section X.

# CHAPTER 7

## THE REMOUNT SYSTEM

### I. PROCUREMENT

The local breeding of horses which satisfy military demands is economically of great importance, for the purchase of large numbers of horses from foreign sources is very costly. While the normal horse market can supply the relatively constant number of military horses needed in peacetime, requirements during wartime climb rapidly, so that Germany was forced to depend upon horses employed commercially within the Reich.

To the extent that this is necessary, horses used in the civilian economy must be suitable for military purposes. The state, therefore, should influence horse breeding accordingly. Government-owned stud farms were established in Germany to assure selective breeding over a long period and to develop horses suitable for the requirements of both the army and the peacetime economy.

### II. THE PEACETIME

Before the war purchases within Germany were made by remount commissions, which bought young horses at specially

organized remount markets. Purchases were authorized by the Inspectorate of Riding and Driving of the Army High Command. Procurement orders denoting number of type of horses were issued by the inspectorate, which was responsible for the over-all management of horses in the Army. The horses were divided into classifications according to probable type of employment. This subject is treated with detail in Appendix B, Sections V and VI.

The three-year-olds purchased by the remount commissions were first collected in remount depots run by the Army. There the Inspectorate of Riding and Driving could survey the entire herd, at the same time checking on the activity of the commissions. The young horses, not yet fully grown, grew strong under uniform treatment during their year in the remount depots and progressed in a common direction even before their actual training began. At the end of the year the horses were transferred either to the services which conducted their own training, the artillery and cavalry, or to the Wehrkreis Riding and Driving Schools, where they were trained to serve in the infantry and other arms.

III. IN WARTIME

Special measures were required to meet the suddenly increased demand for military horses following the outbreak of war. In 1939 the number of horses in the German Army increased almost in one stroke from 120,000 to 590,000. Throughout the course of the war a large reserve of horses was continually required, many times over the number needed in peacetime.

It was possible to meet the increased demand for horses at the beginning of the war only because all horses in Germany had already been listed according to suitability, availability, and need, a task performed by the Inspectorate of Conscription and Recruiting and its various agencies. Both military and civilian agencies, especially agricultural organizations, collaborated in drawing up lists of horses, in order that consideration could be given to both economic and breeding requirements. Horses could be declared indispensable just as could persons who held important civilian jobs. Without this careful preliminary work, the sudden induction of thousands of horses would have been hard felt by the national economy.

As the war progressed, the continued high demand for more horses could not be filled by the old system, except by cutting into the stocks of full-grown horses. The

number of horses requisitioned in Germany and the occupied territories was in 1940: 148,000; 1941: 282,000; 1942: 400,000; and 1943: 380,000.

At the beginning of the Russian Campaign not only did the demand greatly increase but far more care had to be exercised in requisitioning horses. Mistakes were of course unavoidable: overage or immature horses were too frequently accepted, too large horses should never have been taken, and the induction of valuable studs was especially unfortunate. At the front many mistakes were also made, which in turn added to the strain on sources of procurement. Horses suffering from overexertion were too seldom evacuated to the zone of interior while still able to perform light farm work, even though at the front they only burdened the veterinary service and after recovery and reassignment soon broke down again. Collecting depots and stables were notorious sources of infection, owing to lack of care and adequate supervision.[1]

## IV. PROCUREMENT IN OCCUPIED TERRITORIES

Horses were requisitioned from occupied territories in accordance with the same principles applicable in the zone of interior, for the preservation of economic life,

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[1] For danger of large assemblies, see Appendix C.

especially in agriculture, was to the interest of the occupiers. A considerate policy was especially important in the densely populated nations of Central and Western Europe, where the agricultural economics are sensitive and highly developed. The particular manner in which horses were requisitioned depended on conditions in the respective country, although when possible existing agencies and markets were utilized.[2]

Conditions are different in Eastern Europe, where the sparcer population, less developed economics, and hardier breeds of horses made requisition easier. But even here care had to be taken not to damage the local economy, especially since the strength of the partisan movement fluctuated with the kind of treatment extended by the occupiers.

Very few breeds of horses common in other countries were encountered in Russia, where the panye horse is almost universally employed. In utilizing panye horses for military purposes, it must be remembered that this small, usually filthy mongrel is not a plaything or an animal whose use should be left to the discretion of a unit commander or an individual soldier. Only in cases of emergency should individual units be authorized to requisition

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[2]See Appendix C, Section III.

horses outside of normal channels. There are several reasons why panye horses should be requisitioned and controlled by higher headquarters: (1) If agricultural areas are deprived of necessary horses, crops will suffer and the population will join the partisans; (2) Troops who are allowed to requisition farm horses and vehicles at will soon attach to themselves a long, unnecessary train, which hampers mobility and endangers discipline; (3) The distribution of farm horses and vehicles according to actual over-all requirements is possible only by a higher headquarters, which is in a position to see the broad picture; (4) The unorganized incorporation of panye horses into combat units is likely to spread contagious disease.

The tendency to over-employ panye columns in the German Army was partially checked by giving proper explanations and by appealing to the understanding of unit commanders.

In practice horses were requisitioned most efficiently by command agencies, aided by their subordinate units in the field, town and other administrative headquarters, and agricultural supervisory and administrative agencies. Horses were obtained in three ways, requisitioning, purchasing, and hiring.

Horses were requisitioned only in exceptional cases, under direction of the division veterinary officer or, in emergencies, of a lower headquarters.

Purchasing was often accomplished through agencies of the military government. Mayors were instructed to present the town military headquarters with a specific number of horses on a designated date, whereupon the purchases were conducted by commissions who paid established standard prices. The purchased horses were then transferred to the division veterinary companies, which after a period of quarantine allocated them to individual units.

Hiring proved to be the best procedure in most cases. The farmer who permanently lost his horse was soon hungry and unable to work. There was already a serious lack of local horses, for the kolkhozes used mostly tractors, which the retreating Russians naturally took with them. Consequently, when the Germans expropriated large numbers of horses during 1941-1942, many farmers were forced to join the partisans in order to eat. For this reason it was wise to hire the farmer along with his horse and wagon. He was released during the sowing and harvesting seasons, and nearby units even helped him work his fields if the combat situation permitted. Often this practice was more effective than the use of arms in combating the partisans.

It should not be forgotten that the communist system of the present and the paternalist pattern of the past have

accustomed the Russian people to strict control, regardless who is in charge. They are content to be ruled by any authority whom they believe to be just and considerate, even if the controls are severe and demanding.

## V. THE PRESENT REMOUNT SITUATION IN THE GERMAN FEDERAL REPUBLIC

The outcome of the war has radically changed the situation as concerns the military use of horses in Germany. Formerly the most valuable area for breeding military horses was East Prussia. So far such East Prussian horses present in Western Germany and suitable for breeding purposes have not been collected in a spot adequate to maintain and make use of the valuable characteristics of the breed. Further valuable sources of lightweight, hardy, warm bloods have disappeared with the loss of other regions of Eastern Germany.

The area now controlled by the Federal Republic produces the heavier breeds that in part are more susceptible to disease. On the other hand, since cavalry is no longer widely used there is less need for the light warm bloods, while there is a greater need for powerful draft horses. Thus the situation is not as serious as it might seem. Sections I-IV of Appendix B describe in detail the procedures and statistical studies which are the current basis for the breeding of military horses in the Federal Republic.

## CHAPTER 8

## THE HORSE IN THE RUSSIAN ARMY

In 1941 the Russian Army, like the German, was largely horse-drawn. As in Germany, the wide-spread use of horses was made necessary by a limited capacity to produce motor vehicles.

In contrast to the German Army, however, the Russians in 1941 possessed no fully motorized or armored force organized for independent operations. The first step toward creating such a force was taken early in the war, and it was not long before large motorized forces, armored corps and armies became increasingly evident. Still, at the beginning of the war motor vehicles were only an aid to the infantry and cavalry, whose essential mobility was determined by the speed of the horse.

Also in contrast to the German Army, the Russians possessed numerous cavalry divisions, often organized into cavalry corps and in several cases into cavalry armies. The effect of these cavalry forces remained small, however, and as the war progressed they played an ever decreasing role, at least insofar as they influenced the course of the campaign. Presumably this was owing to their high casualty

rate and the impossibility of replacing losses with suitable horses and well-trained personnel.

The Russian cavalry demonstrated a high degree of mobility on the battlefield in 1941, employing development tactics, deploying on horseback, conducting mounted reconnaissance, and cleverly practicing the art of concealment. The cavalrists were courageous and well-disciplined, launching frequent attacks and at the same time cleverly evading German attacks. They tried to turn the German flanks and to infiltrate through gaps in order to harass the rear. The burning of bridges and similar acts of destruction were carried out skillfully and with great haste. In spite of their ability, however, the cavalry was never assembled on a large scale for decisive action. It appeared that the regimental and especially the division commanders were not equal to the task.

A single action on the central front in January - February 1942 offers an example of the Russian's use of cavalry. The German Army at that time had been forced on the defensive following the reversal before Moscow. Two Russian armies in heavy fighting had pierced the Ninth Army front west of Rzhev. A cavalry corps from one of the two Russian armies had advanced some distance

to the south and temporarily blocked the Smolensk - Moscow highway. Other spearheads composed partly of cavalry had broken through the army adjacent on the south, reaching the same highway in the vicinity of Durov. The main support arteries of Army Group Center, the highway and the railroad, were greatly endangered. (See Sketch 2.)

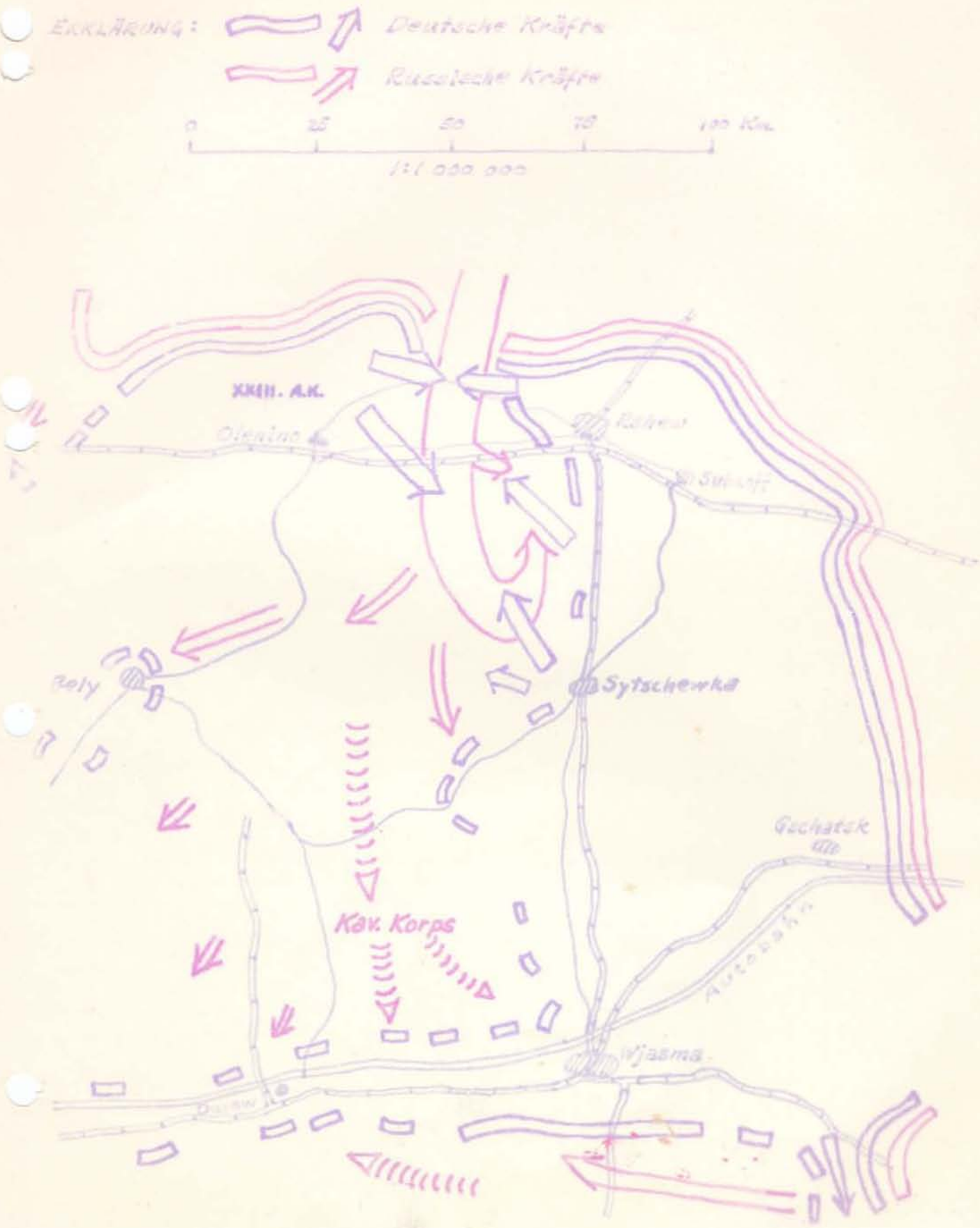
Despite the weakness of the German defense, neither of the Russian cavalry forces won any advantage. Indeed, the cavalry to the south was soon driven off. The cavalry force on the north concealed itself in the woods north of the highway and made no serious attempt to block it, even though the German security forces were numerically weak and poorly equipped. This situation continued until July 1942, when the Germans were able to gather sufficient forces to encircle and defeat the cavalry corps and other enemy units behind the front, which had meanwhile been closed at Rzhev.

Similar experience was to be found in other areas. In the summer of 1941 a cavalry force composed of one or two divisions, followed by infantry divisions, had advanced from the south, west of Beresina, deep into the flank of Second Panzergruppe, which was pushing eastward. For such a weak cavalry force the enemy's objective, Osipovitshi, was too far to the rear of the Panzergruppe.

MC P-090

SKIZZE X 2

# LAGA BEI WJASMA - RSHEW IM JANUAR/FEBRUAR 1942



Although the cavalry penetrated to the vicinity of Osipovitshi and caused localized disturbances, it was forced to withdraw and suffered casualties when attacked by pursuing infantry. (See Sketches 3 and 4.)

The low effectiveness of Russian cavalry can probably be attributed to its being only sparingly equipped with heavy weapons. Besides a small number of mortars, the cavalry divisions were apparently equipped only with 76.2-mm guns. Cavalry often appeared in combination with motorized infantry, frequently supported by heavy rocket launchers and artillery.

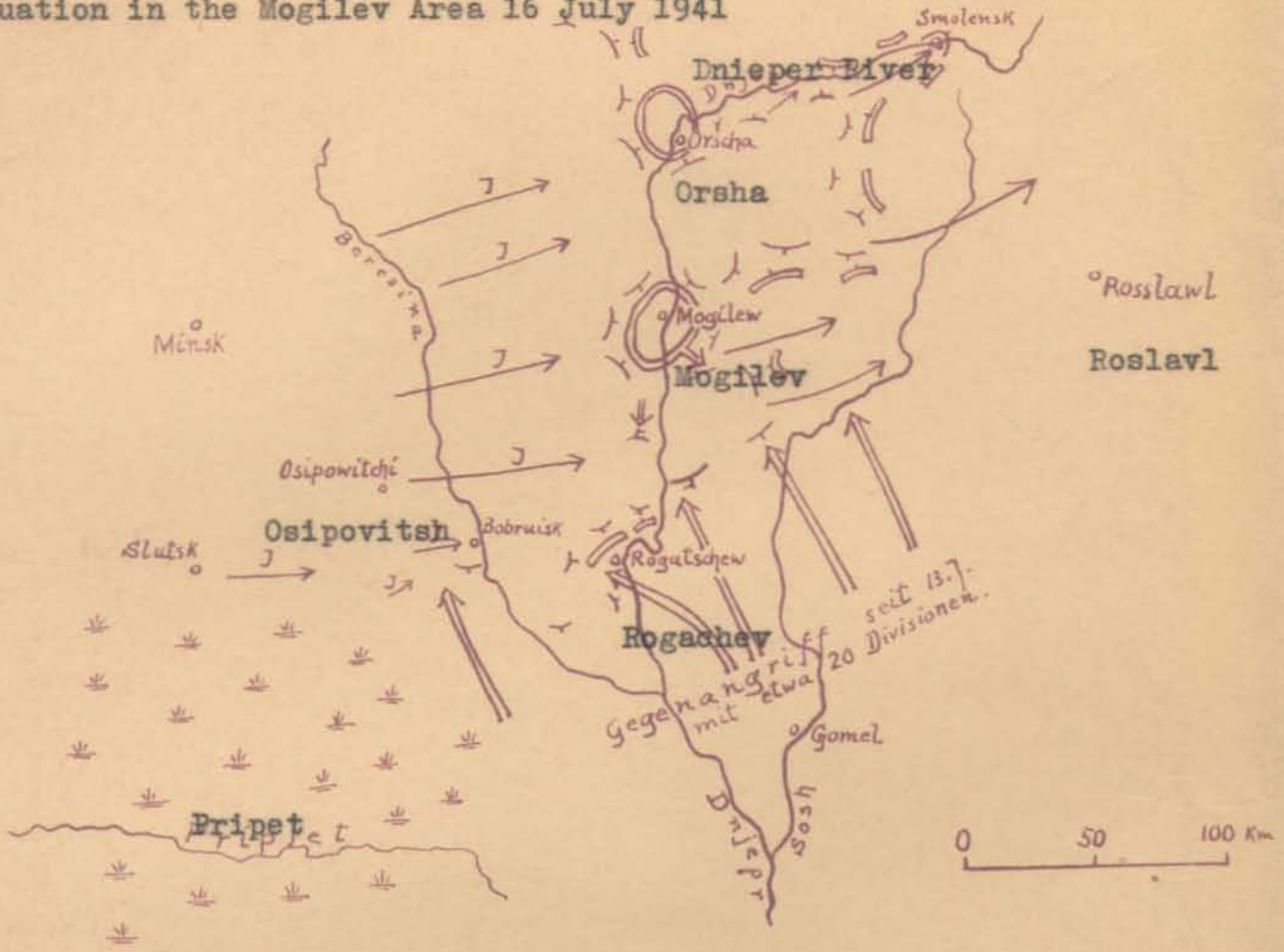
The Russian cavalry diminished in importance as the war continued. Although they were still at an advantage in swamps and thick forests and were employed to infiltrate through gaps in the front and to effect contact with partisans, their weapons, vehicles, horses, and training increasingly showed the signs of improvisation. In winter cavalry still was often employed with ski troops. Stories were also told of cavalry streaming through gaps in the front, each cavalriet carrying an infantryman behind his saddle.

The artillery of the Russian infantry divisions possessed excellent mobility, especially during the first half of the campaign. This was largely owing to light

Lage am 16.7.1941.

Skizze X 3
zu P - 090

**Situation in the Mogilev Area 16 July 1941**




Motorized forces of second Panzergruppe (betwee
Dnieper and Sos

Erklärung: Mot. Verbände der Pz-Gruppe 2 (zwischen Dnjepr und Sosh)

Points of the infantry divisions of the Second Army which was following

Anfänge der Inf.-Divisionen der nachfolgenden 2. Armee.

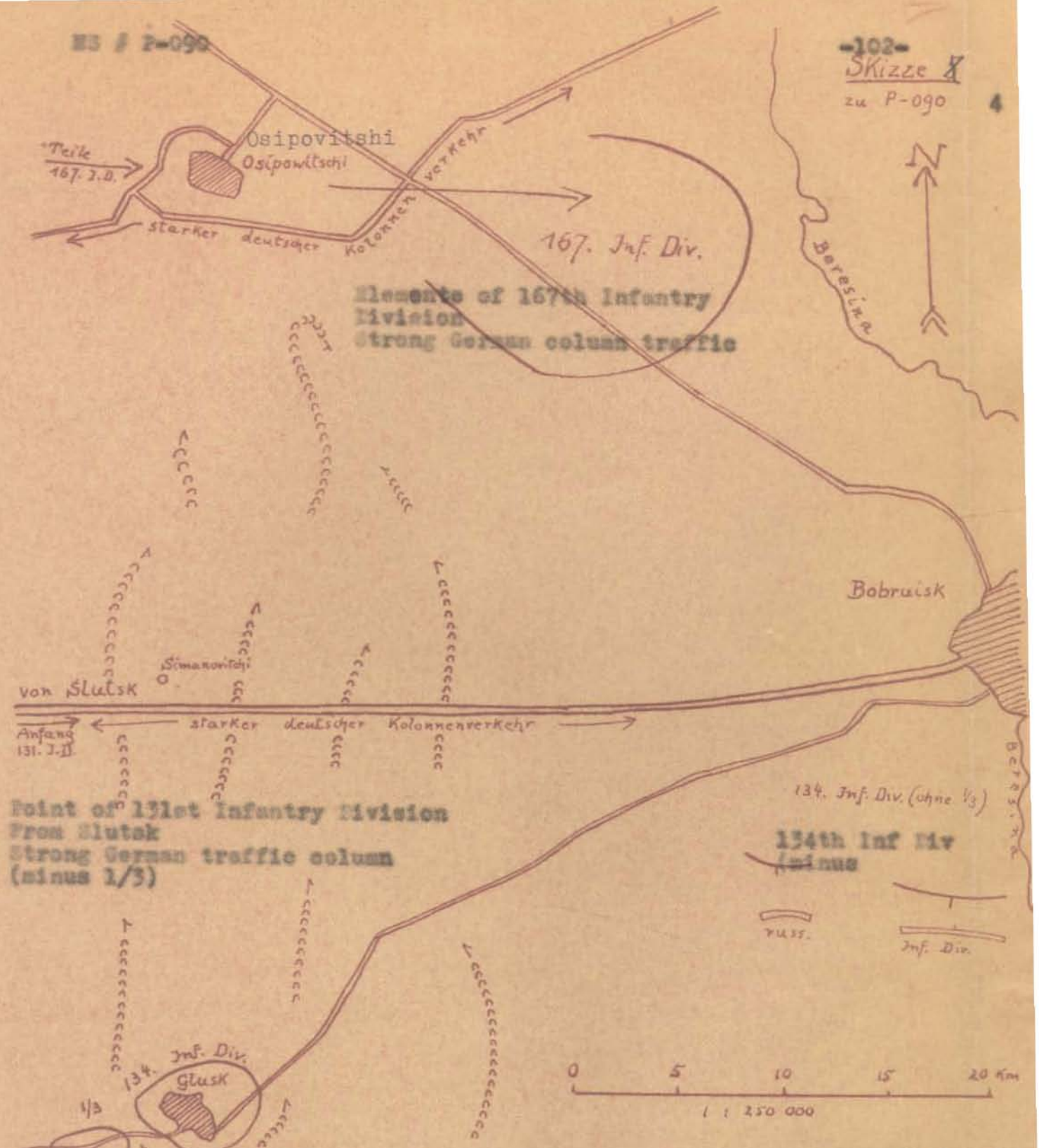
1st Cavalry Division, northeast of Rogashev (as signed to second Panzergruppe)

1. Kav.-Div. nordöstlich Rogatschew (der Pz-Gruppe 2 unterstellt).

Russian forces

Russische Kräfte.

Skizze 4
zu P-090




Sketch 4

Lage westlich Bobruisk
etwa am 16. 7. 1941.

1-2 Russian cavalry divisions
(armoured cavalry ?) covering several days
(Bewegung mehrere Kavallerie Kavallerie-Divisionen)

situation west of Bobruisk on
about 16 July 1941

weight guns and to the excellent use made of the artillery's powerful, warm blooded horses. The major weapons of the horse-drawn artillery were the 76.2-mm guns and the 122-mm howitzer, the latter being lighter than the German 105-mm howitzer and having a range of only two kilometers less. Usually these guns were pulled by teams of eight horses.

Like the Germans, the Russians utilized trained pack animals when fighting in mountainous terrain. Horses were also widely used by the supply services, although the distribution between motorized and horse-drawn supply is not known. It was noticed that a very large number of horse-drawn vehicles were employed in the division combat trains, probably because each vehicle had a very limited carrying capacity.[1] As the campaign continued the Russians incorporated an increasing number of pack horses and wagons into their field units. During the muddy seasons the Russians suffered from supply problems just as much as did the Germans, while less able to plan ahead against predictable difficulties. Their lack of foresight was compensated to some degree by greater ruthlessness in their demands on the soldiers and the civilian population.

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[1] See also Appendix D, Section I.

When difficulties arose in moving supplies, the Russian commanders made immediate, often ruthless use of civilian labor. Upon an interruption in the rail system, supplies would immediately be transferred to farm carts belonging to local civilians. In this way distances of over twenty-five kilometers per day were sometimes covered. Fuel barrels were simply rolled from village to village along the entire route by members of the population, mostly by women. German air observers aptly called this "the ant supply service."

In general the performance record of the Russian supply service was low. It is not easy to say whether this was owing to organizational shortcomings or to shortages of motor vehicles. However, it was clearly evident in 1944 - 1945 that the Russians were unable fully to exploit the successes gained by their offensives because of failures in supply. After an advance of 100-300 kilometers the Russians were forced to stop until supplies could catch up. During these pauses the Germans would improvise a new defense line, which would then collapse under the impact of the next attack. Thus the Russian offensives in the last stage of the war were a series of regular spurts, the progress of which was determined largely by the rate of supply.

Appendix J comprises a pamphlet published in 1939, written by a high ranking Russian veterinary officer. It indicates the Russian view at that time of the role of horses in the army, a study of the demands made on a horse by various missions, and a review of breeds found in the Soviet Union. Unfortunately the available translation is incomplete and poorly worded, the latter deficiency being explained by the fact that it was not made for publication but only for specialized use in unedited form.

# CHAPTER 9

# LESSONS

## I. HORSES IN A MODERN ARMY

Lessons clearly applicable to possible future operations in Russia are not easily drawn from the experience of the German Army. Conditions prevalent in the East during 1941 - 1945 are not necessarily those of today or tomorrow. Climate, terrain, and the horse itself will hardly change, but almost all other factors are subject to the rapid progress of modern technology. Improvements in motor, rail, and air transport are certain to alter the circumstances that surrounded the use of horses by the German Army in Russia. Even if these improvements were not realized, the differing structure and potential of the German Army would have to be considered before its experiences are applied by others.

In general German experience showed that horses performed adequately in all respects as long as they received proper care. Performance was higher in those units where horses were under the management of officers with true understanding of their needs and capacities. Where proper care was not given, injury was frequent and the efficiency

of the unit suffered. Too much emphasis cannot be placed on the necessity for trained personnel. As the war continued and the problem of securing trained manpower grew increasingly acute, horse performance was seen steadily to decrease.

Long years of experience in the organization and training of horse-drawn forces and a full understanding of the horse's significance in the economic life of the country provided a firm basis for the most efficient use of horses by the German Army. Still, throughout the campaign constant, untiring efforts were required to maintain the degree of mobility which the proper treatment of horses can achieve. Cavalry forces in particular demanded the most painstaking, protracted, and intensive training of horses and riders.

The fact that the horse, as a living organism, can still perform when temporarily given only a minimum of feed and care indicated to some inexperienced personnel that horses had only scanty requirements. All soldiers responsible for horse management, even if only for a single animal, should therefore thoroughly understand the complicated constitution of a horse and the considerable requirements necessary for the maintenance of its health.

Although commanders in the German Army almost without exception had at some time in their careers seen service with horse-drawn units, it became evident that many of them, once they were no longer on horseback or had been transferred to the motorized forces, tended to forget the measure of performance possible of horse-drawn units. The young general staff officers who were transferred from motorized to horse-drawn forces were especially apt to demand too much from cavalry or horse-drawn columns.

## II. DIVISION OF DUTIES BETWEEN HORSE AND MOTOR

In the campaigns of the future, particularly in the East, the conduct of operations will be determined by the rate of advance of motor vehicles. The fighting will be waged by armored and other motorized forces and by airborne units, for only the motor assures the degree of mobility necessary in modern warfare.

The horse, however, may still be considered to have a supplementary role. Locally and for limited periods during the winter and the muddy periods in the spring and fall and in marshy and forested regions such as are found in central and northern Russia, the horse still retains a useful purpose. Such limited employment of the horse is an improvisation, however, and can be carried out with relatively low expenditure.

Horses also can be usefully employed by mountain troops operating in rugged inaccessable terrain and in the marshes and forests of northern Russia and Finland. The incorporation of mountain troops as small combat teams in predominately motorized armies is discussed above in Chapter 3, and is shown to require only a small outlay in animals and specialized equipment. Mountain troops equipped with horses may also be effectively utilized against partisans, who will inevitably exist in less accessable regions, in which horses will be less handicapped than motor vehicles.

The extent to which horses will be employed also depends, of course, on whether the resources and production capacity are available to permit the organization and maintenance of motorized armies of the necessary size. It must not be forgotten, too, that the terrain, climate, and road conditions in the East require specially suited vehicles. And motorized armies of any type require tremendous amounts of materiel. It might become desirable, therefore, to organize larger horse-drawn units than those suggested above, for employment on secondary fronts and in rear areas.

Experience has made it clear that any great extension in the use of horses entails considerable expense. Moreover the incorporation of large numbers of horses into an

army within a short time is a very difficult task possible only after careful advance planning.

The fact that circumstances might conceivably compel the activation of horse-drawn units makes it wise for complete plans to be made during peacetime. This is also true if cavalry might conceivably be organized.

As soon as the horse-drawn units of an army comprise a large part of the whole, the rate of advance becomes determined by the horse instead of by motor, and successful operations in areas of the size and type found in Russia are no longer possible. This was the case of the German Army in 1941 - 1945. Where a shortage of motor vehicles exists, it would seem better to exclude or isolate large areas, at least for a limited time, so that over-all motor vehicle requirements might be reduced and the spearheading armored forces strengthened.

Ten of the contributors to this study, all of whom had seen personal experience on the Eastern Front, were asked to give opinions on several questions. Asked whether forces fighting in such regions as European Russia should be predominately horse-drawn or motorized, eight contributors preferred full or almost full motorization and two held that horses were indispensable for the bulk of the

troops. One contributor felt that horses could be dispensed with altogether, except for a few pack animals for use in alpine regions. Six others would have employed horses to a limited extent in swamps and forested regions and auxiliary panye horses locally as special situations might temporarily require.

Only one out of seven, all former cavalrymen, considered cavalry indispensable in the East. This officer favored a number of cavalry divisions and even corps but otherwise felt that horses were unnecessary. Two others admitted that cavalry formations up to brigade size might be used to advantage in certain situations but agreed that they were not really necessary.

Four of the cavalrymen, all of whom had been with the cavalry only during the first part of the war and were later transferred to the armored forces (but who are still personally interested in riding as a sport), felt without exception that cavalry is outdated, even in the East. Two held that a limited number of horse-drawn divisions for use in swampy and forested regions might be justified, while the other two supported the use of horses only by mountain troops or during the muddy seasons.

III. HORSES IN A FULLY OR PREDOMINATELY MOTORIZED ARMY

1. Limited use of Horses. A fully motorized army waging war in Russia or similar geographical regions may very likely find it necessary to use horses at certain times and in certain places. Motor vehicle equipment may become scarce, either generally or only in certain areas, fuel shortages may develop, the supply services might not always function efficiently, or terrain obstacles may prove more difficult than expected. In such cases the army can find a ready substitute for motorized transport in the common Russian farm or panye horse, the characteristics of which are described above.

Because such a use of horses is clearly an improvisation, and because all improvisations in wartime are inherently dangerous, ample preparations should be made well in advance. The far better results obtained by experienced personnel fully justifies their training. Once they have been trained, care must be taken to assure they are properly assigned when horse-drawn forces are finally organized.

If the indigenous population together with their own horses and vehicles are extensively employed, army specialist personnel must be assigned to every column, at least at first. Some of these specialists should be able

to speak the local language. To assign untrained personnel as column commanders is a serious error, for they will either be dependent on the knowledge of the indigenous drivers or issue improper orders which will lower their authority. This will destroy mutual confidence and respect, which is the basis upon which the employment of indigenous personnel should rest.

Not only must personnel be trained in advance but equipment should also be made ready. The local panye carts and wagons are not likely to be found in condition suitable for military use, and the harnesses commonly used by the Russian peasants are not adaptable to pulling heavy loads. Carts and wagons can be repaired by the peasants themselves, especially if the village mayor or some responsible local official is directed to organize the work. Indigenous vehicles are not likely to meet the entire demand, however, and wagons specially constructed for Eastern conditions should be made ready in advance of their intended use. A supply of small-size horseshoes should also be available for the small panye horses.

Soldiers should receive pamphlets on the management of horses and officers pamphlets on the organization, command, performance, and supply of panye columns. Instructions on the treatment of indigenous personnel should be given to commanders. An ample supply of dictionaries will also be useful.

At army and possibly also at corps level a small staff of officers, veterinarians, and subordinate personnel should be assigned to prepare plans for the use of local farm horses, to issue the accompanying equipment when necessary, and to organize the local repair and construction of vehicles, sleds, and harnesses.

2. Horse-drawn Forces for Secondary Missions. If horse-drawn units are to be employed behind the lines as security or occupation forces, the measures described above will not be sufficient. A peacetime cadre must be organized to serve as the nucleus of the wartime organization. The cadre would be made responsible for selecting personnel, acquiring horses and equipment, training, and wartime supply.

Just how these tasks would be carried out will depend, of course, on the over-all organization of the army. Probably horse-drawn units would not be fully established in the normal sense but only provided for on paper and in school curriculi. Certain divisions, perhaps national guard divisions, might be designated for conversion to horses if necessary.

In selecting personnel, both enlisted men and officers, it is best to rely on volunteers. Men should be chosen who will care for their horses under all circumstances, regardless of the discomfort to themselves.

Training was aided in Germany by the existence of rural riding and driving schools, in which farmers were given instruction in horse management. Such schools still exist in West Germany today.

In a situation where the army maintains no horse-drawn divisions as an integral part of its establishment but has only schools, instructors, and certain motorized divisions designated to become horse-drawn should the need arise, of first importance is the establishment of a core of trained personnel. This can be accomplished by detaching men to schools or instruction units or, better, by training men within their own divisions; this, of course would require the actual incorporation of horse-drawn elements. The officers and NCO's of the horse-drawn units should have received the same training courses.

An officer from the motorized forces training to command horse-drawn units must completely alter his thinking. Not only is the internal routine of horse-drawn units and the problems of horse management different, but a full understanding of time requirements and performance capacity is required. This cannot be learned from theory alone but requires practical experience. The time needed to prepare a march with a horse column, for example, is considerably greater than for a motor movement. Other than for fueling there is little delay in starting a

motor march, so long as the vehicles are in good condition. Horses, on the other hand, must first be fed, which takes one to two hours, and then harnessed. After a relatively short distance the horse becomes worn out, while the motor vehicle can normally run as long as it has fuel. Over average terrain a motor vehicle in the East could cover ten to fifteen kilometers, the horse-drawn vehicle only four to five kilometers. Planning must take account of these differences. Senior officers concerned with both motorized and horse-drawn forces must remember that tactical direction is very different in each case.

The height of good training is achieved in the annual maneuvers of horse-drawn forces, in which motorized units planned for horse-drawn conversion also participate. Horses from the regular units, from the training schools, and even from the farms can be assembled under wartime conditions.

Good training also requires periodic training cycles for horseshoer and veterinary personnel, riding instructors, and all others directly concerned with horse management. A number of officers should be trained as advisors to commanders on the treatment of horses. (Compare Appendix D, Section II and Section IV, Subsection 1.)

In addition to the above provisions, riding and driving schools to train remounts for military service will also be needed.

Once horses become more than just a temporary substitute for motor transport, measures must be initiated to meet all needs connected with their use. Necessary installations include veterinary clinics, remount depots, and equipment and supply depots.

A brief glance at the field of supply shows the great outlay required as soon as horses become used other than for limited, localized purposes.

3. Horse-drawn Combat Elements for Front-line Missions. The use of horses by mountain troops is covered in Chapter 3 above. The difficult combat conditions to which such troops may be exposed and the extensive training required preclude any improvised type of organization. The number of horses assigned to mountain troops should be limited as far as possible by the use of special type motor vehicles and helicopters.

If horse-drawn infantry divisions are to be organized as fully efficient combat units, they must exist in peacetime as a regular part of the army. In this case it is no longer possible to speak of a motorized army; for the existence of horse-drawn divisions must be considered in

drafting the over-all program of command, organization, training, and supply. Cavalry will require even more training than horse-drawn forces.

# APPENDIX A

## EXAMPLES OF THE MILITARY USE OF HORSES IN RUSSIA

# PART I

## EXTRACTS FROM ACTION REPORTS ON THE RUSSIAN CAMPAIGN, 1941-45, SHOWING THE SUPERIORITY OF HORSES OVER MOTORS UNDER CERTAIN CONDITIONS AND THEIR RELATIVE COMBAT VALUES ON VARIOUS BATTLEFIELDS AND IN DIFFERENT SEASONS

(Examples 1 to 14)

Example 1.

Source : Report of Major Mendrzyk, staff officer of the Third Panzergruppe.
Area : Lithuania.
Time : End of June, 1941.
Subject : Difficulties Experienced by Troops Depending on Motorized Supply Compared with Those Depending on Horse-drawn Supply; The Inadequacies of Normal Type Commercial Motor Vehicles in the East.

At the end of June 1941 serious difficulties were experienced in supplying the Third Panzergruppe when some of its rapidly advancing units had to be supplied from the newly established base in Varena. South of Varena the road to Werenov and Vilno ran along the top of a three kilometer long embankment. Here the road was so badly cut up by earlier traffic that a large portion of the commercial type

vehicles in the supply service got stuck and completely blocked the road. The situation was made worse by vehicles pressing forward on the sides and returning from the front, ambulances in particular. Even the prime movers proved of little help as they had great difficulty in getting through to the vehicles most in need of assistance.

Horse-drawn vehicles made much better progress, since they were able to make use of secondary dirt roads. Traffic direction and control was of little help. Fortunately the railway line from Grodno to Vilna and Molodzno was very quickly brought back into service, and this prevented the supply situation from becoming too critical. A motorized unit without the necessary supplies is soon brought to a halt, even without enemy action, while infantry forces not seriously engaged in combat action can live off the land for quite some time. This was our experience, and it was repeatedly confirmed at the time of our withdrawal, when Russian units, sometimes with only the most rudimentary equipment, stuck closely to our heels. This they could do easily seeing that the food requirements of the Russian soldiers were less than ours. In this respect I often envied the enemy for not having to worry about the daily menu the way we still had to do back in 1941.

Example 2.

Source : Same as above.

Area : About 100 kilometers west of Moscow.

Time : December 1941 to January 1942.

Subject : The Replacement of Motor Vehicles by Russian Horse-drawn Vehicles and Sleds in Winter.

The bringing of food and other supplies to our winter position was possible only with horses and sleds. This was particularly the case when in the course of the various actions the Russians temporarily gained control of the Smolensk-Vyazma highway. The supply line to the rear was cut and there were periods when no motor fuel whatever could be brought through.

The Russians, accustomed to the severities of winter, were favored by this circumstance. The bulk of their troops moved forward on foot, some on snowshoes, accompanied by light vehicles, while our own clumsy, motorized mass in an area poor in roads but rich in forests could move forward only along the few good roads. Restricted to movement along the roads and hampered by the weather, action increasingly developed into close combat in which our various weapons, especially artillery, could not properly be brought into play. In close combat the Russians generally had the edge over us.

In this winter position almost all motor vehicle traffic came to a dead stop. In part, as already mentioned, this was due to the lack of motor fuel, but it was also due to the fact that the few remaining vehicles were urgently in need of a complete overhaul if our forces were to become mobile again at the conclusion of winter.

That our unit was still mobile, with the exception of a few prime movers, was entirely due to the use of Russian panye horses. These were accustomed to the severities of the Russian winter and needed little care, fodder, or shelter. These were our helpers and with their sleds were often the sole means of evacuating our numerous casualties, most of whom were frost-bite cases.

Example 3.

Source : Same as above

Area : East of Vitebsk, about 400 kilometers west of Moscow.

Time : Between February and April 1942.

Subject : The Difficulties Encountered when Motorized Forces Become Dependent on Horses; Difficulties in Heavy Mud.

The situation described above was about the same among the troops of the Third Panzer Army which took over the Vitebsk sector in February 1942. Based on Demidov, Seraj, and Velj, the units, which were at all combat-worthy,

continued to fight, although surrounded by the enemy, hemmed in by ice and snow, and almost completely without motor transportation. Indeed the surrounding terrain was so difficult that even the Russians, contrary to expectations, did not avail themselves of the opportunity of advancing westward between these bases. Vitebsk itself was held by the supply services stationed there, and these also made maximum use of native horses and sleds. The reinforcements arriving by rail at Vitebsk were immobilized by winter conditions and their completely inadequate equipment. When the 205th Infantry Division detrained at Vitebsk at the end of February 1942, it was ascertained that its units could advance only on foot, since the sleds that had been sent from Germany (the division itself had been equipped in France) were so broad and heavy that they could scarcely be moved even when empty. On the streets of Vitebsk they looked like snow plows. Horses could move them on the streets of the town all right, but not in the country. The result was that the division left these sleds in Vitebsk-where I could still admire them in 1943-and relied on Russian sleds. Such transportation had become a matter of urgency, since the troops surrounded at Demidov and Velij were in an increasingly critical situation with little relief from the air because

of the bad weather. Within eight or ten days the Third Panzer Army succeeded in collecting 2000 panye sleds for the 205th Division and brought them to Velij. But even with this equipment combat was still limited to well traveled roads. Motor traffic was very light.

The disadvantage of motorized forces having to rely on horses, without the experience necessary for their use under battle conditions, was very noticeable. A unit which the army detached for action against a numerically inferior partisan band was repulsed with heavy losses by an enemy more familiar with the terrain and more accustomed to the weather.

The sleds and vehicles subsequently sent from Germany, though more serviceable than the sleds with which the 205th Division had been originally equipped, did not measure up to the demands placed on them by Russian conditions. Nor could the factory established by the Army in Vitebsk to build sleds and carts meet army requirements. No sooner was the necessary number of sleds on hand than the spring muds called for a conversion to carts. Light carts were called for, but the ones furnished were so heavy that even the sleds did better in the mud.

Thanks to the opening of navigation on the Dvina River, supplies could be brought in to Velij via Suraj during the

muddy period. To a considerable extent, at least in so far as stocks on hand would permit, the troops were supplied well in advance of the campaign with provisions and ammunition, since it would evidently be impossible, even with the customary local transport media to get to the units occupying positions where there were no roads. These units subsequently were left to take care of themselves and even had to bake their own bread. Only a few cavalrymen and pack animals could reach them. In this general situation the horse with a light sled or cart was definitely superior to any motor vehicle, and the fact that it proved possible to carry on the war in the East through the winter of 1941-42 and to prepare for a war of movement in the summer of 1942 was solely due to the help of the Russian panye horses. To these animals thousands of German soldiers owe their lives, their escape from capture and imprisonment.

Example 4.

Source: Same as above.

Area : Vyazma-Gjatzk, about 180 kilometers west of Moscow.

Time : Early summer 1942.

Subject: Partisans in Swamps and Forests.

The Third Panzer Army relied almost exclusively on infantry divisions for fighting partisans. The main supply bases were camps in Vyazma and Gjatzk. Besides the railway, almost the only line of supply was the highway from Smolensk. Rail traffic, however, was at times interrupted by enemy action, since the line passed through terrain favorable to partisan operations. This area was almost inaccessible to motorized units and was inhabited by people who even in peacetime had made trouble for the established government.

Our operations against this enemy did not bring the desired results, for the partisans could quickly evade our troops and escape into the forests and swamps. By the time we succeeded in combing the area the partisans had turned into peaceful peasants against whom we could not prove anything. If a peasant were seized who really had had nothing to do with the partisans, it would suffice as an incentive for the remaining peaceful population to join the partisans. This was all the more true when it was realized that the latter were constantly applying pressure in that direction. A constant surveillance of the area by motorized patrols was impossible. The only possibility for patrolling lay in the employment of cavalry units. The higher headquarters finally came to the same point of view the following summer.

Example 5.

Source : Lieutenant Colonel Mendrzyk, Operations Officer of the 20th Panzer Grenadier Division.

Area : Novgorod, about 150 kilometers south of Leningrad; Orel, about 300 kilometers south of Moscow; and Novosokolniki, about 450 kilometers west of Moscow.

Time : Autumn 1942 and Summer 1943.

Subject : The Temporary Employment of Horses by Motorized Forces and the Use of the Indigenous Population with Their Own Horses.

In the summer of 1942 the 20th Panzer Grenadier Division relieved the Spanish Division in the Novgorod area, and I had similar experiences in bringing in supplies. Again horses proved of great value. The division itself, still fully motorized and mobile, had no horses of its own, but when horses were needed for supply purposes they were available locally. Later, when the division was relieved by a newly activated Luftwaffe field division[1] in order to be shipped by rail for service in the south, the horses were left behind for the use of the Luftwaffe unit. The latter

[1] An air force unit specially organized as a ground unit for fighting with the Army.

accepted the gift gratefully when they learned of the advantages which accrued from using horses for bringing up supplies.

It was to this use of horses that the division succeeded in remaining fully motorized and ready for service, for in addition to the other advantages was that of being able to conserve our motor vehicles and keep them in a good state of repair. Whenever the division was ordered to roll, it was ready to do so in the shortest possible time, and the number of vehicles that dropped behind for repairs was very small.

In late October and early November 1942, when the division after a short lift by rail was assigned positions in the Veliki Luki area, the same procedure was followed as soon as the situation allowed, that is to say, as soon as the enemy's break-through at Veliki Luki had been sealed off. Horse-drawn vehicles were used between the division's supply points and the front, especially when winter brought heavy snows and again in the spring when the roads in the division sector were deep with mud. During the latter period, the only motor vehicles which could be used at all were of the track-laying variety. As I have pointed out elsewhere, the use of trucks was stopped in the muddy season or at any time after heavy rains cut up the roads, which generally did not

have firm foundations, so that later when they dried out they could scarcely be used unless they were rolled or graded while still in a moist state. This work could be obviated by barring the roads completely and using horse-drawn vehicles on parallel temporary roads in adjoining fields.

The great advantage of being able to do without motor vehicles during the winter was shown again in summer 1943 when the division was suddenly ordered into action in the Orel bend. Within a few hours the division pulled out of the Novosokolniki sector and in a rapid march through Vitebsk and Smolensk covered the 800 kilometers to the Orel bend, where a violent defensive battle was raging. There the division was able to use its motor vehicles to good advantage and carried out all movements without difficulty. Even after the completion of this combat action, the division remained fully motorized throughout August and September. When a wound compelled me to leave the division near Gomel in September, it was still fully motorized and ready for service, although it had not been relieved for reorganizational purposes for a single day since June 1941.

The division experienced no particular difficulties in converting its motorized supply trains to horse-drawn columns, since the unit was comprised of many young men who had learned

to handle horses on their fathers' farms. Many of them were from Holstein, a region noted for its horse breeding. The division could always find enough native volunteers to serve with their own horses, since this afforded a chance to look after them and return home with them upon completion of their work. In the Novosokolniki sector the volunteers were even permitted to go home on Sunday. As a rule this trust was rewarded; indeed it often happened that these men brought new volunteers to work with them on the following Monday. Women were also successfully employed for this type of work. In Russia a woman is a man's equal and she expects to do the same work. As we learned from experience, it is wrong to appoint a man as mayor of a community simply because no other man is available. In such a case it is better to entrust a suitable woman with the position, and this is true for any other task. The psychology of a people must be taken into consideration. It would be wrong to consider a woman as inferior and in need of protection, since in Russia a woman is proud of her equal status.

Example 6.

Source: Colonel Harteneck, Chief of Staff, Second Army.

Area : Orel-Konotop, extending 200 to 500 kilometers northeast of Kiev.

Time : November 1941.

Subject: Horses and Motors in Mud.

At first I was only able to visit the divisions assigned to the Second Army in a small observation plane. On these occasions I repeatedly flew over the once proud Panzergruppe Guderian, stuck in the mud between Orel and Konotop. Even track-laying vehicles lay motionless with played-out motors, half sunk in the swamp, and easy prey to partisans or to Russian soldiers breaking out of the Bryansk pocket.

In Bryansk, at the very same time, I witnessed a parade of Division Stemmermann, which had followed the same route as Guderian's forces. It had come through all right and was battle-worthy.

In spite of the originally paved road, the couriers of the Second Army could reach Smolensk from Bryansk only in track-laying vehicles. On the same road I saw five-ton supply trucks break through the pavement up to their axles.

Example 7.

Source : Generalleutnant Harteneck, Commander of the 72nd Infantry Division.

Area : Luck, 330 kilometers southeast of Warsaw.

Time : 1944, period of spring mud.

Subject : Inability to Utilize Motor Vehicles.

In March and April 1944, around Luck, while Commander of the 72nd Infantry Division, I was not able to visit my regiments except on horseback for weeks at a time.

Example 8.

Source : Major Richert, Operations Officer of the 134th Infantry Division.

Area : Romni (Ukraine) to Krupets, about 250 to 300 kilometers northeast of Kiev.

Time : October 1941

Subject : An Infantry Division Tied Down by Autumn Mud.

In the course of these marches interrupted by minor fighting, the mobility of the motorized elements, now mostly equipped with Russian motor vehicles, proved equal to the horse-drawn elements for the first time since 22 June. Time calculations could be brought into some degree of relationship with distances.

On 10 October disaster struck the entire division. In the evening of that day, after two days of rain, the vehicles became hopelessly mired in mud, the columns extending sixty kilometers along the road from Putivl to Krupets and Amon. Only the Russian horse-drawn panye carts and a few track-laying vehicles were capable of moving. Even light artillery pieces, pulled by ten-horse teams, were mired in mud up to their axles. During the next few days the division was formed

into nine hedgehog positions of battalion strength, using villages as their centers. In the case of the artillery the ten-horse teams brought in the gun mounts and limbers separately. All trucks and vehicles which were stuck were unloaded with the aid of panye carts, the supplies stored within the hedgehog positions, and the empty vehicles pulled out with teams of as many as twelve horses, with Stalin tractors on loan from the heavy artillery battalion, or with two heavy German prime movers belonging to the division workshop company. All the equipment was hauled into the hedgehog positions which were prepared for all-round defense.

The rains continued. At first, contact between the various strong points was established by radio. The horse-drawn telephone sections were quickly used to establish telephone contact, since the motorized telephone sections were completely immobilized within the strong points. The horse-drawn telephone sections exchanged their heavy carts for twice the number of the lighter local type. The transmission of orders and messages was only possible by horse or cart moving at a walking pace. And again these brave, little native horses, in the face of a growing scarcity of fodder, saved our force. They were our absolutely dependable

helpers in every situation, whether for courier service as in our great-grandfather's time, for transporting the very limited food supplies which could still be brought in, for evacuating the growing number of hospital cases (severe cases of jaundice, typhoid fever, some cases of spotted fever), for reconnaissance, or for fetching urgently needed firewood from the neighboring forests.

One night, around 20 October, some wild shooting occurred near the most northerly hedgehog positions. The Bryansk pocket had burst and thousands of Russian troops were breaking out toward the southeast, right past our isolated battalions. Again it was our Russian horses that brought help to our seriously threatened comrades. Mounted elements from the strong points, which were not threatened, were able at the last moment to prevent two battalions from being overwhelmed by the Soviet masses, along with all that had been collected within their defensive position, in spite of the fact that the Russians had the support of light artillery and some tanks. Our prime movers could no longer be used since there was no fuel left. The only cavalry squadron in the division, attacked by at least one Soviet infantry regiment and completely surrounded, lost almost all its horses, a terrible blow in this critical situation.

The artillery was scarcely of any help at all, since the ammunition brought along from Kiev had never been replenished and was almost completely consumed. The division's ammunition supply train was stuck at Putivl. The men of the cavalry squadron owed their lives to the fact that the squadron had just received its full allowance of ammunition for small arms, machine guns, automatic weapons, and mortars, and also to the circumstance that the Russians were in a hurry to get home and were at the critical moment attacked on the flank by some of our horse-drawn infantry.

Example 9.

Source : Same as above.

Area : Krupets-Fatej-Maloarkhangelsk (50 kilometers south of Orel)-Livni (370 kilometers south of Moscow).

Subject : Marching in Mud and Frost.

On 6 November, after there had been some frost during the nights, the division resumed its march out of the Krupets area with the infantry and the horse-drawn elements, but left behind the heavy carts as well as all the motorized elements. The condition of the roads would not permit the latter to move as yet, and they were, in any case, completely out of fuel. After a very difficult march which resulted in a loss of over a thousand horses from exhaustion

(no grain had been received since mid-October), the division reached the Patej-Poniri area and then Maloarkhangelsk and prepared the Sosena sector for defense against prodding but inferior Soviet forces.

On 15 November the motorized elements got under way on the now frozen roads and in spite of the short daylight hours rejoined the division at the end of the second day. Again there were increasing numbers of broken springs, even in the case of Russian vehicles, and now there were also numerous blowouts and flat tires caused by the hard, frozen ruts made by earlier traffic.

In the course of this winter campaign towards Livni and Yelets the motorized elements of the 134th Infantry Division for the first time proved superior to the horse-drawn elements. On the frozen ground with scarcely any snow these motorized elements could go anywhere providing they were prepared to deal with broken springs and axles, damages to tires, and the high consumption of motor fuel due to having to drive exclusively in low gear. The heavy artillery battalion and some of the motorized supply troops were compelled to stay in Livni because of the fuel shortage. This fact turned out to be their salvation. The horse-drawn and mounted elements were only able to advance at a walking pace and numerous horses dropped out due to falls and sprains.

Example 10.

Source : As above.

Area : Yelets-Orel, 330 kilometers south of Moscow.

Time : December 1941.

Subject : The Movements of an Encircled Infantry Division, Cut off from Its Fuel Supplies and Operating under Winter Conditions.

On 5 December the Soviets launched their offensive from the Voronej area and forced the evacuation of Yelets between 7 and 8 December. On 9 December the division was cut off from its already woefully inadequate supply base at Livni. Strong Soviet cavalry units with light, partially mounted artillery, motorized infantry, and for the first time light, mobile multiple-type rocket projectors (Stalinorgel) pushed through behind us from the south deep into the rear of the adjoining German division on the north. Some of the Russian elements also veered back towards the east. The 45th Infantry Division, adjacent to us on the south, and our own division were separated and surrounded. To add to our troubles, the combat trains which had been organized from our sorely needed supply troops, two ammunition trains, a few trucks with motor fuel and a bakery company, were intercepted by cossacks and captured. All but a few of the men were killed.

The division now fought its way back toward the northwest in a shifting pocket, using the Yelets-Orel rail line as a guide. If any aid could reach us at all it had to come by the railroad. While the infantry and the horse-drawn elements-with normal losses in horses-fought and marched on, each motor vehicle was burned when its fuel ran out. The antitank companies were divided among the infantry regiments, and these were made responsible for the transportation of the antitank guns when it became necessary. Horse-drawn vehicles which were not absolutely necessary were abandoned. Catastrophe threatened during the evening of 13 December when the units were caught in an ovrag, one of those long extended ravines which cut across the Russian steppes. Because of the icy roads our tired teams were unable to climb out on the far side. Taking advantage of the fact that the German forces were concentrated within this ravine, the Russians fired on us from all sides with light artillery and multiple rocket projectors. But in the early dawn of 14 December the 446th Infantry Regiment stood ready to attack in a westerly direction with all light antitank and infantry guns hauled by the enlisted personnel into the forward line and with each rifle company accompanied by a horse-drawn light field howitzer. As the sun rose fiery red over the snowy landscape, the reenforced regiment and its

supporting elements began to attack with the last of the ammunition in its rifles, the last shells distributed among the guns, and the last pieces of frozen bread in the packs. With the 445th Infantry Regiment as rear guard, and the 439th Infantry Regiment acting as a screen against strong enemy forces in the north, although some elements of the latter were supporting the attack of the 446th, the 446th Infantry Regiment broke through the Russian encirclement and destroyed a Cossack brigade. The 439th likewise smashed and scattered a Russian brigade. The attack of the 446th was the most vigorous attack in which I ever participated. Commanders and company leaders either fought with gun in hand in the foremost line, or directed the action from horseback close behind, along with the horse-drawn batteries. The cavalry squadron, which had received new mounts since the episode of late November, was drawn up ready to be thrown in as a final trump against the Russian cavalry. Everything was staked on this final effort: to fail to break the encirclement would mean capture and Siberia.

In the first onslaught the ridge dominating the area was carried by an attack across the frozen Lyubovska River. With the exception of three heavily damaged pieces of artillery, the division got all of its heavy weapons across, all of its wounded-over 400 of them stowed on Russian sleds and

carts-but only a very small number of motor vehicles. Many wounded owed their lives to the horse-drawn 1st Medical Company of the 134th Battalion, but the motorized 2nd Medical Company and the remnants of the motor ambulance trains had to withdraw as weak medical units, without any motor vehicles whatsoever, without medical equipment, and without any medical supplies other than the kits which the men carried on their backs. So once again the brave little panye horses made possible the conduct of a successful operation, saving the lives of 15,000 German soldiers.

Example 11.

Source : Same as above.

Area : About 50 kilometers northwest of Orel.

Time : January 1942.

Subject : Improvised Methods for Making an Infantry Division Mobile in Winter Time; Attack Operations; Problems of Supply on Winter Roads.

In the Khotinets-Karachev area the division was made completely mobile for winter operations. The motorized elements which had been left in the Livni area because of the lack of fuel were returned to the division with the exception of the heavy artillery battalion which was badly needed where it was. So the division again disposed of a small number of motor vehicles. But these could have been used only on the main highway running from Bryansk through Karachev

to Orel, which was kept more or less open throughout the winter. Russian type winter equipment was procured through the Second Panzer Army and a division motor pool was established at Khotinets. The entire division was put on sleds, and all the larger horse-drawn vehicles were likewise kept in the Khotinets area with the exception of the field kitchens, which were mounted on sleds drawn by four-horse teams. All field pieces were provided with extra horses, in some cases double the previous number. The light field howitzers were each drawn by ten-horse teams. Every kind of equipment not absolutely necessary was left behind, and baggage was reduced to essentials. The signal battalion organized radio and telephone sections on sleds and were assigned to their respective command staffs for supplies and provisions.

The horse-drawn columns were uniformly organized in groups of sleds with a total capacity of twenty tons. The two medical companies, an ambulance train, and the veterinary companies were also equipped with sleds. The entire reorganization was carried out under the direction of higher headquarters and with excellent support from all concerned, including the Russian population. Success, however, was chiefly due to the enthusiastic support of the officers and men, who showed so much good horse sense that ways were found

to improvise for the impossible. Local Russian saddlers and shoemakers worked on the harness and other leather equipment needed for the teams and sleds, and the makers of felt boots worked day and night, expecting and getting no other renumeration than German army rations, until almost the entire division had been provided with felt boots. The same assistance was obtained for the manufacture of fur caps, vests, and camouflage snow-shirts. If after all these changes our force did not exactly look ready for a parade and could scarcely be distinguished from a Russian force even from short distance, the changes, nevertheless, were unavoidable, if there were to be even minor successes in the coming campaign.

On 19 January 1942 the division received the following mission: The 134th Infantry Division minus the reinforced 446th Infantry regiment attached to the 4th Panzer Division will move north on 20 January, and with the support of the 56th Infantry Division moving out of the area southwest of Bolkhov, will drive back enemy forces advancing in a northwesterly direction toward Orel. The first objective will be to establish a line from Krasnikovo to Peshkova and Kudryavets. Elements of the division, not mobile under present winter conditions, will remain in the Khotinets area

and will be responsible for the security of the Bryansk-Orel railway line from the town limits of Karachev to Khotinets.

On 20 January 1942 with a temperature of 42° below zero and with the snow generally about three feet deep, the division moved forward with four battalions, one ski troop, five light batteries, three engineer companies, and one antitank company in the direction of Ilinskoye. Not a single motor vehicle went along. Fighting against a stubborn and tenacious enemy, as well as against its ally, the grim Russian winter, a terrible natural force, the division pressed on towards the north. The average rate of progress was between one and two kilometers per hour, the average daily advance, if no particularly heavy fighting took place, from ten to twelve kilometers. And yet the exertions which had to be made by the men and horses were indescribably severe.

Slowly and painfully the division fought its way northward through ice and snow, with daily objectives varying greatly as to distance. Occasionally the forward units except the combat reconnaissance elements remained stationary for twenty-four hours, to allow men and horses to recover strength or supplies to catch up.

Supply problems, at all times difficult in Russia, became all the more serious in snow and cold weather. In this

extremely cold weather and in the complete absence of our motorized ration supply train II, getting supplies all the way to the front lines was no easy matter. This was also true of ammunition supplies for all types of weapons. Similar difficulties were involved in evacuating casualties, since these were particularly susceptible to the cold.

The supply line from one place to another followed winter trails often completely at variance with the roads marked on the map. Trails could be recognized only from tracks made by native sleds. These locally established winter trails generally avoided ravines and the larger depressions, in which snow often accumulated to great depth; they also avoided the places which the natives, with years of experience, knew to be particularly subject to snowdrifts.

The total available sled column capacity amounted to no more than 120 tons. Consequently, with the daily increasing distance between Khotinets rail head and end of the main supply artery and the front lines, the tonnage of supplies delivered grew correspondingly less every day, for the capacity of the horses only permitted a daily maximum of around twenty-five kilometers. On reaching Nisina this daily maximum was attained, which, counting another day for the return trip, meant that the daily load delivered at the front

amounted to around sixty tons. Beyond that point a relay system had to be introduced which involved loading and unloading due to the different types of sleds used and the corresponding differences in harness. On the other hand the continuous use of sleds along trails, undamaged by motor vehicles, improved these trails by making them smoother. This resulted in an increased daily performance: thirty kilometers could be covered per day and tonnage correspondingly increased. Two columns were assigned to every ten to twelve kilometers and operated as sections. This procedure was the more important since at Wisina and later at Peshkova supply lines branched toward the north, and supply depots had to be established to control and expedite shipments. The ten to twenty-five tons of grain used daily to feed the horses doing heavy work had to be deducted from the total supply tonnage deliverable daily at the front.

The events which have been no more than outlined above prove irrefutably that in winter warfare horses alone made possible the conduct and direction of operations, the supply of troops, and the evacuation of casualties. In this sort of terrain and amount of snow every motor vehicle sooner or later broke down or else got stuck in the snow. The Soviet T-34 with its broad tracks was the sole exception and had a chance to get through. The horse and not the motor saved the German Army in the terrible winter of 1941-1942.

Example 12.

Source : Same as above.

Area : About 50 kilometers northwest of Orel.

Time : September to October 1942, autumn mud period.

Subject : Application During the Muddy Period of the Experiences Gained in Autumn 1941.

We were back in the woods again. The division at once readied its positions and built corduroy roads for two-way traffic. However tiring it was at first for men and horses to move over such roads, they later facilitated all transportation problems in a most decisive manner. The supply problem was caused by the fact that stores of all kinds could still be brought in by truck as far as the starting point of the corduroy road system, stored in depots, and from there could be brought forward as needed. At the beginning of October motor vehicle traffic was stopped until about the middle of November, and traffic was possible only on the corduroy roads. These had been partly ballasted with gravel taken from a nearby pit and distributed by horse-drawn columns. Even on these roads only light traffic was permitted and it was strictly controlled sectionally. Traffic beyond the corduroy section until the ground was sufficiently frozen, was confined to the evacuation of casualties and the transport of bread and fresh meat. In

contrast to the autumn mud period of the previous year everything had been well prepared for the winter, including the distribution and storage of grain and hay in sufficient quantity for the large number of horses attached to the division. Again the horses had proved their great importance. Without them the corduroy roads could not have been built.

Example 13.

Source : Generalleutnant Feldt, Commander of the 1st Cavalry Division.

Area : Pripet Marshes.

Time : Summer 1941

Subject : The mobility of Horse-drawn and Motorized Elements in the Pripet Marshes.

After crossing the Bug River at Slawatycse on 22 June 1941 the 1st Cavalry Division received instructions to advance through Molorta to Prinsk in order to protect the right wing of the Second Panzergruppe (Guderian). In this swampy area our movements were exclusively confined to the few existing roads. These, however, for some strange reason, were built of nothing but sand, so that any but the lightest motor vehicles scraped their oil pans and got hopelessly stuck. The mounted units and horse-drawn elements of the division crossed through at least, though often only a very reduced speeds. The Pinsk Marshes are for the most part safe from tank attacks.

The sands and swamps between Pinsk and Siniawka along the road from Brest-Litovsk to Slutsk compelled the division to separate itself from all the motorized vehicles attached to the combat troops, including the motorized supply services. These elements reached the Brest-Litovsk road by way of the few more or less useable roads through Chomsk-Berezakartuska and Janow-Iwacewicze, while the rest of the division had to fight its way through the swampy terrain east of Lake Wygonowskie in order to reach the highway at Siniawka.

Example 14.

Source : Same as above.

Area : About 100 kilometers southwest of Bryansk.

Time : October 1941.

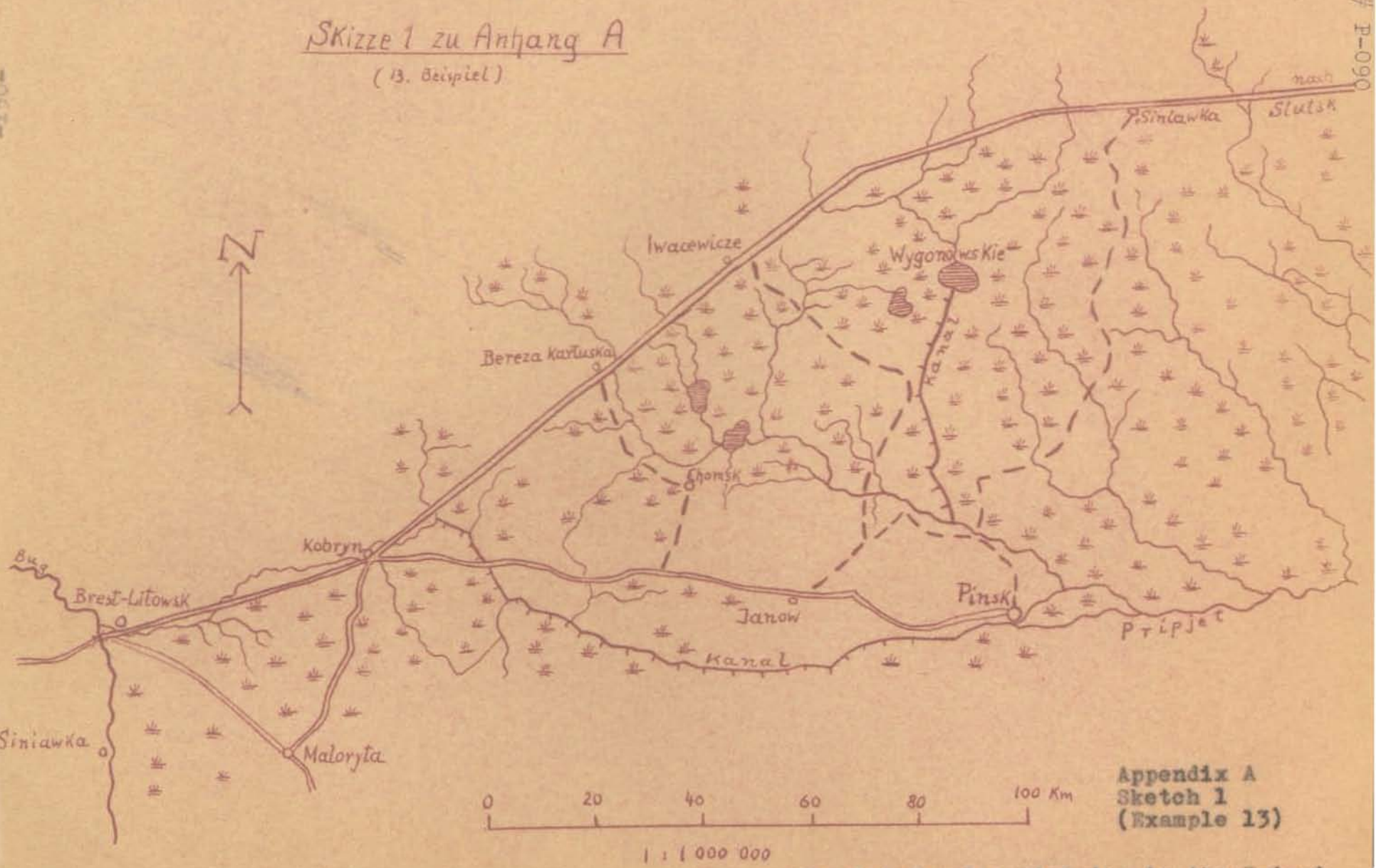
Subject : The Superiority of the Horse over the Motor in Wet Weather.

On 9 October 1941 the 1st Cavalry Division attacked from its forward security line on both sides of Pogar across the Suedost River toward the east, with Trubshevsk as first objective. During the attack rain and then a driving and blinding snow began to fall, so that the swampy and muddy terrain, difficult enough before, became very soggy in a short time. Again all the heavy motorized elements had to be collected, to follow later or to be pulled through with

MS # P-090

Skizze 1 zu Anhang A

(13. Beispiel)




Appendix A
Sketch 1
(Example 13)

The 1st Cavalry Division in the Pripet Marshes Summer 1941

teams of horses. All the mounted elements and the horse-drawn carts made comparatively good progress.

# PART TWO

## THE USE OF CAVALRY FORCES

### I. OPERATIONS OF THE 1ST CAVALRY DIVISION IN 1941

Example 15. Mobile Flank Protection. (See Sketch 2).

The Second Panzergruppe, consisting of three armored corps of three motorized or armored divisions each, began operations on 22 June 1941 at the start of the Russian campaign along both sides of the Bug River at Brest-Litovsk with the objective of destroying Russian frontier defenses and exploiting initial advantages for the purpose of reaching the Roslavl-Yelna-Smolensk area.

The 1st Cavalry Division was assigned to the XXIV Panzer Corps and committed on the right wing of the Second Panzergruppe with the mission of protecting the right flank of the latter against enemy attacks from the Pripet Marshes and at the same time advancing toward Maloryta and Pinsk. In the Maloryta area the division was confronted by elements of two Russian infantry divisions, the 75th and 120th. The actions of the 1st Cavalry Division prevented them from moving against the armored forces advancing east along the north edge Pripet Marshes. The rapid attack of the 1st Cavalry Division took the enemy by surprise and compelled

Legend: Route of Advance of the 1st Cavalry Division

Erläuterung.

Vormarschweg der 1. Kav. Div

Von den Pz-Kräften erreichte Räume:

23.6. bis 23.6.

26.6. bis 26.6.

28.6. bis 28.6.

9.7. bis 9.7.

# Skizze 2 zu Anhang A.

(15. Beispiel)

Line reached by the Second Panzergruppe as of 23 June 1941

Smolensk
Yelna
Jelnja
Dnjepr
9.7.
Orscha
Orsha
Roslavl
Rosslawl
Borisow
Borisov
Mogilev
Mogilew
Minsk
Beresina
28.6.
26.6.
9.7.
Bobruisk
Slonim
Bialystock
Slutsk
Sluzk
Iwacewice
23.6.
Bug
Brest Litowsk
Brest-Litovsk
Kanal
Pinsk
Pripjet
Pripet
Maloryta
Moloryta

Sketch 2, Appendix A
(Example 15)

0 100 200 300 Km

etwa 1 : 2 500 000

him to withdraw to the south. After the division had proceeded on its way, the enemy reorganized his defense and stubbornly fought the 255th and the 267th Infantry Divisions which followed. These two units did not succeed in gaining permanent possession of Moloryta until 27 June.

Example 16. Holding a Bridgehead: Attack and Defense on a Broad Front.

On 10 July 1941 the I Panzer Corps consisting of four armored divisions and ten motorized divisions crossed the Dnieper at Star Bikhov and advanced towards the east. The 1st Cavalry Division, which had protected the southern flank of the XXIV Panzer Corps on the west side of the Dnieper opposite enemy-occupied Rogachev and further south, was ordered to Star Bikhov on 11 July. On 13 July the enemy launched a counterattack in the Gomel area on a broad front with about twenty divisions. The attack was directed against the southern flank of the Second Panzergruppe.

The 1st Cavalry Division, which had just arrived at Star Bikhov, received orders to secure the bridge there, which was of great importance to the XXIV Panzer Corps, and also to secure the lines of advance on both sides of the Dnieper against the enemy forces approaching from the

south and against scattered enemy groups west of the Dnieper approaching Star Bikhov from the north. (See Sketch 3).

The 1st Cavalry Division occupied a defensive line on both sides of the Dnieper (line "a" in Sketch 3), and shortly afterwards the enemy began an attack along the Gome-Mogilev road. Growing enemy pressure further east was exerted against the regimental outpost lines. The security lines were held by committing mobile reserves held in readiness for the purpose. Heavy defensive engagements took place between 15 and 18 July along the Gomel road. Elements of three Soviet divisions, the 102d, 151st and 187th were identified. They were repelled with heavy losses.

By 18 July the infantry divisions of the XII Corps arrived on the west bank of the Dnieper. The elements of the 1st Cavalry Division which were stationed on that side were relieved. A German counterattack was ordered for 19 July, to be led by the infantry divisions on the west side of the Dnieper and by the 1st Cavalry Division on the east side. The area around Novy Bikhov was the objective. The approach of additional Russian forces from the northwest was announced.

The 1st Cavalry Division, at the risk of exposing its forward security line and its defensive positions along

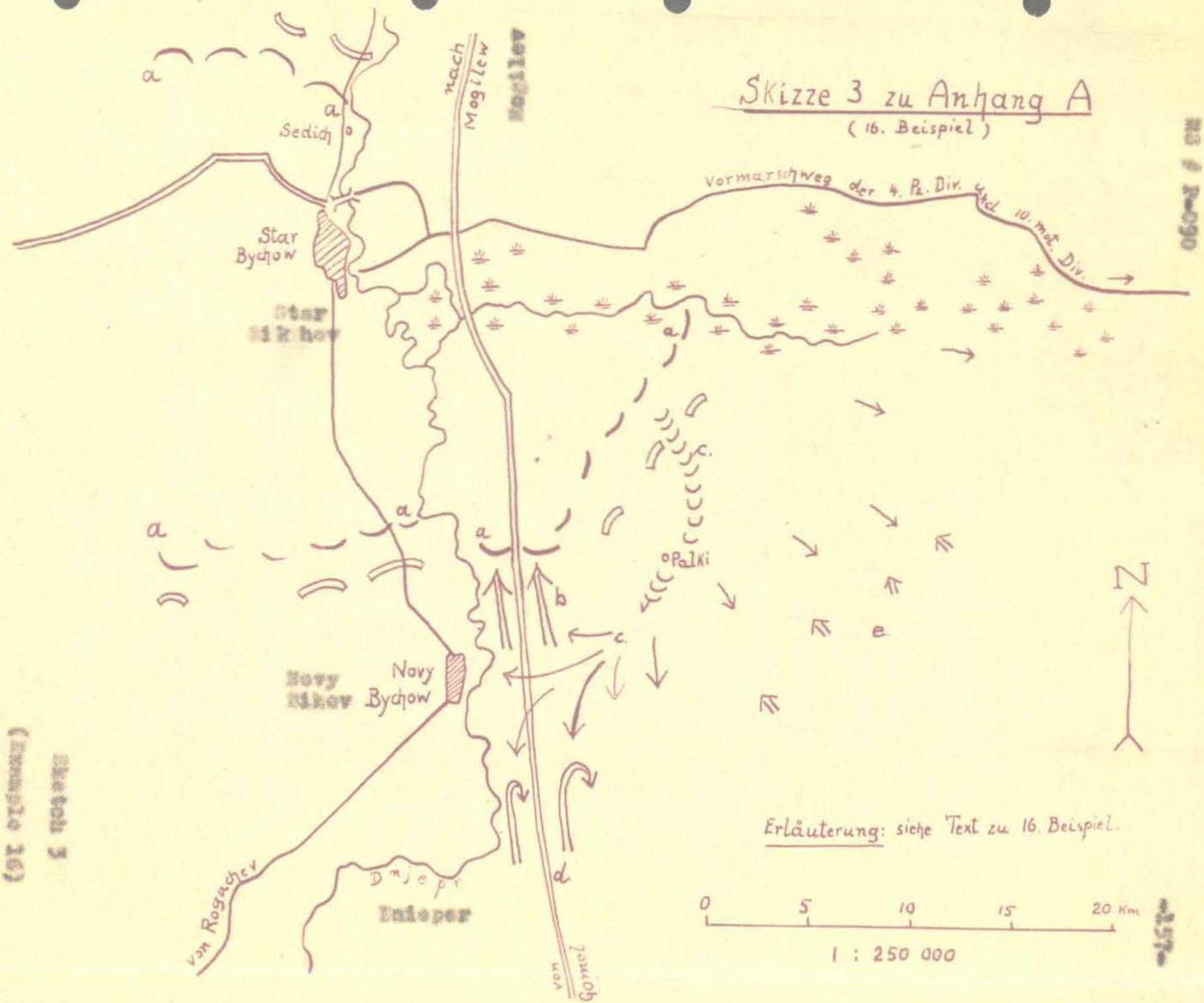
the Gomel road, decided on a wide flanking movement eastward, with the intention of breaking through the weak enemy forces in that area, then proceeding as far as Palki and pushing through to the Dnieper at Novy Bikhov, hoping thereby to encircle large enemy forces along the Dnieper. By the morning of 21 July the enemy forces along the road at Novy Bikhov had been encircled, though as late as 19 July, Russian forces were once more attacking along the road to the north. New enemy forces were also advancing along the Gomel road, but these were immediately repulsed. The encircled forces were compelled to give up and on the evening of 20 July 4,022 Russians surrendered with 48 guns, 24 tanks, 16 heavy and 40 light mortars, 7 antitank guns, and 203 machine guns.

The forces which now became available along the perimeter of the encircled area were either rushed to the eastern security line, which was more extended than before, or were committed defensively against the renewed enemy attacks from Gomel.

The intention to resume the attack towards Gomel on 21 July had to be abandoned, because ever-increasing enemy forces pressing against our extended security line in the east compelled us to take up defensive positions

# Skizze 3 zu Anhang A

( 16. Beispiel )




Erläuterung: siehe Text zu 16. Beispiel.

along the forward line and hold them until the infantry divisions could relieve the 1st Cavalry Division.

Nevertheless the Cavalry Division had fulfilled its assignment. Our very considerable numerical inferiority and particularly our weakness in artillery had been compensated by the greater mobility of the mounted elements of the Cavalry Division.

Example 17. Overtaking Retreating Enemy Forces. (See Sketch 4).

On 12 August 1941, the XIII Corps began an attack southward between the Dnieper and the Soj Rivers. During the night of 12-13 August the 1st Cavalry Division, which was assigned to XIII Corps, was moved through the attacking infantry divisions, for the purpose of pursuing, overtaking, and cutting off the largest possible number of the enemy units committed on the west flank. To this end the division was to move swiftly southward across the road from Dovsk to the Dnieper and there lay in wait for retreating enemy forces.

The process of moving through the infantry divisions also heading south led to traffic congestion and other difficulties extending throughout the following day. In front of the 1st Cavalry Division the enemy avoided being attacked by withdrawing rapidly to the south. Consequently the 1st Cavalry Division changed its plans and pursued the enemy

forces withdrawing towards Gomel with the objective of preventing new enemy forces from moving up to take part in the actions still continuing in our rear. This movement facilitated the southward advance of the east wing of XIII Corps, so that it still proved possible to trap four or five Russian divisions in the rear of the 1st Cavalry Division. The encirclement was extended by the eastern advance of German infantry divisions across the Dnieper, 50 kilometers northeast of Gomel.

Moving a division through another engaged in combat presents very great and often insurmountable difficulties. Similar difficulties attend the overtaking of an infantry division on the march by an armored division.

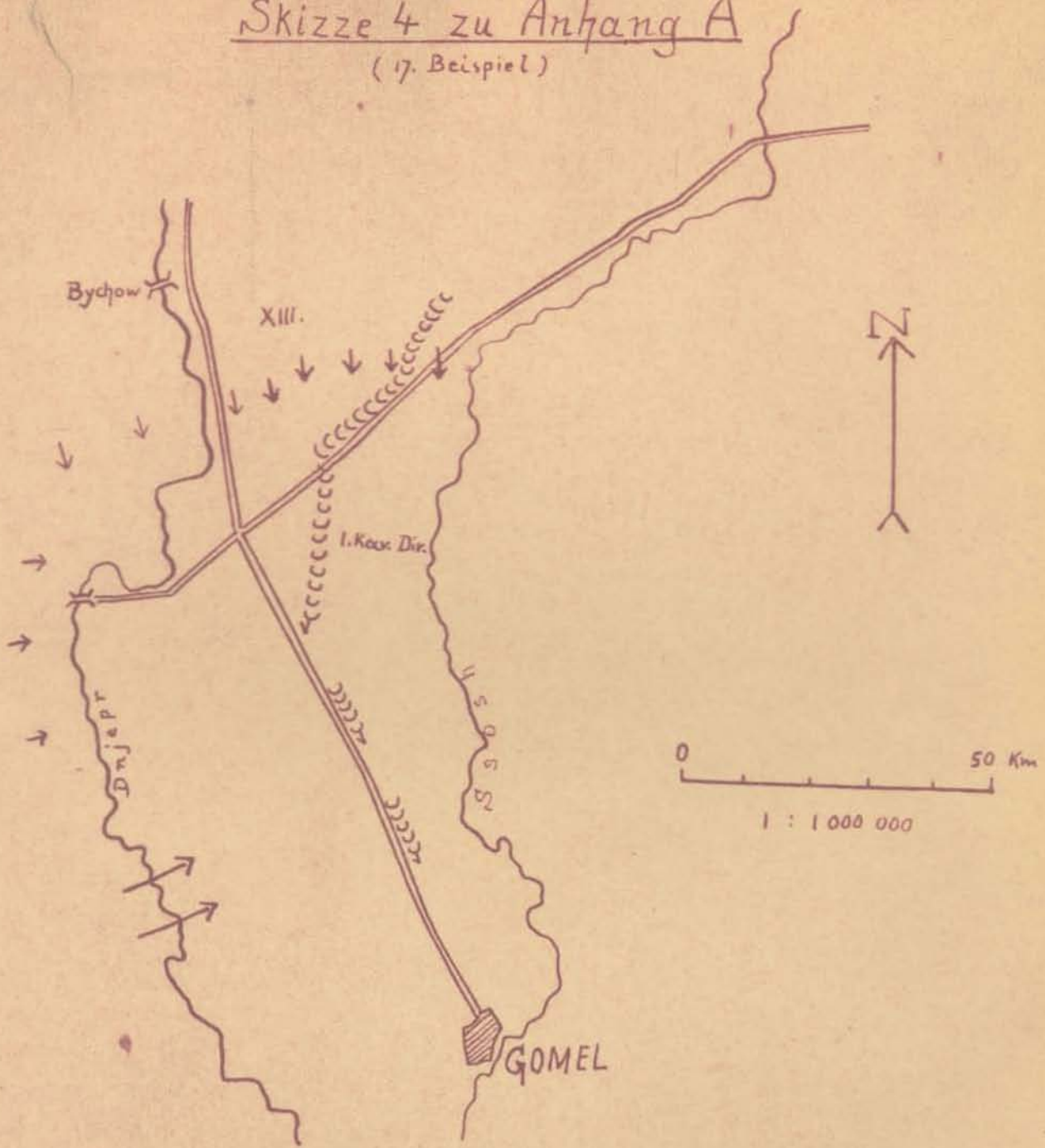
Example 18. Securing a Broad Sector. (See Sketch 5).

During August and September 1941 the Second Panzergruppe moved out of the area east of Gomel southward across the Desna River to join the other armies of Army Group Center and Army Group South in a decisive blow against the strong Russian forces collected in the Kiev area. By mid-September the ring was closed around four Russian armies at Kiev and southeast of it.

During these operations very weak forces of the Second Panzergruppe were charged with securing the former main front facing the east. On 19 September a reorganization

# Skizze 4 zu Anhang A

(17. Beispiel)




Appendix A, Sketch 4

(Example 17)

Overtaking Retreating Enemy Forces

of the Second Panzergruppe was begun for the purpose of continuing the offensive in a northwesterly direction. A strong attack group was organized in the Yampol area and moved in the general direction of Orel. The projected advance was intended to surround and smash the strong Russian forces located in vast forest areas between Bryansk and Yampol.

The 18th Panzer Division, which for some days had been holding the Suedost River sector along a ninety-six kilometer front, was relieved by the 1st Cavalry Division. Its right flank extended about twenty kilometers south of the junction of the Suedost River with the Desna; the left flank extended just south of Potshep. The 18th Panzer Division was to be committed in the Yampol area, the point of main effort in the Second Panzergruppe offensive.

Ravines, swamps, and forests traversed the sector taken over by the 1st Cavalry Division and made it difficult to survey. The Suedost River could be forded at many points. Because of its length, this sector could only be secured through the use of a system of defensive strong points with active reconnaissance between the points and with mobile reserves kept in readiness. Russian forces along this sector comprised the 6th, 137th, 155th, 269th, and elements of the 282nd Infantry Division and the remnants of the 4th Cavalry Division.

The Russians enjoyed great superiority in artillery and mortars, and daily maintained a lively fire on our strong points. By night, being equally superior numerically, they engaged in numerous forays between our strong points to the rear of our security line. Counterattacks launched by our reserves before daylight invariably succeeded in pushing the enemy back across the Suedost River in the early morning hours. Thanks to the mobility of our cavalry the 1st Cavalry Division succeeded, as the 18th Panzer Division had done before us, in preventing the enemy from gaining a firm foothold across the river, from whence they might have undertaken reconnaissance activity into the area in which the German units were being reorganized in preparation for the new offensive.

On 30 September units of the Second Panzergruppe began their advance out of the Yampol area in the direction of Orel. A week later the forces facing the 1st Cavalry Division were surrounded in a drive towards Bryansk from the southeast. On 6 October the 1st Cavalry Division moved east, beyond its broad front, for the purpose of combing the entire area as far as the Desna. (See Sketch 6).

The bulk of the enemy troops had in the meantime succeeded in withdrawing eastward across the Desna. Nevertheless, the 1st Cavalry Division captured 4000 prisoners, 25 guns, 21 mortars and 125 machine guns. Our own losses were very small.

# Skizze 5 zu Anhang A

(18. Beispiel)

Lage am

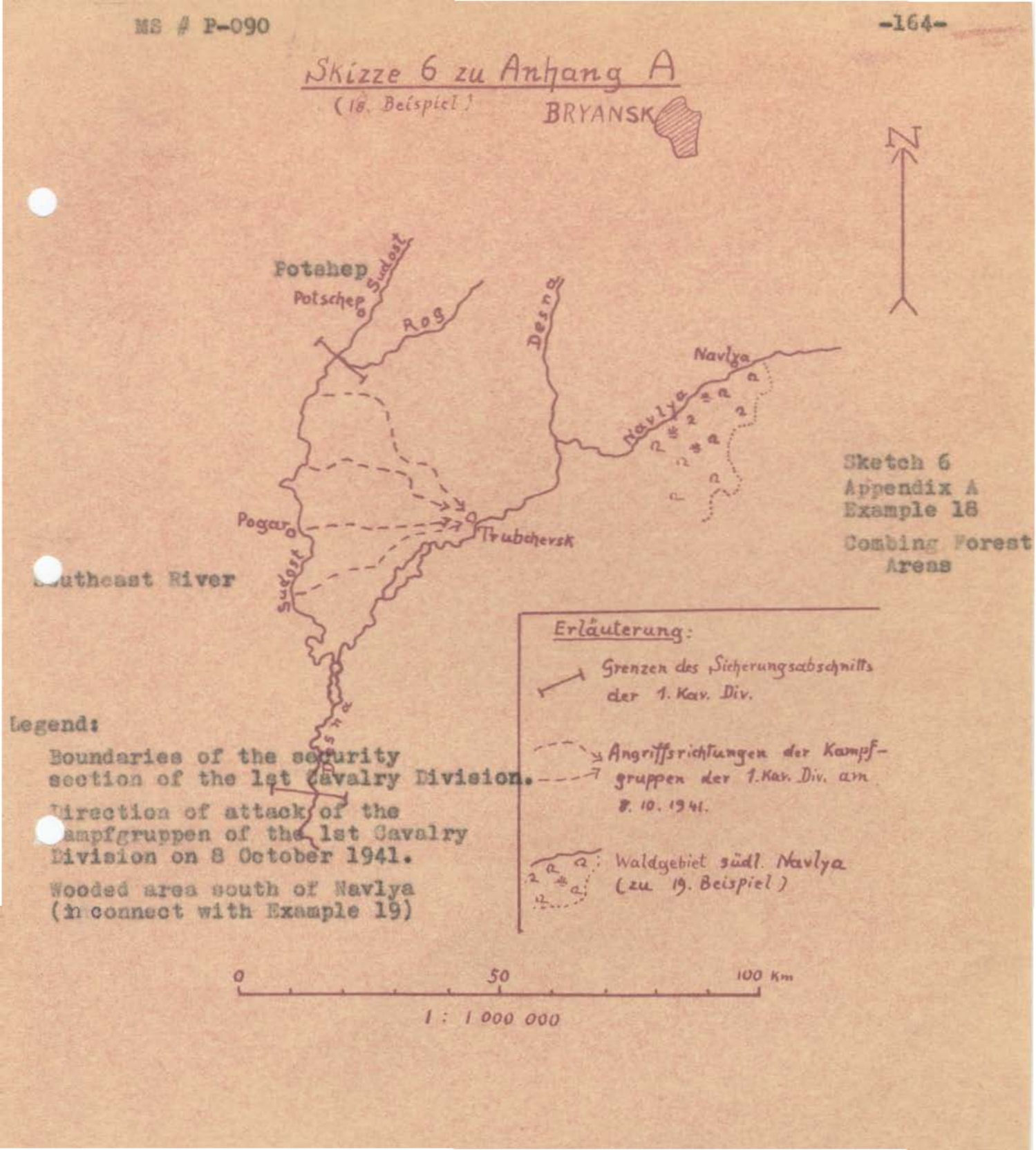
18./19. 9. 1941

Securing a Broad Sector
Situation on 18/19
September 1941

Sketch 5
Appendix A
Example 18

# Skizze 6 zu Anhang A

(18. Beispiel)




Sketch 6
Appendix A
Example 18

Combing Forest Areas

Southeast River

Example 19. Combing Forest Areas.

On 18 and 19 October 1941 the 1st Cavalry Division mopped up the extensive forests south and southeast of the town of Navlya and the river of the same name. This forest area was about thirty kilometers long and about fifteen kilometers wide, yet it was only a small sector of the area within which the Russian forces south of Bryansk had been encircled. (See Sketch 6).

The 17th Panzer Division had already engaged in some hasty mop-up operations in this wooded area, but they were prematurely withdrawn for service elsewhere. Strong Russian forces were left behind within the extensive forests and marshes and lay hidden some distance away from the roads and trails. From these hideouts they soon began to harass German troops with attacks and raids.

Advancing on a broad front the mounted elements of the 1st Cavalry Division combed this entire area for two days and captured 9,322 prisoners, 39 guns (19 of which were 180-mm guns), 8 antitank guns, 7 mortars, 37 machine guns, 11 prime movers, 80 trucks, 250 horse-drawn vehicles, 1 complete ammunition train, and 1 field hospital.

## II. OPERATIONS OF THE CAVALRY CORPS, 1944-1945

Example 20. Defensive Operations on a Broad Front. (See Sketch 7).

In early summer the headquarters of the Cavalry Corps was organized in Pinsk. It was to assume command over the 3rd and 4th Cavalry Brigades, which were occupying security positions on a broad front, facing south in the areas of the Pripet Marshes on both sides of Pinsk. At the same time the Hungarian 1st Cavalry Division was moving to join the Corps. This was the situation at the time of the collapse of Army Group Center.

Cavalry Corps headquarters received orders to march in the direction of Slutsk. That small town had been declared a fortress and was occupied only by administrative units. Resistance in that area was to be so organized as to block the advance of the unopposed enemy forces.

Elements of the 4th Cavalry Brigade were immediately sent ahead in trucks toward Slutsk, while the rest marched out of the Pinsk area via Janov and Iwacewicze, a distance of 300 kilometers. The 3rd Cavalry Brigade was still tied down around Pinsk, as also were the elements of the Hungarian 1st Cavalry Division which had just arrived.

At Slutsk the 4th Panzer Division was also assigned to the Cavalry Corps and was committed to positions on and

south of the main highway east from the city. Elements of the 4th Cavalry Brigade were committed as they arrived on the north in an unsurveyable wooded area with a front thirty kilometers wide. These troops were to stop the advance of the Russian armored and cavalry units which were pursuing the routed German forces. The Cavalry Brigade succeeded in holding the Russian cavalry through mobile action until the pressure of enemy infantry forces compelled a withdrawal.

Example 21. Shift of Major Units in Front-line Positions. (See Sketch 8).

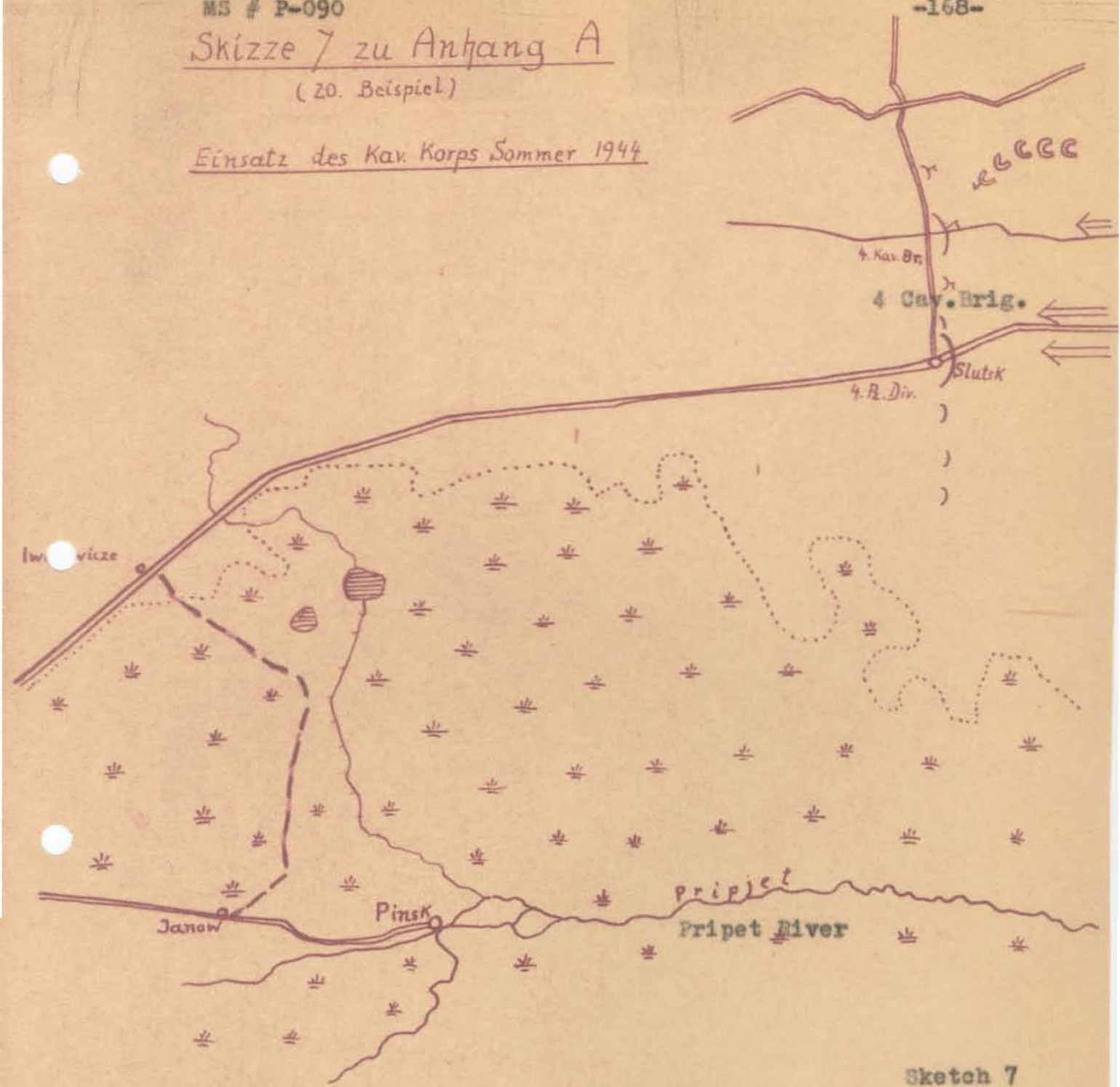
Later the Cavalry Corps was assigned defensive positions north of the great forest of Bialowiez; the 4th Cavalry Brigade held the right flank, the 129th Infantry Division the center, and the 4th Panzer Division the left flank. The units were extended along the main highway from Slonim to Bialystok. Informed that strong enemy forces had penetrated the forest of Bialowiez, the Corps was instructed to protect its own southern flank by preventing these forces from emerging out of the forest between Mainovka and the southern wing of our defensive front.

Since the Corps was fully engaged within the sector it occupied, it received permission to shift its lines fifteen kilometers further west, leaving its northern neighbor to secure the road from Slonim to Bialystok.

Skizze 7 zu Anhang A

(20. Beispiel)

Einsatz des Kav. Korps Sommer 1944




Sketch 7
Appendix A
Example 20

Operations of the Cavalry Corps in the Summer of 1944.

During the reorganization of its forces, the Cavalry Corps decided to commit the 4th Panzer Division, as the strongest and most mobile force, on the northwestern edge of the forest and to pull back the 129th Infantry Division perpendicularly on the northern flank. These movements were to be carried out in one night. Other than the main highway from Slonim to Bialystok, only a very few roads were available for the movement of the troops. Consequently the 4th Panzer Division was given priority on all the roads needed for its movements and its elements had the right of way at all road intersections on its line of march.

To reach its new position the 4th Cavalry Brigade was moved diagonally across the area. Thanks to the fact that the cavalry units were highly mobile, the movement succeeded. On the next day the three units involved in these moves were firmly established in their new lines.

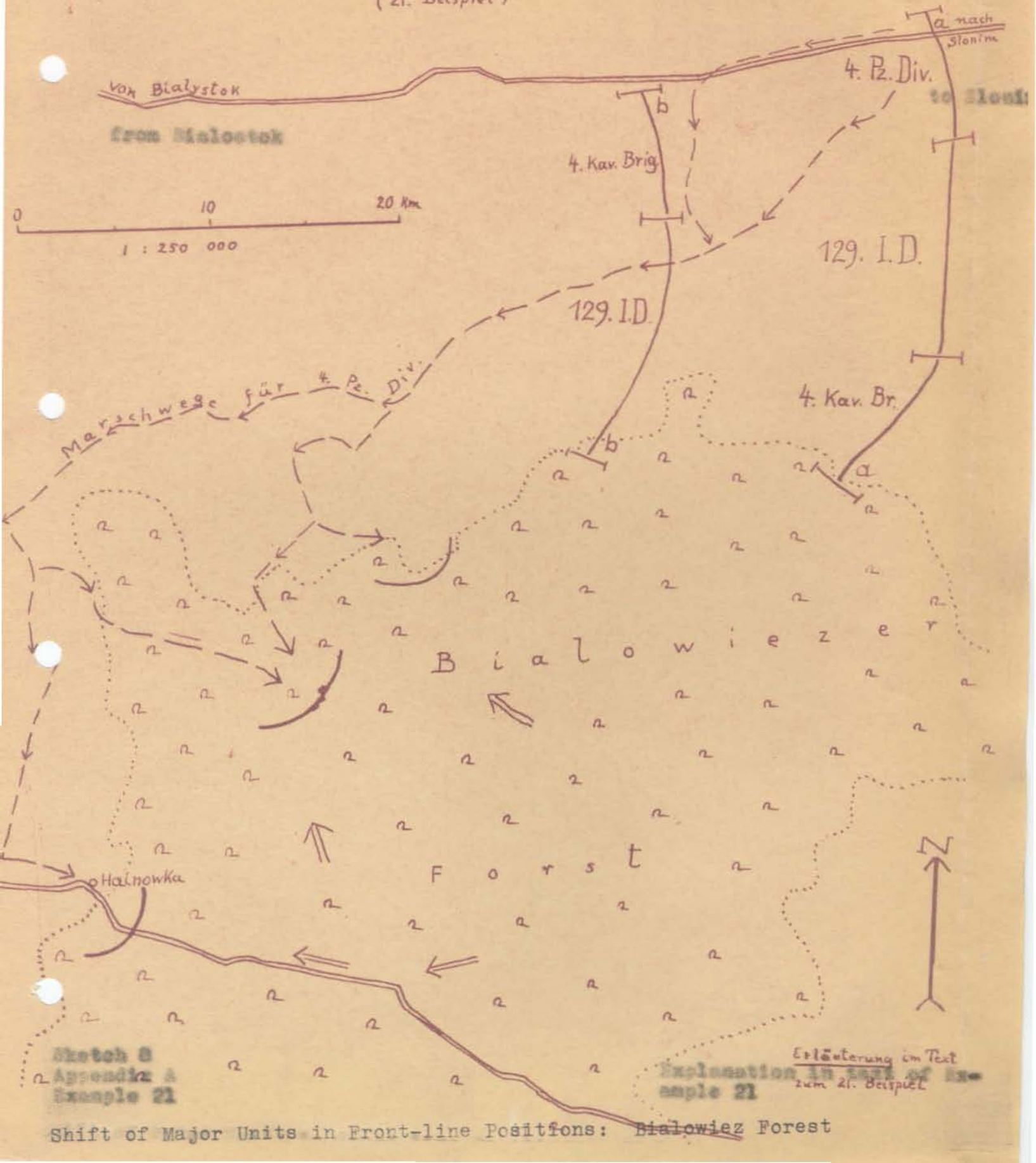
Example 22. Break-through Followed by an Advance into the Enemy's Rear. (See Sketch 9).

In March 1945 a German armored army launched an attack between Lake Balaton and Budapest. The Cavalry Corps, with the 3rd and 4th Cavalry Divisions assigned to it was committed on its right flank.

The Cavalry Corps was to lead the attack as infantry across the swampy terrain to the Sio River. Once across

# Skizze 8 zu Anhang A.

(21. Beispiel)




Sketch 8
Appendix A
Example 21

Erläuterung im Text zum 21. Beispiel

Explanation in text of Example 21

Shift of Major Units in Front-line Positions: Bialowiez Forest

and remounted, it was to advance into the rear of the Russian forces south of Budapest and west of the Danube, while an armored corps to the north was to attack frontally and destroy the enemy.

The attack of the armored forces, after some minor initial successes, came to a halt,[2] but the cavalry divisions reached the Sio River according to plan, and at one point succeeded in establishing a small bridgehead. By then, however, the striking power of the Cavalry Corps was exhausted, the more so seeing that after the enemy had successfully beaten off the attacks of the armored corps he was able to send more and more reinforcements to the Russian units fighting on the Sio.

Example 23. Coastal Protection. (See Sketches 10 and 11).

By December 1941 the Russians had been driven out of the Crimean Peninsula with the exception of those surrounded at Sevastopol. The Romanian 8th Cavalry Brigade was resting thirty kilometers west of Feodosia when Russian forces landed at four points along the road north and south of the town of Kerch on 26 December. Variable winter weather prevailed

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[2] There were special reasons for the failure of the armored forces closely connected with the disintegrating elements at work toward the end of the war. The units of the Cavalry Corps were unaffected by these elements. (Author's note).

# Skizze 9 zu Anhang A

( 22. Beispiel )

Erläuterung

a)r = Ausgangsstellung des Kav. Korps

b) = Ausgangsstellung der Panzerkorps

= Angriff des Kav. Korps

= Angriffsabsichten der Panzerkorps

= weitere Angriffsabsicht des Kav. Korps.

0 50 100 Km

1 : 2 000 000

Legend:

Jump-off point of the Cavalry Corps
Jump-off point of the Panzer Corps
Attack by Cavalry Corps
Intended attack by Panzer Corps
Intended attack by Cavalry Corps

Sketch 9
Appendix A
(Example 22)

Break-through followed by and Advance into the Enemy's Rear

at the time with alternating snow, frost, and thaw. The cavalry brigade was placed at the disposition of the corps headquarters on the Kerch Peninsula and reached its assigned area on 28 December, having covered roughly 100 kilometers in one day in spite of deep mud. On the following day the brigade assumed the mission of securing the coast line south of the enemy's invasion beachheads.

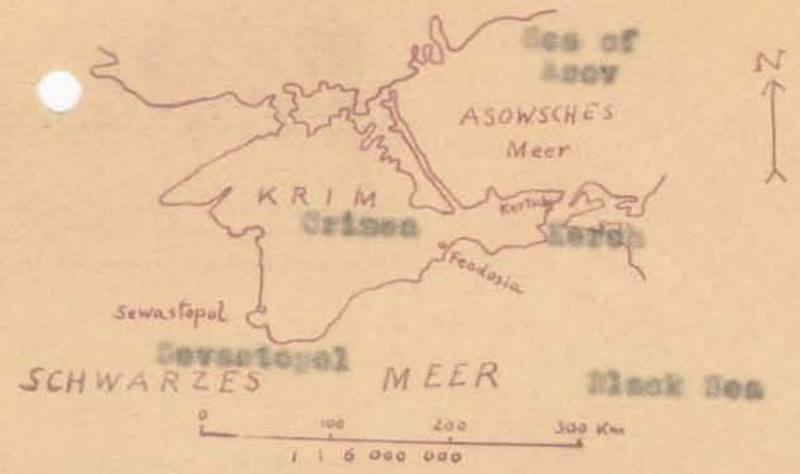
Early that day, 29 December, additional Russian forces made a surprise landing at Feodosia. In the meantime the weather suddenly changed and the temperature dropped to 20 degrees below zero Centigrade. Vehicles were frozen fast in the mud. The horse-drawn vehicles could be pried loose without too much trouble, but the motor vehicles, because of their rubber tires, were either only freed with difficulty or not at all--chiefly due to the inexperience of our troops. Some motors had cracked cylinder blocks.

The Rumanian 8th Cavalry Brigade was ordered to turn back at once to a point twenty kilometers northeast of Feodosia, where it was to join other forces in an attack to be launched on the following day against the enemy's landing parties. In spite of very difficult road and weather conditions the Brigade again covered the 100 kilometers in twenty-four hours, sealed off the beachhead and opened an attack on Feodosia. Although this attack was

repulsed, it nevertheless served the purpose of containing the enemy until additional forces could be brought up.

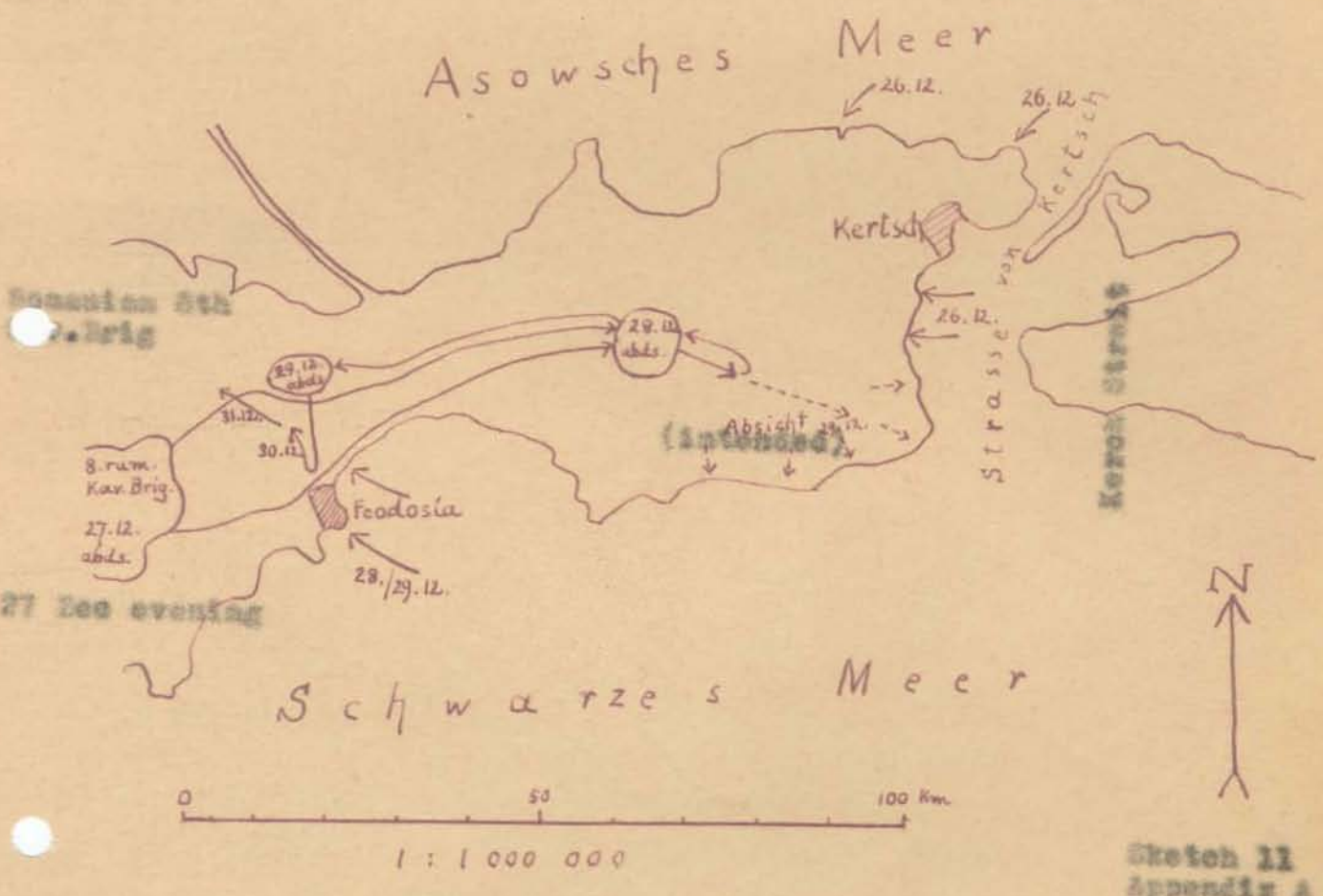
On the other hand, largely due to the exertion of the previous days, the 8th Cavalry Brigade was not able to stop a Russian attack launched north of Feodosia the next day.

# Skizze 10 zu Anhang A
(23. Beispiel)




Sketch 10
Appendix A
Example 23

# Skizze 11 zu Anhang A
(23. Beispiel)




Cavalry in a Coastal Position

Sketch 11
Appendix A
Example 23

Erläuterung: siehe Text 23. Beispiel.

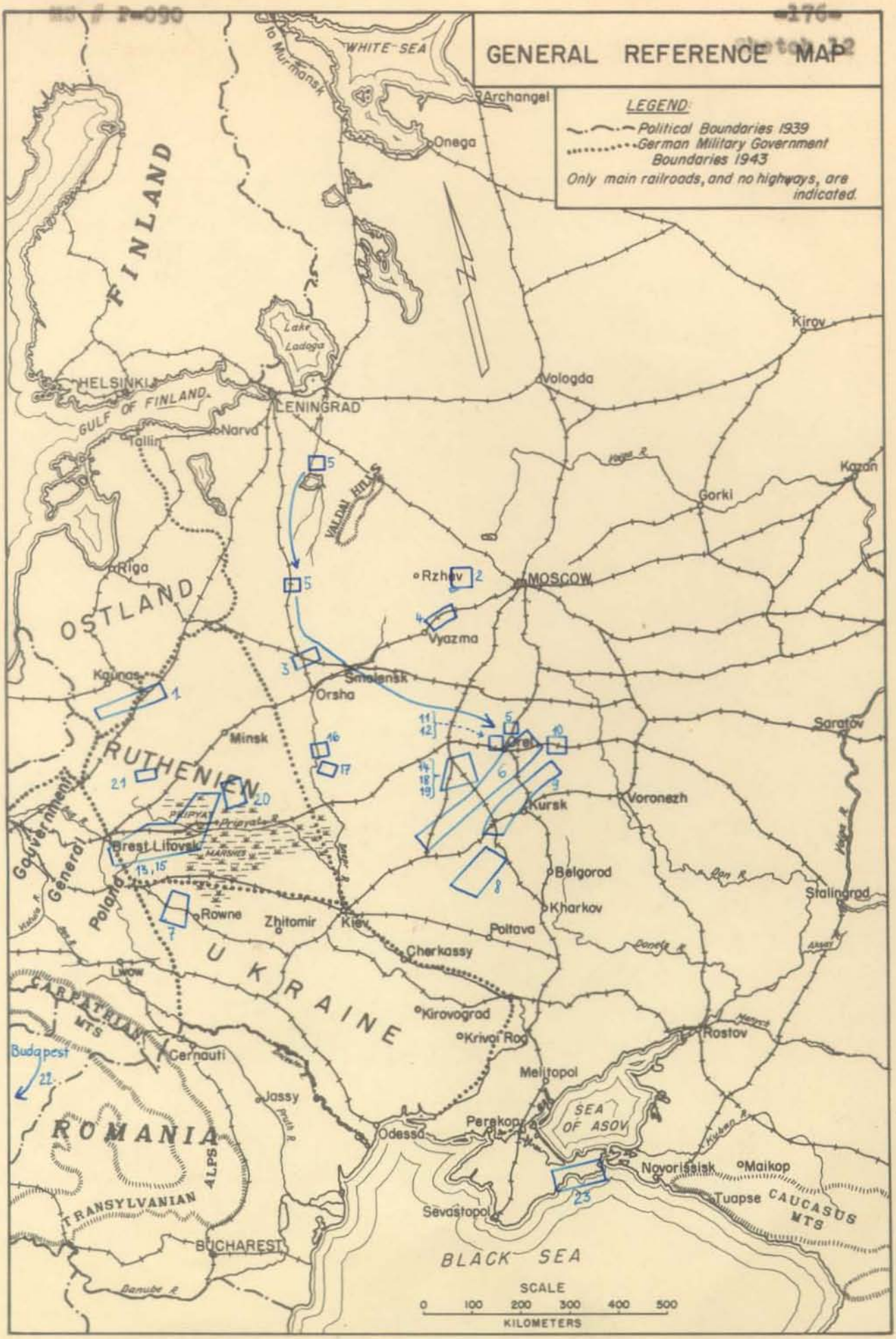
# GENERAL REFERENCE MAP

LEGEND

Political Boundaries 1939

German Military Government Boundaries 1943

Only main railroads, and no highways, are indicated.

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# APPENDIX B

## HORSE BREEDING AND THE REMOUNT SERVICE IN THE GERMAN FEDERAL REPUBLIC

By

Joseph PULTE, Lieutenant Colonel

I. PRESENT STATE OF HORSE BREEDING IN THE GERMAN FEDERAL REPUBLIC

1. Warm Blood Breeds.

a. Introduction. A number of warm blood types have been bred in Western Germany for many generations; the Hanoverian, the Oldenburg, the East Frisian, and the Holstein. Warm bloods are bred in such areas as Westphalia, Wuerttemberg, Bavaria, and Hesse. In the main breeding areas the warm bloods have such striking characteristics that it is easy to distinguish between a Hanoverian, an Oldenburg, or a Holstein. West German breeders confine themselves to the breeds that originated in their own areas. Whether bred in their place of origin or in breeding establishments elsewhere, all German warm bloods are registered in stud books. Breeders are organized in associations which are interested in the preservation of the breed. The breeding of German warm bloods is attended by exact rules and regulations such as were formerly practiced only in the breeding of English pure bloods. Books have been written on the subject.

Today the various Ge man state governments take the same special interest in horse breeding as was formerly the case in Prussia and some of the other German states. As long as Germany had a large army, the responsible authorities saw that the army obtained the necessary horses

and took a corresponding interest in their breeding. After World War I breeding aimed primarily at producing horses for agriculture and trade. After World War II this trend is even more pronounced.

After World War II the army horse was no longer needed, and industry now calls for a horse with a stronger bone structure, which is hardy and tough and yet capable of free and easy movement, in short, an all-round, general purpose, utility horse. German breeders are busy creating such a horse. Indeed, in view of the great progress made in this direction after World War I, it may be said that such a horse already exists. German breeders have produced a horse for every special need.

In order to maintain the high standards of German horses, performance tests were reintroduced on a large scale after World War II. We have already reached the point where all sires, dams of sires, and stud mares that have won state awards are officially tested for length of stride. Their offspring may be able to complete their work more quickly. They are also tested for trotting ability and for the ease and endurance of their gallop.

There are hurdle jumping contests, cross-country races, trotting and galloping contests, and tests for build and suitability as riding, cart, and draft horses. Tests like

these are held in every town, large or small, and in almost every village in the country.

b. Breeding Areas.

(1) The Hanoverian Horse. The influence of Hanoverian horse breeding on German warm bloods is still on the increase, and a large number of breeders have decided to raise them. In Hanover itself and in the secondary breeding areas using Hanoverian stock, breeders look for a strong, tough, high quality horse of easy movements and good temperament, serving equally well as either a riding horse or a draft animal and adaptable to the needs of both large and small farms. Hanoverian stocks produce the highest quality work and carriage horses. They are the modern, heavy warm bloods and possess all the qualities that make them popular: a particularly strong bone structure, fine lines, balanced form, smooth and brisk movements, an excellent, quiet and yet energetic temperament.

Hanover produces a sturdy type of riding horse, capable of carrying any weight, classified as medium heavy, heavy, purebred and half purebred. It also produces a powerful steeplechaser, a half-blood race horse, an imperious carriage horse, and a work horse of the heaviest type, capable of competing with the best cold bloods in pulling a plow through the deepest soil, or in hauling heavy-laden farm carts across the fields.

Horse breeding in Hanover is entirely in the hands of small farmers, who own no famous studs. Hanoverians are chiefly bred in the lowlands along the Elbe and Weser Rivers and their tributaries. Hanoverian breeders all belong to the Hanoverian Warm Blood Breeders Association (Verband der Hannoverschen Warmblutzuechter). The center of Hanoverian horse breeding is the stud farm known as the Hannoversche Landgestuet at Celle, which has been in existence since 1735. The promotion of Hanoverian horse breeding is the primary concern of Celle, which has every type needed among its 250 stallions to preserve the breed and to supply animals to meet every requirement.

(2) The Oldenburg Horse. Thanks to the skill of its breeders and its heavy and rich lowlands meadows, Oldenburg produces the strongest of all the warm bloods. The harmonious balance which has been achieved is amazing. Oldenburg breeders aim to produce a type of horse which is most in demand today: a carriage horse of compact build and average height, broad-chested and well-ribbed, with as powerful a frame as possible without impeding brisk and spirited movement. The trotting action of the Oldenburg horse is particularly good.

Oldenburg's richest lowland meadows are along the Weser River. All the animals raised in that area are broad,

sturdy, full-ribbed and powerful. In Oldenburg the stallions are either owned by individual proprietors or are in the hands of associations owning from one to five stallions.

Horse breeding in Oldenburg has long been well organized. The genealogical indexes trace every Oldenburg horse back a hundred years, and an official selection list has existed since 1820. Every Oldenburg horse since that time has had to be registered. Oldenburg's law governing horse breeding was published first in 1897. In it every detail of breeding is precisely regulated.

It should be pointed out that the breeding of horses in south Oldenburg, like the soil itself, rests on a lighter base. The horses are not as heavy as in the bottom lands, but strong enough for every purpose and very wiry.

Oldenburg once had a very considerable export trade in horses, and efforts are being made toward a resumption of this business.

(3) The Holstein Horse. The Holstein-Lowland horse is bred throughout the old well-established breeding areas in the districts of Pinneberg and Steinburg and in the Sueddieth and Norderdieth lowlands. Holstein-Lowland horses have been known for centuries as one of the most characteristic of German breeds. The noble and striking

appearance of Holstein horses has scarcely changed during these centuries. It was always an imposing horse, remarkable for its fine head, peculiar stance, perfect equilibrium of structure, and its beautiful floating gait, qualities which make it particularly suitable as a carriage horse.

The horse breeders of Holstein belong to the Holstein-Lowland Horse Breeders Association (Verband der Pferdezuechter der Holsteinischen Marschen). Holstein also used to have a brisk export trade in horses, particularly breeding horses, to America, Russia, and Switzerland. The harmonious balance in Holstein horses is so complete and their characteristics so striking that every Holstein horse can be easily recognized. Their temperament is particularly good, their pulling capacity ideal. They can be used equally well as draft or carriage horses, and yet the breed includes excellent riding horses, particularly good at jumping.

The Holstein Geest or upland horse is raised on lighter soils. It has considerable Hanoverian blood. With the aid of purebred stallions these horses have been bred chiefly for light but spirited riding horses, yet they are strong enough for general purposes.

(4) The East Frisian Horse. The East Frisian is a heavy coach horse, closely resembling the Oldenburg

horse. It is generally not as strong, but wirier and more spirited. There are many excellent horses in Ostfriesland, the administrative district of Aurich, which forms the northwestern portion of Hanover. They are adaptable to almost every purpose. The most purebred are primarily heavy riding horses. Although of strong muscular build they are shapely. Every East Frisian is a good carriage horse, excellent in temperament, and tough enough to be indefatigable.

The breeding of these horses is controlled by a society of breeders called the Ostfriesisches Stuthuch. Through a close study of the East Frisian breed it is still possible to distinguish four types: A heavy and somewhat common type; a stocky and yet shapely type with the fine head and broad chest of the Oldenburg breed; an elegant type of carriage pure bred which, although it has broad withers and is wiry enough, is usable also as a sturdy riding horse capable of carrying a heavy load; a fourth type, now almost extinct, is a sort of chestnut, sometimes heavy sometimes light, part riding and part cart horse. Among these chestnuts there are some very excellent utility horses.

(5) The warm bloods in Westphalia. In Westphalia the warm bloods and the cold bloods are bred side by side. At present Westphalia breeds an excellent horse

of the Hanoverian type. The aim is to develop a strong horse with good movements and with such pedigree qualities as to enable the warm bloods to compete with the best cold bloods.

The breeding of warm bloods in Westphalia made such progress during the period between the two world wars and again after World War II that the breeding area, formerly a secondary one, must now be considered as a primary or main one. Already the warm bloods bred in this region compete with those of the old established areas at fairs and exhibitions, particularly with the Hanoverian warm bloods.

(6) Horse Breeding in Wuerttemberg. In Wuerttemberg the main emphasis rests on breeding warm bloods. In conformity with the hilly character of the region breeders favor a medium-sized horse, deep-barrelled, with short legs, powerful lungs, and capable of pulling heavy loads and of trotting long distances. During World War I Wuerttemberg horses gave a very good account of themselves. They required little food and produced very high performance records because of their stocky build and mighty chests. Breeders belong to the Wuerttemberg Horse Breeders Society (Wuerttembergischer Pferdezuchtverein). The state of Wuerttemberg owns a stud farm at Marbach-an-der-Lauter.

(7) Horse Breeding in Bavaria. In Bavaria some types of horses are bred to fill the needs of local agriculture. In scattered areas good riding horses are also raised. An area particularly noted for horse breeding is the Rottal, a very fertile valley where breeders have maintained long established and high standards in animal husbandry. The Rottal is based on Oldenburg blood.

In the Pfalz a noble, powerful riding and carriage horse is bred which still retains a strong admixture of Arabian blood from olden times.

(8) Horse Breeding in Hesse. In many parts of Hesse warm bloods are bred with Oldenburg and East Frisian stock. The difference in climate produces a lighter weight horse, nobler in appearance, yet a practical horse and adaptable to every purpose.

2. Cold Bloods.

a. Introduction. German cold bloods include three breeds: the Rhenish-German, the Schleswig, and the Noric. A Belgian breed was the original stock from which the Rhenish-German was derived.

The aim of German cold blood breeders is to produce an all-purpose farm horse, although the breeding of the Rhenish-German cold bloods frequently changed its objectives over

the years, according to the shifting demands placed upon this type of horse. Nowadays the objective of all German cold blood breeders is the same: a strong, well-built, deep-barrelled, broad-chested horse, economical to feed, of medium weight, with strong legs, and a free and easy gait. Besides stressing economy of feeding habits, good health, and toughness, great value is placed on a high performance.

Because their growth takes place chiefly in the first year and is practically completed in the second, cold bloods reach full maturity and utility earlier than the majority of warm bloods. Cold bloods can be bred at three years of age. This is true of the stallions as well as the mares of all three of Germany's cold blood breeds.

There is no difficulty whatever in feeding German cold bloods. They have the capacity of thriving on a great variety of foods. Their large bodies contain high capacity digestive organs, capable of feeding on bulk foods such as green or dry fodder, root crops such as turnips and potatoes, and commercial residue and by-products pressed into dry cakes.

All German cold bloods combine weight, early maturity, and economical feeding habits with the good-natured cold

blood temperament. The result is a willing and reliable heavy draft horse which has no superior as a worker. Its qualities are precisely those necessary to meet the various demands made upon them. These qualities account for the continuous and inevitable spread and numerical increase of cold blood horses.

The breeding for capacity performance in cold blood breeds is older than is generally thought. In 1927 the National Association of German Cold Blood Breeders (Reichsverband der Kaltblutzuechter Deutschlands) introduced the first systematic tests for draft performance among the cold bloods. The standard test items are: heavy draft, endurance, short and long haul, pace and trot, pulling capacity on slopes of varying degrees, and pack load capacity (for Noric breeds only).

b. Breeding Areas

(1) The Rhenish-German Cold Bloods. Rhenish-German cold blood horses are bred in the Rhineland, Westphalia, Hanover, Brunswick, Hesse, and in one section of Holstein. The Rhineland and Westphalia are considered the original breeding areas. These areas still maintain a special position particularly for breeding stallions for export to other breeding areas.

The secondary Rhenish-German breeding areas are in the South Hanover-Brunswick area, Hesse, the Saar, the Palatinate, Baden, and Wuerttemberg.

(2) The Schleswig Cold Bloods. This breed, which in earlier times was widely distributed all over Germany, is now almost exclusively confined to its breeding area in Schleswig-Holstein.

(3) The Noric Cold Bloods. This breed of horses is called Oberlaender in Bavaria. Noric cold bloods are held in very high esteem in Bavaria and Wuerttemberg. It should be mentioned that a Noric type, lightweight horse is bred in the Black Forest region of Baden. These cold bloods are specially suited to the agricultural conditions prevailing in that region, and they thrive even on the acid soils of the Upper Black Forest. Chestnut colors predominate in these "Black Forest Foxes." They originate from an old native breed, but their present appearance evidences a strong admixture of Rhenish-German blood.

3. Lightweight Horses.

Before and during World War II the Hafling among lightweight breeds proved to be a horse of exceptionally great value to the army, not only as a horse for use in alpine regions, but also as pack horse generally. This

sturdy and exceedingly tough alpine horse, capable of great performance, originated in Austria. Before the war its breeding had been extended far into the adjoining mountain areas of Bavaria, not only because the Hafling met the requirements of the army, but also because there was a general demand for small horses. There was a great future in the breeding of these horses.

The breeding of Haflings is based on horses of Arabian strain, and their high performance both as an alpine horse and a pack horse goes back to this admixture of Arabian blood. In its physical characteristics the Hafling stands about midway between the Arab and the little Noric mare. The angularity of the Noric was smoothed out by the Arab strain, and subsequent breeding within the original stock produced the present uniform and characteristic features. The natural breeding ground of the Hafling is South Tyrol; however, between the two world wars the breeding of these horses shifted more and more towards Bavaria, where the Hafling finally became well established through the work of appreciative breeders. The value and significance of Hafling stock to any future army will depend on its being preserved in a pure state. No attempt should be made to modify this stock with stallions of another strain. The Hafling

is excellent in every way, suited not only to the requirements of the alpine regions in which they are raised but also to army requirements.

Before and during World War II the mule acquired great importance. Since Germany did not engage in the breeding of mules, the army could obtain mules for its mountain troops only from Italy, Sicily, and America. This was done on a large scale for a while, but since the army wanted to be independent of such imports, mule breeding was established in North Germany, North Westphalia, South Oldenburg, South Hanover, and the Ems River lowlands. Jackasses suitable for breeding purposes were imported from France, Italy, and the United States. These jackasses were mated with the short-legged, broad, deep-barrelled farm mares which experience had proved to be the best foundation for the breeding of mules. The offspring from these unions were purchased by the army and raised at special breeding farms established in South Bavaria and Austria. Through very careful training in the mountains on stony slopes, an excellent type of army mule was produced. In this respect the efforts and endeavors of the army both before and during World War II met with considerable success. The Army High Command set up a special agency in Salzburg tu supervise the breeding establishments and to expedite the shipments of mule foals.

Yet the needs of the army were not met completely by the Hafling horses and the mules. The total number available was much too small. For this reason the German Army, before the war, imported a large number of Bosnian mountain horses and Huzuls from Yugoslavia. These small mountain horses, found chiefly in Bosnia and Herzegovina, are unobtainable outside Yugoslavia, at least not in numbers and with the requisite characteristics. At one time Yugoslavia had around 1,200,000 horses, and of these at least 270,000 were the Bosnian and Huzul breeds. In the German army these horses proved their superior worth as pack horses. They get along with amazingly little food; in winter they feed almost entirely on straw mixed with a little hay. The carrying capacity of these small animals borders on the incredible. They can carry from 250 to over 300 pounds without effort.

The origin of the Bosnian mountain horse goes back to the Tarpan breed. In the course of centuries these horses frequently received an admixture of Arab blood. This served to maintain quality without influencing the basic characteristics of the breed. The characteristics for the entire mountain breed consist of compactness, robustness, stockiness, and muscular strength. Most striking at first sight are their broad chests and their short sturdy yet wiry legs. The contour of their back is excellently formed. The strong,

muscular kidney section is a quality of particular importance in all pack horses. The withers of pack horses should not be prominent, since the pack saddle is apt to press unduly on that section of the spine. The ancle joints of nearly all pack horses are rather angular, which favors the carrying of loads, particularly in mountainous country.

II. ARMY REQUIREMENTS FOR HORSES.

What are the demands placed upon the various types of horses by the army? What should be the objectives aimed at by German horse breeders in order to satisfy the requirements of the army? What course should be followed by those who direct German horse breeding? How must German horse breeders operate in order to satisfy the needs both of the army and the civilian economy? In order to understand and appreciate the course which should be followed today it may be well to consider the system followed in the period before and after the two world wars.

There was a time when army horses had to be bought in foreign countries. There were then no stud farms as a part of a thriving agricultural economy, which could be turned to the production of army horses. Frederick the Great, with the best army and the best cavalry of his day, was compelled to send his remount commission throughout Europe and as far

as Asia in order to procure horses. Simultaneously, he made all means available for the further development of the Trakehner, which were horses from the royal stud at the East Prussian village of Trakehnen which his father originated. These subsequently became a nearly inexhaustible source from which stock for sturdy army horses was drawn.

When the German army was rearmed in 1935, Germany was again compelled to buy horses abroad; not because the quality of our horses was below standard, but because larger deliveries of horses were needed than had previously been planned. It may also have been considered inadvisable to deplete Germany of its horses since there should always be a reserve to draw upon. German horse breeders, however, made such great efforts that by 1939, according to statistical estimates, the army's needs were at least quantitatively met from internal sources.

It was only natural that the state should turn its interest and its resources exclusively to the breeding of horses suited to army needs. But the mass breeding of army horses before World War I had resulted in a great number of horses which were too light, too spirited, and too temperamental to be of satisfactory use in the peacetime economy. Consequently, the cold bloods were employed in

ever increasing numbers. The intensification of agriculture, particularly the utilization of heavy soils, and the demand for a heavy horse for the furtherance of trade and industry compelled the introduction of cold bloods in many parts of the country. It may therefore be expected that in the course of time the cold bloods will prevail, even in those regions which formerly specialized in the breeding of army horses.

World War I, which for four years drained away Germany's best horses, put the breeding of German horses to a test. The result showed that German horse breeders had done their duty, and that every German breed, in its own special field, had stood the test. The sacrifices made by German agriculture were enormous.

Equally remarkable was the performance of German breeders in recuperating from these losses within a few years after the end of World War I. The program established by Dr. G. Rau, later State Director of Stud Farms, for the breeding of warm bloods was carried through. The basic point of this program called for strengthening the breeds through selective mating and intensive feeding. Warm blood breeding was saved and a firm foundation was laid for subsequent, successful development. The performance tests, which were also introduced, greatly promoted quality breeding and were

copied abroad. The establishment of country riding societies was another step. The breeding of horses and the testing of their performance were reestablished and coordinated.

Once again in World War II the sacrifices which German horse breeders were called upon to make were enormous. At the end of the war, German horse breeding associations went to work with incomparable industry to restore the breeding of warm bloods in the areas where stock had been preserved. The stock was increased and improved. The importance which may some day again be attached to German horse breeding will depend in the first place on the objectives pursued by the leading specialists in the field, so that the right type of horse with the required attributes will be available for every need. Our German economy needs an ideal combination of military horse and general utility horse. The ideal army mount must also be the ideal horse for peacetime purposes and vice versa. The task at present is to breed warm bloods of maximum strength but perfectly balanced for economy of movement and adaptability. Such horses must have bold and sweeping lines, must be broad and sturdy, and must stand close to the ground. Horses of this type are capable of great performance because of their ample builds and adequate muscle structure. Primary stress must

be laid on short legs and deep-barrelled chests without rejecting beauty of line, a strong foundation, and well-constructed joints and bones. To a large extent these qualities are the natural result of objective breeding.

The breeding mare must be a direct descendent of the original half-bred stock. The choice of stallion must always be critically considered. Horses bred for the army must fulfill, even better than has been the case, the demands placed on them, that is to say, they must combine all the good qualities of a multi-purpose horse. The utilitarian purposes for which horses are used by the army must not be lost sight of, so that any deficiencies will cause them to be used to poor advantage.

We must, therefore, clearly differentiate between the various types of breeding stallions which are necessary to establish the firm foundations from which the various types can be developed. Standard procedure must be followed in every breeding area.

High performance is a major goal in horse breeding. If the questions were asked what is performance and how can this capacity be bred into horses, the answer might well be that performance is value and increased performance is increased value. A horse destined to pull heavy loads

cannot improve its economic value by breaking high-jumping records. In breeding horses for peacetime economic purposes their eventual use as army horses should be kept in mind at all performance tests. Performance tests should be adapted to the animals' ultimate, future employment.

Since it has been shown that 85 to 90 percent of all horses are eventually used for hauling, an increasing importance is being attached to testing for draft capacity. On the basis of tests every breeder can determine for himself whether any given horse will meet the requirements of the army, agriculture, or of his particular own business. In draft capacity tests great value is attached to a long, rapid stride, and it will be these tests that will help the breeder select the types capable of the greatest performances. The horses which always rank highest for both the army and agriculture will be those which show the best combination of forage consumption, performance, endurance, and longevity.

After the army decides the types of horses it needs, it is up to the breeders to produce what is wanted. The army primarily requires warm bloods. In the past, if distribution of horses among the various arms is considered, it is quite evident that the German warm bloods bred for army purposes were principally utilized as draft horses but

which could also serve as mounts. During World War II the warm blood type that was most in demand was of medium weight, compact of structure, sturdy, short-legged, broad, deep-barreled, of good temperament and good movements in all three types of gait; but such a horse was also in short supply. Before and during World War II those responsible for keeping stud records and all German associations of horse breeders were told again and again that the draft horse was still the most important element in German horse breeding.

It should be evident that the continued development of the warm blood breed is not merely a fad. On the contrary it corresponds to civilian and army requirments. If the problem is not tackled methodically and energetically the warm bloods will loose ground to medium weight cold bloods or even to cross-breeds.

Naturally if we are to get a clear idea of the possibilities of developing a horse of a special type for use in industry and agriculture, we must know what industry and agriculture want. But considerations as to the procedure, the basic principles, and the means applicable to attain such a result, while based on general economic considerations, need not lose sight of army requirements altogether. How do matters stand today regarding this problem? Basically, it

may be said that the objectives of the civilian economy and the army overlap.

The demand for spirited warm bloods of very lightweight horses has greatly diminished. Today, all the breeders of such horses are faced with increasing difficulties. Since the army, if it needs horses at all, will continue to be a big buyer, it is its responsibility to insist that all the measures being taken will create an improved type of German warm blood. Such measures include the following:

1. Breeding of warm blood mares of a quality which are strong enough to be equal to every demand of agriculture.

2. Selection of stallions on the basis of size, depth of chest, breadth and short-leggedness.

3. As a corollary to the above, a ruthless culling of the too small, the too large and the too long-legged horses.

Because of extensive motorisation and subsequently a reduction in the number of horses, the army no longer has to accept horses too noble in blood, or too light, or too sensitive, or too temperamental. The quest for the right type of warm bloods to meet the needs of the army compells a standardization of warm bloods, that is to say, the creation of a uniform type, as was done in the case of cold bloods. If such a course is not followed, a serious situation may develop in regard to the employment of warm bloods in the army.

Changes in type and breed take place only over long periods of time but a much shorter time is required for a change in appearance only. The special demands, which will be made on the army horse of the future, call for very special measures. If adherence to basic breeding principles will produce horses which will meet the present day requirements of the market, then these principles will have been justified. Stubborn adherence to these principles for their own sake in these difficult times will, however, surely result in severe losses for the breeders. What, for instance, is the sense of striving to maintain purity of breed if the horses so produced are no longer the type in demand and cannot be used by the Army?

The main effort in German warm blood breeding, it may be concluded, is production to the maximum extent possible of a strong horse equally suited to civilian and army needs. Experience has shown the importance of having this idea accepted by all those who have anything to do with the breeding of horses. This acceptance alone will insure the continued breeding of warm bloods and provide a reservoir of suitable horses in case of a war.

All German warm bloods must combine those qualities which give them highest utilisation value for an army at war. Insofar as they are deficient in those qualities they are

also of little use in the civilian economy and may in fact represent an economic burden on which valuable fodder is wasted.

German cold bloods bred for army service are also liable to special demands. At the time of German rearmament in 1935 when thousands of heavy draft horses had to be procured in the shortest possible time, German cold blood breeders were unprepared to cope with this demand. Consequently, it was extremely difficult to obtain suitable cold bloods. Army buyers did not differentiate between cold, warm, or mixed bloods, since for the time being they were glad to obtain any kind of horse suitable for heavy draft purposes.

However, the decision regarding future remounts soon had to be made, whether these should be cold bloods, heavy warm bloods, or both. Experience both before and during the war proved that mixed teams could do good work. However, a high performance record can only be obtained with horses of the same nature and above all of the same temperament. With this objective in mind, mixed teams of cold and warm blood horses were dropped from consideration, and it only remained to be decided whether remounts should be fairly light and medium cold bloods, or only the very heaviest of warm bloods.

Although the performance of cold bloods during World War I had been highly praiseworthy, this had been forgotten by the beginning of World War II. Those unfamiliar with cold bloods were prejudiced against them; the very name cold blood suggested that it did not have the temperament and mobility suitable for an army horse. The experts argued back and forth until the Army High Command decided that all of the heavy artillery should receive cold blood replacements.

What qualities are to be looked for in horses used for this purpose? Apart from their basically essential pulling capacity they must have a long stride and trotting endurance. Horses without temperament or with a dragging or swaying gait are not suitable. Before and during World War II a horse well liked for the qualities here in mind was the Ardennes type, a medium heavy cold blood. With their compact build, short neck, broad and short back, abruptly terminating and well-divided rumps and buttocks, strong bone structure, and lively temperament, these mediumweight cold bloods possessed good pulling capacity and showed great endurance, particularly in trotting.

A heavy draft horse should be able to maintain an alternate walk and trot of two and four kilometers respectively for a long time. The loads for six-horse teams were generally from 9000-10000 pounds, that is to say, 1500-1650 pounds

per horse. Generally it is estimated that horses used for heavy artillery or supply trains should haul their own weight. On that basis the weight per horse would be from 1300-1650 pounds. The heaviest horse should be harnessed next to the wheels and the lighter ones in the middle or in front. These lighter horses must have an even trot and must be used to being ridden by their drivers. This does not mean that they should become riding horses, but their drivers must be taught to mount them correctly and to give any assistance the team may require. The wheel horses, that is to say, those of around 1550-1650 pounds, need not be trained for this purpose, although experience has shown that some of these, if they have a free and easy stride, perform well under a saddle.

As has been said, the Ardennes horse, a mediumweight cold blood, should not have overly long legs and bodies. Horses of compact build, about five feet four inches in height, with a good stride, good shoulders and strong legs, with shanks about nine inches in circumference, are best. Heavy army draft horses must have good hoofs, must be strong and capable of sustained effort without showing signs of early fatigue. Even the heavy cold blood draft horse should have a military appearance. A horse with a drooping belly,

bow-legged, with a dragging or swaying gait, may pull well enough but will not look well in the army. It is important that a soldier be proud of his horse. Heavy draft horses with these qualities, be they Rhenish-German or Schleswig cold bloods or the Noric horses with their wonderfully even temperament, are eminently suitable horses, not easily excited, always willing, dependable and easily managed even by poorly trained soldiers.

## III. HORSE BREEDING STATISTICS

According to the census of December 1950, the number of horses in the German Federal Republic totaled 1,566,500. Compared with the 1949 census this means a decrease of 62,900 or 3.9 percent.

The 1949 total was the highest since World War I, and thus there are still 25,000 or 1.6 percent more horses in Germany in 1950 than the average number in the normal years from 1935 to 1938. If it should be deduced from the above that we are today only 1.6 percent removed from that normal average, the conclusion will be deceptive, since the age composition today is quite different from what it was then.

During the 1935-1938 period 1,256,300 of the 1,541,500 horses were classified as full-grown, that is they were three or more years old, while 285,200 were classified as

foals or two-year olds. At that time, then, 18.5 percent of the total were in the latter class.

In 1950 1,196,900 of a total of 1,566,500 horses were full-grown and 369,600 were foals or two-year olds so that the latter comprised 23.6 percent of the total. In addition, a larger proportion of the full-grown horses were in the lower age categories. Of the 1,196,900 horses of three years and over 261,500 or one fifth were between three and four years old. Adding together all the horses between three and eight years old the total is 718,600 or 60 percent. This leaves only 478,300 horses nine years old or over. The proportion of horses between three and eight years of age will increase even more in the course of the next two years because of the two large crops of present one and two year olds.

What conclusion may horse breeders draw from the above figures? The irreplaceable foundation of horse breeding rests upon stud registration, or in other words upon the horses registered in the stud books. These studs must be preserved at all cost, since they are all specially selected horses, perfect of their kind, serving as foundation for all the horse breeding in the country.

Since we cannot at this time allow ourselves to breed horses of lesser quality, future breeding must be equivalent to stud book quality. In 1950 young foals numbered 110,800,

but 278,636 mares had been covered the previous year. Since it is known from experience that such poor breeding results are impossible, the above figures reveal that a very large number of foals were slaughtered for meat. In 1950 only 155,456 mares were covered, a reduction of 44.2 percent from the previous year. This would indicate that the maximum number of new foals which can be counted upon in 1951 will not exceed 80,000. It would also indicate that the present yield of foals is equal to the number required to maintain a supply of around one million horses three years old and older by 1954. This number will be adequate, however, only because the large number of new foals in 1948 and 1949 will have reduced the average age of full-grown horses by 1954. In estimating that a million horses will meet all the demands of the civilian economy the effects of a further expansion in motorization have also been taken into consideration.

In the long run, however, the breeding of 155,000 mares annually will not prove adequate. Official inquiry showed that in 1950 there were 226,700 registered mares in the German Federal Republic. Since the 155,000 mares covered in 1950 were by no means all registered mares, it would indicate that almost 50 percent of the registered mares were not bred, while at the same time some 50,000 unregistered mares were

covered. Since a regular reduction in the number of registered mares has become evident, a reduction which may amount to as much as 30 percent from 1950 to 1951, it follows that for the breeding period 1951 there should still be at least 160,000 registered mares.

If it is assumed that another 80,000 foals in 1952 will satisfy the demands of the German economy--an assumption which may be justified in view of the relatively low average age of German horses for the next few years--at the same time bearing in mind the need of breeding only quality horses, it follows that in 1951 all registered mares will have to be bred to the exclusion of less qualified mares.

How would the situation be affected if the army again came into the picture, calling for remounts and for full-grown horses to satisfy initial requirements. No doubt it would be possible in the beginning to meet the requirements, since civilian needs are more than covered at present. Horse breeders would also immediately react to the situation by intensifying their breeding program. However, it must be taken into consideration that three whole years are required before a horse can be utilized and a three year-old even then is only of limited use for army work. Long range planning is necessary if the German horse breeding industry is to be ready to deal with all eventualities.

Table 1

Statistical Survey of Present Stock of Horses in the German Federal Republic

(given in thousands according to the census of 2 December 1950)

| | Under 1 year | 1 to 2 years | 2 to 3 years | 3 to 4 years | 4 to 5 years | 5 to 9 years | 9 to 14 years | 14 years and older | Total |
|---|---|---|---|---|---|---|---|---|---|
| | 110.8 | 133.0 | 125.8 | 128.9 | 132.6 | 457.1 | 334.8 | 143.5 | 1 566.5 |
| Increase or Decrease in Relation to 1949: in Thousands | -44.5 | -2.2 | -5.1 | +17.5 | -9.6 | +5.3 | -7.8 | -16.0 | -62.9 |
| Percent of Increase or Decrease | -28.7 | -1.6 | -3.7 | +15.2 | -6.8 | +1.1 | -2.3 | -10.0 | -3.9 |

## IV. ORGANIZATION OF HORSE BREEDING IN THE GERMAN FEDERAL REPUBLIC, 1951.

The organization of German horse breeding societies is shown in Table 2. The Association of German Horse Breeders with its seat in Bonn is part of the central association of all German animal breeding societies (horses, cattle, pigs, sheep, goats, and others).

The Central Association for the Breeding and Testing of German Horses is located at Celle. All north German societies, whether for breeding warm or cold bloods, belongs to this central association as does the Central Commission for Testing the Performance of Warm and Cold Bloods located at Warendorf. The Central Commission, an administrative office for all state and district commissions, controls and supervises all performance testing in the nation. The German Olympic Committee for Horsemanship, the German Amateur Riding Association, and the Central Committee for Riding and Driving Clubs are also members. The Association of South German Horse Breeders, to which all south German societies are affiliated, is located in Stuttgart.

Federal supervision over horse breeding is shown in Table 3. It should be emphasized, however, that the actual supervision and promotion of horse breeding are the responsibilities of the state governments. However, the Federal

Minister for Food and Agriculture is generally responsible for the enforcement of the federal government regulations which apply to all the states. With the exception of the General Breeding Law, such regulations are rare, so that the main responsibility falls upon the state officials in the ministries of agriculture. In practice the local chambers of agriculture and the state stud farms work directly under the guidance of the ministries of agriculture.

## V. THE ARMY REMOUNT SERVICE

In the German Army prior to 1933 the employment of horses varied greatly, and horses were classified as follows: riding horses for officers, horses for cavalry and mounted infantry platoons, riding horses for other arms, artillery wheel horses, artillery swing and lead horses and horses for pulling machine guns, heavy artillery draft horses, heavy draft horses for other arms, and extra heavy draft horses (cold bloods).

An army mount was required to be noble in appearance, wiry, long-necked, with pronounced withers, sloping shoulders, of brisk movement, and to have a good back for a saddle. Long, broad, muscular hind quarters were important since, in combination with long sloping shoulders, these guaranteed a sure and easy motion at every gait. Horses with short front legs and abruptly dropping shoulders, short forelegs and steep fetlocks are inclined to tire early.

Table 2

ORGANIZATION OF HORSE BREEDING
IN THE GERMAN FEDERAL REPUBLIC 1951

ASSOCIATION OF GERMAN ANIMAL BREEDERS
(BONN)

ASSOCIATION OF GERMAN HORSE BREEDERS
(BONN)

CENTRAL ASSOCIATION FOR THE BREEDING AND TESTING OF GERMAN HORSES (CELLE)

ASSOCIATION OF SOUTH GERMAN HORSE BREEDERS (STUTTGART)

SUBSIDIARY NORTH GERMAN SOCIETIES

CENTRAL COMMISSION FOR TESTING THE PERFORMANCES OF WARM AND COLD BLOODS

GERMAN OLYMPIC COMMITTEE FOR HORSEMANSHIP

GERMAN AMATEUR RIDING ASSOCIATION

CENTRAL COMMITTEE FOR RIDING AND DRIVING CLUBS

Table 3

FEDERAL SUPERVISION

OF

HORSE BREEDING

FEDERAL MINISTER FOR FOOD AND AGRICULTURE

STATE MINISTERS FOR FOOD AND AGRICULTURE

CHAMBERS OF AGRICULTURE STATE STUD FARMS

In general, the type of horse most in demand was thick-set, with good movement and strong sinews, and of a practical build. Such a horse was always able to carry on through long marches without tiring, even under a heavy load.

Draft horses for the swing or lead positions on artillery teams should be stocky, deep and broad in the barrel, short but strong-legged and broad-ribbed. While they need not be particularly dashing, they should be spirited enough to meet the many demands made upon them. Artillery wheel horses should be particularly strong with an adequate frame and must combine the qualities of both draft and riding horses. When extra heavy draft horses are to be harnessed to artillery pieces, they should be a superior type of wheel horse. With these horses some might can be sacrificed in favor of short-leggedness.

Cold bloods were used as the heavy draft horses for other arms. While they should be able to move along briskly, they also should have strong bone structure with corresponding bulk, broad and deep breasts and weigh from 1300-1600 pounds. These horses had to be capable of accomplishing long and heavy pulls even in soft earth. On hard ground they had to be able to maintain a trotting pace for a considerable length of time.

## VI. THE INSPECTORATE OF RIDING AND DRIVING IN THE ARMY HIGH COMMAND

In 1938 an Inspectorate of Riding and Driving was established in the Army High Command (OKH), headed by an Inspector of Riding and Driving. Acting as the deputy of the commander in chief, the inspector supervised all mounted and horse-drawn units and was responsible for uniformity of training. He was also responsible for the remount services, the development of training programs, the participation of troops in mounted sports, and the registration and procurement of horses.

The Inspector of Riding and Driving replaced and succeeded the Inspectorate of Cavalry. For a long time the Inspectorate of Cavalry had increasingly undertaken responsibilities for all army horses. Ever-greater attention had to be paid to breeding problems, the procurement, distribution and management of horses and their equipment, the administration of remount services, and horse registration and training. The special departments of Inspectorate of Cavalry which dealt with all these problems were numerous enough to justify establishing a separate inspectorate. It was not practical in the long run that the inspectorate of one of the arms and services should concern itself with time-consuming problems of breeding and training. For this reason

the Commander in Chief of the Army requested in 1938 the creation of the Inspectorate of Riding and Driving.

1. Horse Registration and Replacement. No army in peacetime can long maintain a wartime emergency strength in men, horses, and equipment. The build up from a peacetime to a wartime strength must therefore be based on the resources of private industry. In order that an over-all picture of the available stock of horses suitable for army purposes could be obtained, all the horses of the German Reich, with the exception of those already assigned to Wehrmacht or police, were registered at regular intervals.

The registration of horses for military use was in the hands of special registration officers attached to the Inspectorate of Conscription and Recruiting. They not only decided on the individual merits and potential value of each horse, but also determined in consultation with civilian authorities, the number of horses which might be made available from each community. They also maintained contact and established liaison between army and civilian authorities in all matters pertaining to breeding, and to equestrian sports.

On the basis of each completed registration and the agreements reached with the authorities and breeder associations, the army registration officers prepared plans for the

drafting of such horses as the army might need, with due regard paid to civilian needs, and in accordance with regulations established by law. The extent to which horses were taken depended on whether it was intended to requisition up to full strength or merely a limited increase in strength, also on whether the horses were to fill the replacement needs of individual units or fill entirely the requirements of newly activated units. The horse levies were always a drag on the civilian economy, since even in those days no more than the absolute minimum of horses were retained. It was inevitable, particularly in the case of limited levies, that some localities were drawn upon more heavily than others. A conscious effort was made to obtain the supplementary quotas without impairing the defensive strength of the country.

2. Training in Riding and Driving in All Service Arms. The Inspectorate was responsible for the training programs in riding and driving for all service arms and was the highest authority in matters concerning the remount school of each Wehrkreis. It was also responsible for pre-military service and post-military service training in riding and driving. The Inspectorate handled all national and international competitive equestrian sports and supervised the army riding and driving schools.

3. Administration of the Remount Service. The administration and care of all horses, from the time they were collected as remounts to the time of their death or release, was in the hands of a special office of the Inspectorate. Its duties included the annual procurement of younger animals as remounts. The number and kind of remounts needed by the various units was determined through the remount plan by which the remount purchasing boards controlled the movement of horses from the markets to the units. The office handled the special allocations of mature horses as new units were activated or in cases of an increase in the authorized strength. Each year the remount plan indicated the number of horses which were to be sent for training at the remount schools or for assignment to officers. Decisions on such questions as to whether a given group of officers were to be mounted or not, which according to cavalry regulations was determined by the Army High Command, were made by a special office of the Inspectorate.

4. Army Collaboration with Civilian Programs. In view of the great importance of horse breeding in the national defense program, it was necessary to set up the breeding of horses in such a manner as to meet the requirements of defense. In close collaboration with civilian administrative agencies, which were responsible for the control of horse

breeding, all measures were taken to maintain and advance the organization and development of breeding programs. Officers from all arms of the service took a very considerable interest in obstacle racing, which offered valuable field training. The participation of army officers in horse racing and other equestrian sports and competitions had for years been encouraged and supported by the Army High Command and was to receive even greater support in the future.

The hauling tests for warm and cold bloods were important in breeding a suitable draft horse. A carefully planned, long-term system of testing the hauling capacity of horses was introduced. The chief of the office who handled these matters for the army was a member of the advisory councils of the leading organizations for horse racing and testing warm and cold blooded horses.

5. The Remount Service. The army needed a very large number of remounts each year--in the year just before the war about 15,000--which the remount purchasing boards bought in primary and secondary German breeding areas. The horses were collected in fourteen remount depots where they remained for one year. During this year they completed their growth, which is incomplete in warm blood three-year olds. Army specialists checked the horses at an autumn and spring census in order that the activities of purchasing boards might be reviewed and that the required standards of

selection be maintained. In the course of these inspections, the allocation of horses to the various army units was made on the basis of the remount plan.

The Inspectorate also supervised the farms in Austria and Bavaria where army colts were raised, prepared the budgets of the remount depots, maintained civilian and military personnel records, planned building programs, supervised labor and labor relations, and, in collaboration with other offices of the Army High Command, supervised the overall management of the agricultural enterprise attached to the remount depots. Interdepartmental collaboration was particularly close with the Veterinary Inspectorate, since all remount depots had adopted modern methods for the care of horses.

6. Horse-drawn Vehicles for All Service Arms. Another special office of the Inspectorate handled problems dealing with the horse-drawn vehicles of the service arms, including the training of the necessary personnel in driving and in equipment management at the army riding and driving schools. This office prepared regulations and manuals on the driving of horse-drawn vehicles, the care of horses, pack animals, mountain horses, ox teams, and for the handling of equipment. It was responsible for the handling of a great deal of other army equipment such as tents, camouflage material, illumination equipment, field kitchens, repair shops, and tools.

VII. BREEDING EXPERIMENTS DURING THE WORLD WAR II

When the German Army realized during World War II that horses of the quality needed were not available in sufficient quantities, the Chief of Army Equipment and Commander of the Replacement Training Army instituted new breeding experiments at the army remount depot at Grabau-Schoenboeken. Far reaching objectives were established:

1. To create by cross-breeding warm and cold bloods a new type of horse combining perfect physical proportions, ease of feeding, strength, spirit, high performance, free and easy actions, and good temperament. The new type was to meet closely the demands of both the army and private industry. The following cross-breeding experiments were to be made:

   a. Ardennes stallions with East Prussian and Hanoverian mares.

   b. Boulonnais stallions with East Prussian and Hanoverian mares.

   c. English Thoroughbred stallions with Ardennes mares.

   d. Arab purebred stallions with Ardennes mares.

These experiments were also to be carried out in reverse gender.

The successful products of these experiments were to be bred further in combinations of the above series. The most successful stallions of the new types were to be made available

to national horse breeding associations, while the most successful mares were to continue being bred at army remount depots. Horses considered unsuitable for further breeding were to be sent to troop units specified by the Army High Command.

2. To create a cold type by crossing pureblood Ardennes horses which would meet the requirements of the army and the general needs of the civilian economy. It should be a mediumweight horse that was low-barreled, broad-chested, short-legged, extremely wiry, of great endurance and that had a body structure to make it a light eater. The new type was to be a fast walker and trotter and breed close to type.

3. To create an improved warm blood type by crossing East Prussian stallions with Hanoverian mares and vice versa. This horse should be as perfect as possible: suited to present day needs, corrected of its present defects,( which included being too long-limbed, having "aproned up" ribs with narrow chest and pelvis, having steeply dropping shoulders, and being of an excessive size), and adapted to military uses and German horse breeding. Horses of this type were to be of medium-size, wiry, muscular, light feeders, with excellent action.

4. By crossing the very best East Prussian stallions and mares and a like pairing of Hanoverians, an attempt was to be made to improve these breeds in such a manner that the requirements of both the army and agriculture would be more nearly met than was the case with horses now raised in the established breeding areas. Breeding was to be directed towards obtaining more practical physical characteristics with emphasis on depth of barrel, breadth of chest, shortness of legs, compactness of frame, and more muscle. The improved type was to be better adapted for its projected employment than the established type. A cautious attempt was to be made to improve certain characteristics through the introduction of trotters with foreign blood.

5. Since there was an absence of Arab blood in German warm blood stocks and hence a lack of Arab characteristics, Arab purebloods and halfbloods were to be mated to suitable German brood mares at the Grabau-Schoenbeeken experimental station. The objective was to obtain studs which would reintroduce Arab strains into the breeding of German half-bloods.

6. Mule breeding was to be established to determine what breeds of donkeys and what breed of horses would be likely to produce the type of mule best suited to army purposes.

7. The breeding of Lulassiers was to be established in order that Germany might become as independent as possible from foreign sources and to obtain stallions from which special mares could be bred suited to the breeding of mules.

8. Donkey breeding was to be established to study the breeding and raising of donkeys in order to improve their physical structure and gait. Particular attention was to be paid to their hoofs. The main objective was to produce quality jackasses which would make Germany independent of foreign importations.

9. Plans were to be made for a special establishment in which stallions and mares with the highest standards in competitive equestrian sports could be bred in order to determine whether certain characteristics might be made hereditary.

The army appointed its own special agent who was to keep records on the practical and scientific aspects of the extensive breeding experiments at the army stud farms at Graban-Schoenboeken. Some practical use was to be made of these experiences. The agent's work was to include in reports or records the following data:

a. Stallions:

(1) List of all stallions employed in the experiments.

(2) Short statements descriptive of the nature and value of the stallions.

(3) The number of mares covered each year by the various stallions, listed by breeds.

(4) Hereditary traits of stallions bred from mares of various breeds.

(5) Hereditary differences.

(6) Breed of mares that transmitted the best traits of the stallions bred with them.

(7) Advantages and disadvantages in the inherited traits of the various stallions.

(8) The circumstances under which fertilization failed to take place; influence of climate and care on heats and conceptions.

(9) Employment of special means to create periods of heat.

(10) Colors the various stallions inherited. Reasons.

b. Mares:

(1) List of all mares for breeding up to date of report (give color, date of birth, descent--sire and sire of dam--in what year first used); reasons mare was dropped from program.

(2) Stallions to whom mares should be bred in order to pass on the best traits.

(3) Observations relative to the blood inheritance in the case of each mare.

(4) Did the mare pass on certain specific characteristics?

(5) Which mares passed on their own characteristics as contrasted to those of the sire?

(6) Was there any recognizable effect as a result of inbreeding (trend toward perpetuation of certain traits at the expense of others)? Did the desired physical characteristics of the prototype show up in the progeny?

(7) A brief description of foals. A detailed description of the foals was unnecessary since this was entered in the stud book.

(8) The number of mares, listed by breed, which foaled yearly.

(9) The mares which failed to foal annually. Listed by breed.

(10) Whether the hereditary traits passed on by mares were consistent and sure or inconsistent and haphazard.

(11) Whether a mare passed on her hereditary traits to a stallion offspring.

(12) Observations on the inheritance of parental traits.

(13) The characteristics which the dam and sire transmitted most surely and regularly.

c. Raising Young Horses:

(1) What general experiences are on record?

(2) How often were growth measurements taken and what conclusions were drawn from them?

(3) The differences experienced in raising the three blood types: cold blood, warm blood, and mixed-blood foals?

(4) By blood type which is the period of greatest growth, when they are on pasture or when they are kept in stables?

(5) What are the exercise requirements of the three blood types in summer and in winter?

(6) Should the three types be pastured together or separately?

(7) Is there any justification for the Russian method of introducing standard type horses en masse into a herd with the intention of obtaining a mass physical improvement after a certain length of time?

(8) Have experiments been made in the practice of leaving foals more than the usual four or five months with the mother, as is done in the Russian state operated stud farms where they remain with the mother for nine or even ten months? Experiments along this line are to be conducted at Graßau-Schoenboeken, since the process may result in a quicker and better development of the young horse.

(9) In how many cases do the mixed-blood foals born to date resemble more (a) the sire, (b) the dam, or (c) represent a successful combination of the better qualities of both?

(10) Insofar as this has not already been done, photos are to be taken of the mixed-bloods as yearlings, as two-year olds, and as three-year olds.

(11) How many foals died and the reasons?

(12) How many yearlings, two-year olds, and three-year olds died and the reasons?

d. Particular Experiences Gained in Regard to Feeding.

(1) What was fed? Quantities? Time of day?

(2) Have any observations been made regarding the kind of feeds especially favoring the growth of bones and the body, and were any special calciferous preparations fed?

(3) Differences in the growth of the horses during full pasture and during winter.

e. The Use and Care of Pasture Land.

(1) What fertilizing materials were used?

(2) What fertilizing materials appear to further the growth of the various grasses and the formation of a heavy turf?

(3) Do freshly limed meadows and meadows which have not been limed for a considerable length of time produce any appreciable difference in the bone structure and wiriness of the horses pastured on either type of meadow?

(4) Were any observations made regarding an animal's preference for certain grasses and, if so, which ones?

(5) Were any nitrogenous fertilizers applied in early spring, and did such application stimulate the growth of meadow grass to any considerable extent?

(6) Were any experiments made with winter pasturing?

(7) Do mares and young horses attempt to graze on snow-covered pastures?

f. Experiences in Preparing Performance Tests.

Records of observations and measurements are to be submitted on the walking, trotting, and pulling capacities of the various breeds of horses at Grabau-Schoenboeken.

g. Experiences in the Field of Veterinary Medicine.

(1) Contagious diseases which occurred and their treatment.

(2) Diseases of growing horses.

(3) Diseases and care of horses' hoofs.

(4) Foaling and miscarriages.

(5) Other experiences in veterinary medicine.

Since these measures might be considered revolutionary in horse breeding circles, instructions were issued to avoid publicity and to treat the program as confidential insofar as civilian agencies were concerned. The end of the war unfortunately terminated all such army innovations which were revolutionary in their farsightedness. I may be permitted, however, to express my personal conviction that on the basis of these measures, the army would have obtained a completely satisfactory all-round horse.[1]

## VIII. ARMY HORSES IN COMPETITIVE EXHIBITIONS AND HORSE RACING

Competitive exhibitions and performance tests of every kind are phases of horse training as much as it is a training of those who ride or drive in them. Consequently tests and exhibitions are of military importance, for they tend to

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[1] In evaluating breeding experiments we must take into consideration that horses, like all other living creatures, are the product of their native environments. Consequently, it cannot be predicted with any measure of certainty whether the results of such breeding experiments would come up to all expectations. At any rate, if the breeding experiments initiated had been continued, it would have taken decades, perhaps even a hundred years, before practical results could have been established on a broad basis.--Mueller-Hillebrand.

raise breeding standards and performance capacities of the horses.

Without competitive exhibitions and without the rural riding clubs which supported them, German horse breeding would not have maintained its position after World War I. Nor would German breeders have been able to provide the horses needed after 1934 for the numerous mounted and horse-drawn units of the army.

For a new army equipped with horses, competitive exhibitions will serve a two-fold purpose:

1. By having appropriate tests, breeders will receive the necessary guidance and incentive to enable them to increase horse production both quantitatively and qualitatively.

2. By giving pre- and post-military training to riders, drivers, and horses.

The value of horse racing is determined by two factors, the fighting instinct and the sense of danger. In no other equestrian sport, indeed one might say in no other sport of any kind, do these two factors play such an important role. In racing the rider is not alone; he has his opponents about him and is fighting man to man. Situations change with lightning speed and call for equally fast decisions, apart from skill in horsemanship. Horse racing calls for dash. With rare exceptions, no rider who does not possess this quality

will ever win a race, even though the horse itself may be superior. As a former cavalry inspector, von Kayser, once said, "Tournament riding and fox hunting are maneuvers, but horse racing is war."

# APPENDIX C

## EXPERIENCES OF A GERMAN VETERINARY OFFICER IN RUSSIA 1944-1945

By

Wilhelm Ziegler, Lieutenant Colonel

## I. THE SUITABILITY OF HORSES FOR MILITARY SERVICE IN THE EAST ACCORDING TO BREED, AGE, PHYSICAL CONDITION, AND TRAINING

Before World War I the German Army relied on East Prussian warm bloods for horses whose breeding was strongly supported by government subsidy. The East Prussian warm blood, established as a breed centuries ago, was particularly suitable as a cavalry horse because of its toughness, endurance, speed, and agility. After the war, however, their breeding underwent radical changes. The army was no longer a large-scale buyer of remounts, and agricultural requirements called for a stronger and heavier horse capable of doing farm work even in heavy soil. With the discontinuance of compulsory military service there was also a shortage of men who had acquired experience in handling horses as part of their cavalry training. Consequently, a quiet, willing horse was needed which was easy for attendant, driver, or rider to handle. To meet the requirements East Prussian breeders proceeded to strengthen the strain systematically by which the ideal increasingly approached the strength and weight of the Hanoverian warm bloods.

In contrast to others, German horse breeders, whether of warm or cold bloods, laid particular stress on build and form. At the horse shows and the exhibitions and in the

selection of horses for breeding, the points of particular value were stance, depth of barrel, breast measurement, angle of joints, and the shape of the withers and the back. To judge the toughness and endurance of the various breeds of horses was difficult in peacetime, because the maneuvers and marching exercises of the mounted and horse-drawn units of the Wehrmacht offered no basis for judging these qualities, since the horses were generally all of one kind. Since long distance riding and other really exacting tests were seldom carried out, every association of horse breeders could claim outstanding stamina and endurance for its breed without having to prove this claim in comparative tests.

In tournaments the performances of the German warm bloods were of a high order as was proved by the great international jumping and training tests and by the Olympic equestrian performance tests of 1936. Some notable achievments were recorded during the hauling tests which were then gradually being introduced and developed. Thoroughbreds won few first prizes in international competitions.

When the time came to rebuild the German Army, horses were imported from abroad for the first time and assigned to the Wehrmacht. Apart from a few warm bloods of Irish and Argentine origin, the main contingent of horses came from southeastern Europe. As far as I know, these horses

were not selected by German military commissions in the countries of origin but were bought by native dealers who sold them to German dealers, who in turn offered them for sale to the Wehrmacht. In spite of the profits exacted by the intermediary agencies and the import duties, the prices paid did not exceed the average price for horses of the same quality raised in Germany. The imported horses which I saw came mainly from Hungary. They were conspicuous for lack of balance, faulty position, narrow chest, broken stride, and often for a very lively temperament. These traits made them quite different from the usual concept of a German army horse, and they were accepted at first with considerable skepticism. But even in peacetime it became obvious that while these imported horses did not show up well in training, their performance and endurance in actual field practice was quite satisfactory.

During the campaign against France, in which I participated as a veterinary officer of the 4th Infantry Regiment, it was evident that our troops were glad to avail themselves of the abundant supply of French army and civilian horses to replace losses or to exchange them for German horses which were no longer at their best. The French Postiers were particularly in demand by the infantry as draft horses, since they had been bred specifically for that

purpose. The greyish-colored Postiers were fairly compact horses of medium weight with strong shoulders. They were good harness horses, willing and capable of maintaining a trotting pace for a considerable length of time without impairment.

The Percherons encountered in northern France were also in demand. These horses were the purebred descendents of a type of horse favored by the knights of old. Although fairly large and heavy their rather high admixture of warm blood made them capable of maintaining a sustained trot. The Percherons are nearly all dapple-greys.

During the winter of 1940-41 an assortment of horses comprising many different breeds was entrusted to my care as veterinary officer of the 1st Cavalry Division. The total number of horses was about 13,500. It was expected that in the event of being ordered to Russia, the horses of the division would be called on for extraordinary effort and that it would be possible to subject them to qualifying tests and draw some valuable conclusions on making careful selections. Here was a rare opportunity to study the merits and demerits of a large number of horses of different breeds and ages under the same set of trying conditions. It was an opportunity which I felt should not be passed up.

Consequently, in anticipation of the expected assignment, all the horses were classified according to breed, age, color, and physical condition in order to conclude subsequently the capacity and endurance of the various breed. This evaluation would reveal which horses of the various categories would drop out of service through death, injury, or illness, or which breeds did not possess the absolutely essential toughness required of the ideal army horse. The losses which had nothing to do with the constitution of the horse, its susceptibility to disease, or its physical character, naturally, had to be left out of consideration. In other words, losses through enemy action, straying, or accident were not considered.

Since it seemed proper to consider only those diseases whose freguency made them important, the categories of breed, age, condition, and color were subdivided into four classes of illnesses: Exhaustion, inclusive of heart disease; Lameness not due to external injuries; Saddle and harness sores; and Internal diseases such as the impairment of digestive or respiratory organs, of the kidneys, and of the inner hoof.

For the sake of completeness and in order to establish a basis for comparative studies, the losses sustained while the division was enroute to Gomel at the end of its period of commitment are included. The period covered by the survey is from 22 June to 5 November 1941

1. Losses According to Breed. The Czech, Slovak, and Yugoslav breeds have been grouped together, since they were received by the division in such a way that it was difficult to say from which of these countries the various horses originally came. Hanoverians and Mecklenburgers constitute another combined group. The remaining German warm bloods, with the exception of the East Prussians, have not been subdivided in order to avoid small, individual groups. For the same reason no subdivision has been made of the German cold bloods, the French cold and warm bloods, the Irish, American, and Dutch breeds. (See Table 1). The percentage of casualties for each group is summarized below:

| BREED | PERCENT OF CASUALTIES |
|---|---|
| Irish | 15.38% |
| Polish | 27.26% |
| French Cold Bloods | 30.10% |
| German Mixed Bloods | 32.39% |
| East Prussian (warm bloods) | 32.50% |
| Hungarian | 32.96% |
| Other German warm bloods | 34.04% |
| French warm bloods | 34.27% |
| Czech, Slovak, Yugoslav | 34.79% |
| American warm bloods | 36.66% |

| BREED | PERCENT OF CASUALTIES |
|---|---|
| Hanoverian and Mecklenburger | 47.91% |
| Thoroughbreds | 52.00% |
| German cold bloods | 54.28% |
| Dutch cold bloods | 55.82% |

As may be seen from Table 1, the breeds that came closest to the 33.21 percent disablement average were the Hungarians, East Prussians, German warm bloods, German mixed bloods, French warm bloods, Czech, Slovak and Yugoslavs, French cold bloods, and the American warm bloods.

Both the Irish and the Thoroughbred horses were so few in number that the particularly good showing of the first and the equally bad showing of the second may be due to chance factors. The figures, however, do correspond with our experience relative to the toughness of the Irish breed, and it is well known that Thoroughbreds do not stand up well under the harsh conditions of feeding and working in the field. However, while in Holland in 1943, I selected out of a large number of horses newly levied in France a very lightweight and sensitive French Thoroughbred mare of purest breed for the express purpose of subjecting her to the rigors of the Russian campaign. After securing the services of a Polish auxiliary volunteer, a former Polish cavalry officer, who was competent to care for and handle

## TABLE 1
## SUITABILITY ACCORDING TO BREED

| Breeds | Horses on hand 22 June 1941 | Exhaustion | | | | Lameness | | | | Sores | | | Internal Diseases | | | | Totals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Released from Service | Dead | Total | Percent | Released from Service | Dead | Total | Percent | Released from Service | Total | Percent | Released from Service | Dead | Total | Percent | Number | Percent |
| Thoroughbred | 25 | 8 | 1 | 9 | 36.00 | 1 | - | 1 | 4.00 | - | - | - | 2 | 1 | 3 | 12.00 | 13 | 52.00 |
| East Prussian | 5000 | 1031 | 48 | 1079 | 21.58 | 310 | 1 | 311 | 6.22 | 118 | 118 | 2.36 | 89 | 28 | 117 | 2.34 | 1625 | 32.50 |
| Hanoverian and Mecklenburg | 528 | 156 | 11 | 167 | 31.62 | 44 | - | 44 | 8.33 | 16 | 16 | 3.03 | 24 | 2 | 26 | 4.92 | 253 | 47.91 |
| Other German Warm Bloods | 376 | 90 | 1 | 91 | 24.20 | 20 | - | 20 | 5.31 | 6 | 6 | 1.59 | 8 | 3 | 11 | 2.92 | 128 | 34.04 |
| German Mixed Bloods | 710 | 145 | 21 | 166 | 23.38 | 29 | - | 29 | 4.08 | 17 | 17 | 2.39 | 9 | 9 | 18 | 2.53 | 230 | 32.39 |
| German Cold Bloods | 70 | 25 | 1 | 26 | 37.14 | 3 | - | 3 | 4.29 | - | - | - | 4 | 5 | 9 | 12.85 | 38 | 54.28 |
| Hungarian | 822 | 144 | 6 | 150 | 18.24 | 66 | - | 66 | 8.02 | 24 | 24 | 2.91 | 28 | 3 | 31 | 3.77 | 271 | 32.96 |
| Czech, Slovak & Yugoslav | 2273 | 505 | 36 | 541 | 23.80 | 126 | 1 | 127 | 5.58 | 40 | 40 | 1.75 | 72 | 11 | 83 | 3.65 | 791 | 34.79 |
| Polish | 1658 | 271 | 18 | 289 | 17.43 | 86 | - | 86 | 5.18 | 32 | 32 | 1.93 | 42 | 3 | 45 | 2.71 | 452 | 27.26 |
| French Warm Bloods | 458 | 82 | 11 | 93 | 20.31 | 26 | - | 26 | 5.67 | 12 | 12 | 2.62 | 22 | 4 | 26 | 5.67 | 157 | 34.27 |
| French Cold Bloods | 455 | 83 | 6 | 89 | 19.56 | 20 | - | 20 | 4.39 | 9 | 9 | 1.97 | 15 | 4 | 19 | 4.17 | 137 | 30.10 |
| Irish | 26 | 2 | - | 2 | 7.69 | - | - | - | - | 1 | 1 | 3.84 | - | 1 | 1 | 3.84 | 4 | 15.38 |
| American Warm Bloods | 60 | 15 | - | 15 | 25.00 | 5 | - | 5 | 8.33 | 2 | 2 | 3.33 | - | - | - | - | 22 | 36.66 |
| Dutch Cold Bloods | 77 | 34 | 1 | 35 | 45.45 | 2 | - | 2 | 2.59 | 4 | 4 | 5.19 | 2 | - | 2 | 2.59 | 43 | 55.82 |
| Total | 12538 | 2591 | 161 | 2752 | 21.95 | 738 | 2 | 740 | 5.90 | 281 | 281 | 2.34 | 317 | 74 | 391 | 3.11 | 4164 | 33.21 |

this mare, she was put to continuous service in Russia, often under unfavorable circumstances, and distinguished herself by high performance until she was severely wounded.

The German and Dutch cold bloods, with their high rate of disablement through illness, proved that they were not very hardy. They were particularly susceptible to inadequate or irregular feeding and the lack of rest periods.

In contrast, German mixed bloods, mongrel horses as it were, and French cold bloods stood up very well. The latter, however, were predominantly represented by Postiers and Percherons, renowned for their high capacity, and can therefore not be considered representative of cold bloods generally.

The East Prussian horses rank highest, another proof of their famed hardiness, which apparently has been preserved among the German warm bloods in spite of the reinforcing of their blood between the two wars. Other German warm bloods follow close behind, especially the Holstein and Frisian horses. The Hanoverian and Mecklenburg warm bloods showed a 50 percent higher sickness rate. The often heard and equally often disputed assertion that these two breeds are not very hardy appears to be confirmed.

The Polish horses, long known for their frugality and hardiness, lived up fully to their reputation. The number disabled through sickness was relatively low.

The Hungarian, Czech, Slovak, and the Yugoslav horses proved almost equal to the East Prussians as far as hardiness was concerned. These horses, for the most part, were only assigned to the 1st Cavalry Division in the spring of 1941, as raw replacements. Some of the horses were not completely trained, while others were still in a weakened condition, having only just recovered from the usual colds attendant upon acclimatization. Furthermore, a very large number of these horses were still rather young, that is to say, they had not yet reached full maturity of three to five years. Considering these handicaps they made a particularly good showing.

The hired Russian panye horses, and those collected later in the course of operations were not included in our survey. Insofar as they were employed by the 1st Cavalry Division they proved inadequate. Less than six percent of these small Russian horses, hired in Poland, remained in service at the end of the period covered by this survey. Such a result may appear surprising in view of the well-known hardiness and frugality of these horses. The reason may be that, contrary to my repeated objections, they were assigned directly to the various units and were forced to march with them. These little horses, whether trotting or walking, were

constantly overtaxed and not able to maintain the pace set by the larger, standard type horses. Later on, during long extended marches, sometimes in mountainous terrain as in the Carpathians and at other times through boggy terrain in which horses sank knee-deep, I experimented by having the standard type horses start off alone with the little panye horses following in a separate column. By this method the Russian horses reached the daily objectives without losses worth mentioning, although they took more time to get there. They were able to make up for their comparatively slow pace in walking and trotting by their ability to maintain a trotting gait for considerably longer stretches than the average warm bloods and without overexertion.

Later in the Russian campaign, the use of the panye horses by the infantry divisions and the motorized troops became an increasingly difficult problem. There were times when every unit indiscriminately utilized panye carts and horses. In addition to the increased fodder requirements, the greater daily care, and the longer time required to reach objectives, more and more personnel had to be detached for the handling of these teams. The advantages of the extra carts in our trains were finally outweighed by the reduction in the fighting strength of the units. This was all the more true since the pay load which these horses could haul over

long distances did not exceed 330 pounds in addition to the driver, his equipment, and a supply of fodder. The differences of opinion on the value of the supplementary Russian peasant teams were resolved by the issuance of the new tables of organization for the infantry divisions in the East in the autumn of 1943 which decided against their use.

2. Losses According to Age. The table given below shows how the horses of the 1st Cavalry Division stood the test of age. In order to simplify the picture only four age categories were used: one group of not yet full-grown horses (3 to 5 year-olds); two groups of mature horses (6 to 10 and 11 to 15 year-olds); and one group of over-aged horses (16 year-olds and older).

The figures tell their story unequivocally. Only the susceptibility to saddle and harness sores shows a continuous regression from youngest to oldest horses. Susceptibility to internal diseases is greatest with the youngest horses. In mature horses the incidence of internal diseases appears to be independent of age. The youngest horses are most subject to lameness; mature horses in the prime of life, between six and ten years old, are the most immune. The incidence rate again increases as the horses grow older. Under the stress of strenuous effort, the over-aged horses show by far the greatest incidence of exhaustion, young horses come next, while the fully-matured horses show the greatest endurance.

The percentage of horses released from service for one reason or another was as follows:

| | |
|---|---|
| 6 to 10 year-olds | 27.7% |
| 11 to 15 year-olds | 35.9% |
| 3 to 5 year-olds | 48.1% |
| 16 years or older | 55.6% |

3. Suitability According to Physical Condition. To determine the best physical condition for an army horse, the horses were examined for nutritive condition before being put into service. They were divided into three categories: very well fed, well fed, and moderately well fed. The different ratios of casualties among the three categories were very pronounced and led to instructive conclusions. See Table 3.

Almost half, 49.3 percent, of the horses which were moderately well fed dropped from exhaustion, while the corresponding figure for the well fed was 14.3 percent, and among the very well fed exhaustion produced 10.5 percent of the total casualties. Lameness among the very well fed and the moderately well fed was twice as great as among the well fed. The well fed group also showed the least susceptibility to internal diseases, the very well fed somewhat more susceptible, and the moderately well fed the most susceptible. Saddle and harness sores appeared most prevalently among the lean,

TABLE 2
SUITABILITY ACCORDING TO AGE

| Age Groups | Horses on Hand 22 June 1941 | Exhaustion | | | | Lameness | | | | Sores | | Internal Diseases | | | | Totals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Released from Service | Dead | Total | Percent | Released from Service | Dead | Total | Percent | Released from Service | Percent | Released from Service | Dead | Total | Percent | Number | Percent |
| 3 to 5 year-olds | 1819 | 532 | 28 | 560 | 30.8 | 172 | - | 172 | 9.5 | 51 | 2.8 | 81 | 11 | 92 | 5.1 | 875 | 48.1 |
| 6 to 10 year-olds | 7403 | 1249 | 69 | 1318 | 17.8 | 358 | 1 | 359 | 4.8 | 158 | 2.1 | 178 | 37 | 215 | 2.9 | 2050 | 27.7 |
| 11 to 15 year-olds | 2693 | 597 | 44 | 641 | 23.8 | 156 | 1 | 157 | 5.8 | 52 | 1.9 | 76 | 17 | 93 | 3.4 | 943 | 35.0 |
| 16 years and older | 633 | 254 | 18 | 272 | 42.9 | 55 | - | 55 | 8.7 | 11 | 1.7 | 7 | 7 | 14 | 2.2 | 352 | 55.6 |
| Totals | 12548 | 2632 | 159 | 2791 | 22.2 | 741 | 2 | 743 | 5.9 | 272 | 2.16 | 342 | 72 | 414 | 32.0 | 4220 | 33.6 |

moderately well fed horses. Casualties of this kind were, however, slightly less in the case of the well fed than in the case of the very well fed, and produced one-third of the total casualties among the moderately well fed animals. It must be taken into consideration that the great majority of the officers' horses and those of the first sergeant and the sergeant in charge of forage belonged to the very well fed category. These horses, even during active service, were treated with greater consideration and were more promptly taken out of service when they were ill in order to avoid surrendering them to the veterinary services. Consequently, the comparative tables may unintentionally favor the relative standing of the very well fed group of horses.

It is clear that army horses when faced with heavy tasks must be in good physical condition. They must have physical reserves, but they must not be fattened to obtain it.

4. Suitability According to Color. In earlier centuries great value was laid on the color of a horse, its markings, and the whorls of its hair. All kinds of deductions were made from these items as to the horse's temperament, character, and capabilities. Science has relegated such conclusions to the realm of fiction but has not been able to prevent many people from drawing certain conclusions from the color of a horse. The question of color, therefore, may justifiably be included in this investigation. The results can be found in Table 4.

TABLE 3
SUITABILITY ACCORDING TO PHYSICAL CONDITION

| Physical Condition | Horses on Hand 22 June 1941 | Exhaustion | | | | Lameness | | | | Sores | | Internal Diseases | | | | Totals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Released from Service | Dead | Total | Percent | Released from Service | Dead | Total | Percent | Released from Service | Percent | Released from Service | Dead | Total | Percent | Number | Percent |
| Very Well Fed | 1878 | 185 | 12 | 197 | 10.48 | 150 | 1 | 151 | 8.04 | 22 | 1.17 | 54 | 14 | 68 | 3.62 | 438 | 23.32 |
| Well Fed | 7075 | 952 | 61 | 1013 | 14.31 | 291 | - | 291 | 4.11 | 88 | 1.24 | 160 | 31 | 191 | 2.69 | 1583 | 22.37 |
| Moderately Well Fed | 2528 | 1159 | 87 | 1246 | 49.28 | 215 | 1 | 216 | 8.54 | 118 | 4.66 | 92 | 19 | 111 | 4.39 | 1691 | 66.89 |
| Totals | 11481 | 2296 | 160 | 2456 | 21.39 | 656 | 2 | 658 | 5.73 | 228 | 1.99 | 306 | 64 | 370 | 3.22 | 3712 | 32.33 |

Among brown horses the incidence of lameness and internal diseases was higher than the average, but the ratio of saddle or harness sores and exhaustion did not appreciably deviate from the average. The chestnuts proved to be particularly subject to sores but resistant to lameness, and were about average in resisting exhaustion and internal diseases. The black horses showed the highest number of casualties from exhaustion, but releases from service from other causes were less than the average. The greyish[1] horses had a better record against collapse from exhaustion the ratio being far below the average for the other colors. Casualties among the greys from other causes were also below the general average. Recapitulation of Losses:

| | |
|---|---|
| Brown Horses | 35.98% |
| Black horses | 33.56% |
| Chestnut horses | 31.90% |
| Grey horses | 25.97% |

It should be pointed out that the greys were among the breeds (Polish, Hungarian, Czech, Slovak and Yugoslav, and French cold bloods) which made comparatively good showings by reason of other qualities.

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[1] The term greyish or grey is used to designate any off-white color including dapple-grey, roan, blue-grey

TABLE 4
SUITABILITY ACCORDING TO COLOR

| Color | Horses on hand 22 June 1941 | Exhaustion | | | | Lameness | | | | Sores | | Internal Diseases | | | | Totals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Released from Service | Dead | Total | Percent | Released from Service | Dead | Total | Percent | Released from Service | Percent | Released from Service | Dead | Total | Percent | Number | Percent |
| Black | 1755 | 383 | 33 | 416 | 23.70 | 92 | - | 92 | 5.24 | 38 | 2.17 | 35 | 8 | 43 | 2.45 | 589 | 33.56 |
| Brown | 5650 | 1225 | 74 | 1299 | 22.09 | 396 | 1 | 397 | 7.03 | 114 | 2.02 | 197 | 26 | 223 | 3.94 | 2033 | 35.98 |
| Chestnut | 3970 | 804 | 42 | 846 | 21.31 | 197 | - | 197 | 4.91 | 104 | 2.62 | 92 | 28 | 120 | 3.02 | 1267 | 31.90 |
| Grey | 951 | 143 | 6 | 149 | 15.67 | 52 | 1 | 53 | 5.47 | 18 | 1.89 | 19 | 9 | 28 | 2.94 | 247 | 25.97 |
| Totals | 12326 | 2555 | 155 | 2710 | 21.99 | 736 | 2 | 738 | 5.99 | 274 | 2.22 | 343 | 71 | 414 | 3.36 | 4136 | 33.56 |

In summing up the results of this comparative study, it may be pointed out that mature, well fed horses, from six to ten years old, made the best all-round showing. Neither the breed nor a balanced physical structure appeared to be of decisive importance. More important were easy feeding habits, a certain stockiness of body, and a broad chest.

While attached to the 167th Infantry Division, I had occasion to try an experiment of equipping units with predominantly Berber stallions which had been taken from the Spahi[2] regiments captured or interned in France. The Berber is an almost purebred product from the Arab horse of North Africa. Like its Arab prototype it is not very large, is able to gallop and trot for long periods of time, and has a very fiery temperament.

The conditions under which the tests were made were unfavorable, since the personnel of the division, reorganized after service in the East, was predominantly Bavarians and Westphalians, who could not have been expected to have had much experience in handling warm bloods of such a noble strain. A further difficulty lay in the fact that the Spahi regiments had trained the Berbers exclusively as mounts and

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[2] French colonial (Algeria) cavalry regiment. (Ed.)

had used only stallions. Until accustomed to each other, fighting among the stallions was an everyday occurrence. Contrary to expectations, we succeeded in breaking the stallions, who were nine years old or older, to harness as draft horses. The teamsters had to be constantly attentive to their work and considerate of their charges. The Berbers proved fully adequate as mounts. Like their ancestors they were easily satisfied by meagre food and capable of sustained effort, and, in spite of the fact that they were stallions, they proved good natured. They performed well as draft horses, but their lightweight, averaging little more than 650 pounds, was so out of proportion to the weight of our army vehicles that the idea of using them as draft animals had to be abandoned. Yet it was characteristic of these horses that during comparative tests in sandy terrain, when the best and heaviest cold blood draft horses gave up the attempt to haul a heavy cart up a rather steep and long dune, a team of six little Berber stallions brought the same cart to the top of the dune, their trembling bodies wet with perspiration.

In the light of these experiences the Berber stallions were finally only used in the reconnaissance battalions, and the other units were equipped with other breeds.

The cold bloods originated in Holland, Belgium, and France for the most part, and the warm bloods in Holland

Hungary, and France. Since the division, after a period of rest and rehabilitation, returned to service in Russia, I was not able to carry through a comparative study of performances such as I had done for the 1st Cavalry Division. It was evident, however, that the Dutch and Belgian cold breeds were just as exacting as the Rhenish-German cold bloods in their demands for proper feed and rest periods. The Dutch warm bloods lacked hardiness as did the Hanoverian and Mecklenburg warm bloods. Again the French and Hungarian warm bloods proved easy feeders and capable of high performance and long endurance.

Since the infantry divisions' vehicles were so heavy, most of them had to be drawn by the cold bloods. Considering the marching pace of an infantry division, the use of non-trotting horses is practical and justified. These cold bloods with their quiet temperaments make no great demands on the skill and character of the drivers. However, during my one and a half years' service on the central sector of the Russian front, it was evident to me that heavy cold bloods were very sensitive to a short fodder supply even for brief periods, that they needed rather long rest periods, and that they suffered from the cold when unprotected. Among the cold bloods, the lighter animals of impure breeding were without doubt less exacting in their food and shelter

requirements and were capable of greater endurance. Very satisfactory in this respect were the Ermlaender and Ardennes horses. The extra heavy cold bloods, which were frequently the result of Belgian and Rhenish-German breeding, were particularly soft. Once these horses had been overexerted or had lost weight through illness of lack of food, they were no longer fit to do any work, and, since they usually required several months of complete rest and first class care to recuperate, it was generally not possible to restore them to full capacity as long as they were still attached to an army in the field.

In the summer of 1944, when the 3d and 4th Cavalry Divisions were organized into the new cavalry corps, their horses, drawn from various units and sources, contained a more varied assortment than had been the case in the 1st Cavalry Division. Again the situation prevented a thorough statistical study, but my personal impression of the endurance and hardiness of warm bloods with a strong admixture of Thoroughbred or Arab blood, such as we still find in French and Hungarian horses, was confirmed once more. The Berber stallions, when collected into separate cavalry troops, also proved very satisfactory in every way.

Climatic conditions in Russia affected horses very unequally, even prolonged cold periods were readily endured

if an adequate supply of fodder was available. Even the Berber horses from North Africa were insensible to cold. The extensive supply movement of 24,000 horses to Army Group Center, early in 1942, consisting mostly of heavy cold bloods from France, Belgium, and Holland, reached Russia by rail after a short stopover in Germany. The movement began in mid-February and the horses, newly arrived from a mild region, did not have time to become accustomed to the Russian winter. No harmful effects were observed, however, as a result of the cold; on the contrary, the horses, most of whom had some glandular trouble and respiratory ailments, recovered without complications in a surprisingly short time in the dry cold.

Some of the horses were far more susceptible to heat. The cold bloods, with the exception of the French Postiers and Percherons, perspired heavily and tired quickly. Among the warm bloods susceptibility to heat was in inverse ratio to their admixture of Thoroughbred and Arab blood.

I was not able to gather any data on the performance of horses in mountainous terrain. The low ranges of the central massif in Hungary did not greatly tax the horses, as long as they were properly handled. The horse-drawn infantry units crossed the Carpathians without any great difficulty. The movements of these units, which fell to my care as a veterinary

officer, took place mostly in the plain. However, all imaginable difficulties beset us there. The ice, slippery roads forced the horses to move forward hesitantly. Snow impeded the horses to about the same extent as sand. It was in snow that the draft horses were most often taxed beyond their capacity. Some stretches could be crossed only with the help of additional horses and special crews. Similar difficulties were encountered during the spring thaws and the autumn rains when the roads in the Ukraine and other eastern areas became so muddy that the horses sank as deep as their knees. A march under these conditions produced a spectacular increase in the number of casualties of exhaustion and heart ailments and injuries to the lower limbs. In contrast, losses through lameness would be comparatively low. On hard roads lameness was chiefly due to bone or joint troubles, while on soft ground the source of lameness lay predominantly in injury to tendons and ligaments.

The Eastern Campaign showed that light-colored horses were not easily observed targets, a suspicion of which had led to their ban in the Reichswehr. Unit commanders told me repeatedly that, whether at night or by day, whether in summer or in winter, white horses and light greys, even when in front-line contact with the enemy, were not more conspicuous than horses of other colors, and that battle

casualties among white or grey horses were no greater. The only place they appeared more conspicuously was in the open woods, where they could be spotted from the air with relative ease. In such cases it proved advisable to dye the horses' coats with a watery solution of potassium permanganate about every four weeks depending on the weather. The application of this solution turned the hair a sort of dirty yellow-brown. When dyed in this manner the cavalry units mounted on grey and white Berber horses were targets of enemy air attacks no more frequently than units mounted on horses of any other color.

I was never able to discover any differences in the performance capacities of mares and geldings. Stallions often displayed particular endurance, although perhaps coupled with a rather too lively temperament. Experience repeatedly demonstrated that stallions should definitely not be included among the horses of a unit unless they constituted the entire herd, as was the case of the Berber-mounted cavalry troops. A lone stallion always produced unrest among the other horses, and, in spite of all cautioning to the contrary, it was unavoidable that accompanying mares became covered sooner or later, with the result that with advancing pregnancy such mares were lost to the troop. A good lesson on this subject was taught one of the units of

the 1st Cavalry Division. The commander of this troop, during the French Campaign obtained a few stallions with the express purpose of letting them cover the mares in heat, since many of these could not be ridden during that time. The immediate objective was attained, but unfortunately the troop had to surrender the majority of its well-trained mares a few months later because of their being with foal.

II. CARE OF HORSES IN THE FIELD

1. Fodder Supply. Supplying horses with an adequate amount of fodder of the right composition is of great importance, since it decisively affects their performance. There can be no doubt that the prescribed allocation of fodder was fully adequate to maintain army horses in health and strength as long as moderate use was made of them. Far-sighted troop commanders, while still at their peacetime garrisons when the horses were working no more than an average of five hours a week, were in the habit of saving fodder for the purpose of being able to issue supplementary rations when the horses were called upon to put forth greater energy, as during maneuvers or hunting.

The rations prescribed for use during field operations did not correspond to the greater exertions the horses were called upon to make. A typical illustration of this fact was presented by the 4th Infantry Regiment during the French

Campaign. The horses, which for some time before the big drive into France had been in service in the rugged and snow-covered hills of the Eifel region and where they had to work hard on rather meager rations, recovered and gained strength in their advance into France because of the abundance of captured grain. Their improved physical condition enabled the horse-drawn and mounted elements of the regiment to cover 210 kilometers in three days of perfect marching order with hardly any losses. Experiments, which I conducted during both war and in peace, have convinced me that the heavily-taxed warm blood mounts should receive twelve to sixteen pounds of oats a day and about twelve pounds of hay, if they are to give an adequate performance.

During the Eastern Campaign the authorized allotment of fodder was almost always available, but transportation difficulties often prevented the units from receiving it. The most serious transportation bottleneck was between the railheads and the horse-drawn trains. The motorized trains and convoys, which had to negotiate the gap, often found the roads so bad that they had great difficulty in getting through.[3] The situation was particularly serious when units stationed some distance away from good roads were called upon to make a major move.

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[3] For a contrary opinion see Chapter 5, Section I. (Mueller-Hillebrand)

In Russia any collection of local fodder was uncertain. In some extensive swamp and forest areas, grain was not to be found in any appreciable quantity. Oats are not widely raised in Russia in any areas. Moreover, during major combat operations and while on the march, soldiers do not have any available time or resources to hunt and collect fodder.

Only during rest periods is it at all possible to feed horses on grass. Grass may keep an idle horse in fair condition, but a horse cannot work well when fed on it alone. Such hay as could be collected in Russia was mostly of a very poor quality and could serve only during short emergency periods. The possibility of a systematic destruction of native fodder supplies by an enemy in retreat must be taken into consideration.

In my opinion, in spite of all claims to the contrary, there is no real substitute for oats as a strengthening food for horses. The German Army's preserved fodder had too little food value for its bulk. To meet emergencies it was often necessary to resort to the use of various sorts of grain and leguminous plants. The preferred substitute grains were corn, barley, wheat, and, as last resorts, rye and buckwheat. Corn accomplished the best results, particularly when it was possible to shred or crush it beforehand. However, it has a tendency to cause horses to perspire readily. The other substitutes were only reluctantly accepted by

sensitive horses. Whenever recourse was had to such substitutes, sickness and deaths due to intestinal ailments, such as colic, increased and performances declined. Feeding buckwheat to horses was particularly dangerous, even small quantities often caused skin eruptions and loss of hair.

The effect of adequate feeding could be seen in the great difference in the number of cases of sickness among horses of the combat units as compared to those among the horse-drawn supply columns and veterinary services. The latter generally had to cover the same bad stretches of road on marches connected with combat operations, but, because of their larger load of fodder and of their advantages in personnel and time, the animals of the rear echelon units were better fed than those of the front-line units. Comparisons made over an extended period of time showed that under conditions such as those stated above, the combat units' losses due to exhaustion were 8.6 percent of the total strength, while in the supply columns and veterinary companies such losses amounted only to 0.7 percent.

The losses of the 1st Cavalry Division traceable to fodder, marching and combat are graphically compared in Table 5. The date were compiled from records of the 1st Cavalry Division for the period 22 June to 20 October 194.

2. Sheltering of Horses. Troops on the move can readily use such shelters as are available or camp in the open. For horses, however, open air camping always involves for them a considerable loss of strength. Most horses refuse to lie down and consequently rest less. In the cold air, whether due to the night or the season, a greater or lesser portion of the food consumed is used to compensate for the loss of body heat. In midsummer, particularly where there are rivers or swamps, horses left outside are often seriously disturbed by insects, which results in a further loss of recuperative time and an increase in injuries from kicking and biting.

The stables, sheds, and barns encountered in the central sector were generally satisfactory as temporary shelters, and they had the advantage for the most part of being small, which prevented the massing of horses into a small area which always increases the danger of spreading contagious diseases and may lead to greater losses when shelled or bombed. Some caution must be used before stabling horses in the barns of the Russian collective farms whose animals suffered from glanders. Units stationed in one place for longer periods of time usually built shelters of their own. Log cabines were very suitable and healthy and the spaces between the logs could be stuffed with moss. Shelters built below ground level with wooden frames offered

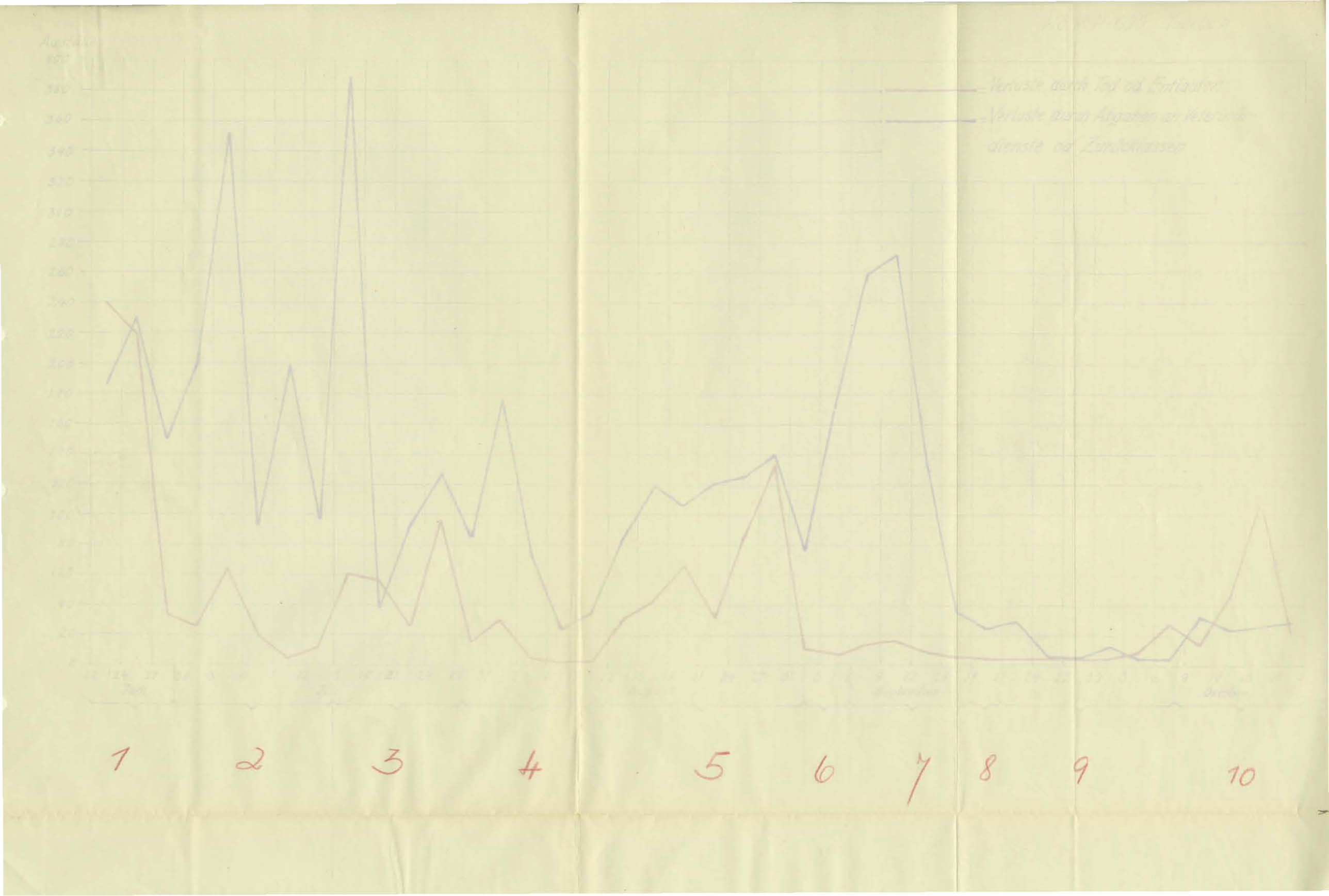
MS # P-090

Horse Casualties in the
1st Cavalry Division:
22 June to 20 October 1941

Losses Through Death
or Straying
Losses Through Turn-
ins or Left Behind

| | | | |
|---|---|---|---|
| 1 Slawatyeze-Dubica-Mokrarny-Siniawka: Violent fighting, exhausting marches, inadequate fodder. | 2 Siniawka-Sluzk-Bobruisk-Rogatschew-West Star. Bychow: Securing arterial military road and Dnieper R, Most exhausting marches, improved fodder situation. | 3 Division engaged in violent combat east of Dnieper near Star. Bychow: Horses inadequately supplied with coarse and green fodder, short of water. | 4 Division resting, moved to base, food and water good. |
| 5 Division in action towards Gomel, later Wetka-Dobrush-Korma-Snaffboyen: much violent fighting, poor fodder. | 6 Division marching through Tachmowitski-Walynka: Strenuous marches, bad weather | 7 March to rest area around Sta-Lebmarsh-Metschkagun on 11 Sep: Rest, good quarters and excellent fodder | 8 Transfer to the Sudostye River |
| 9 Securing Sudostye: good quarters, excellent fodder | 10 Advance through Trabtschewsk-Rjabtschewsk: Action in forest east of Desna, bad weather, very bad fodder situation | | |

1203/1
Table 5


Verluste durch Tod od. Entlassung
Verluste durch Abgang an Heeresdienste od. Landsturm
1
2
3
4
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10

good protection against artillery fire, especially against shell fragments, but had the disadvantage of being too warm and poorly ventilated. In shelters of this sort, horses were more susceptible to colds which tended to become chronic.

My only experience in the use of tents was in connection with collecting horses in peacetime. The tents, each accommodating about fifty horses, offered little protection against cold, and the sun's rays beating against the canvas produced an unbearable heat. The wooden stalls or partitions were too light to last long, and the canvas quickly rotted from the effects of moisture in the ground and the ammonia from the horses' urine. In the light of this experience I consider tents unsuited for use in the East.

3. The Care of Horses' Hoofs. Just as the performance of infantrymen depends largely on the quality of their boots so does the performance of horses depend on the way they are shod. Army horseshoes Number 32, made of Siemens-Martin easily fusible steel and developed on the basis of World War I experience and subsequent experiments, was a half-finished article prepared in twelve sizes. At the toe and shank were screw holes, and eight to sixteen nail holes were located on the sides and toe folds. Shoes for front and hind hoofs were of different types. On the average the shoes lasted 600 kilometers and another 300 kilometers when repaired.

An adequate supply of army horseshoes was available. Due to the familiar bottlenecks in rail and motor transportation, occasional difficulties were encountered in getting horseshoes at the front. However, as far as I know, such delays were never serious enough to delay the movement of any large horse-drawn column. Horses were always reshod in good time. Compared to the importance of our own supply, the horseshoes obtained occasionally in Russia were of minor importance. They were of much poorer quality and consequently lasted only about half as long.

## III. THE REMOUNT AND REPLACEMENT SERVICES

The German eastern armies depended for remounts almost exclusively on the regular re-supply and on the return of horses restored to health in veterinary installations. The number of captured horses and the number of standard type horses requisitioned locally in the east, outside of Poland, was extremely small. The panye horses of the Russian peasants, which were available in great numbers, were of rather limited value.[4]

Before the war the Veterinary Inspectorate repeatedly pointed out that, in the registration of horses which would be requisitioned in case of war, the interests of the horse

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[4] For contrary opinions based on actual combat experience, see Appendix A. (Ed.)

breeding industry should be considered. The interests of agriculture as well as those of the military demanded that, in the event of a long war, the breeding of horses should not be basically disturbed. For this reason I had urged as a matter of general principle that only geldings be considered for army service. This would, of course, have entailed an exchange of horses within the breeding areas in order to protect the interests of agriculture. Unfortunately this suggestion could not be carried out. Consequently it was inevitable that valuable mares in their best years, including prize winning mares of the highest pedigree, were levied for military service and were lost for breeding purposes. The wishes of the Army were also not always considered as far as age was concerned. It was not in the best interests of the Army to levy horses which were too young or too old, however much they might outwardly give the impression of being capable of high performance. It should be pointed out that even a horse far smaller than average size is better suited for army service than a horse larger than average size.

In Holland I personally took part in the procurement of remounts. The practice was to require dealers to show a stipulated number of horses on an appointed day. The horses were previously judged by a Dutch commission which also estimated the value of each horse. The German commission

had nothing to do but to examine the horses and decide whether or not they would take them at the proposed prices. It is my impression that this procedure fully corresponded with the varying interest of the Wehrmacht, agricultural interest, and horse breeders.

## IV. THE SUPPLY OF HORSES

Regarding the supply of horses for use in the East a basic distinction has to be made between freshly levied replacements and animals returned to service by an army or zone of interior veterinary installation after rehabilitation. The supply of rehabilitated horses was small and contained many animals which became casualties again soon after their return. It does not appear worthwhile to return horses which have been sent to the rear because of exhaustion or other debilitation. As a rule, they suffer a relapse after the first major effort. These animals, however, could still be put to good use in agriculture as replacements for the fresh levies. As a matter of principle, combat elements should receive only such rehabilitated horses that have been treated by the veterinary services for wounds, injuries, or contagious diseases.

The procedure for obtaining remounts varied. Newly levied horses passed from collecting points in the zone of

interior or in foreign countries to assembly areas, from these to the remount depots of the Field Army, and from these to the divisions. This procedure required a lot of time, and there can be no doubt that many a good horse was lost at one point or another and that others were the victims of careless handling and inadequate facilities. The largest number of in-transit casualties, however, were caused by the horses contracting contagious diseases at the in-between stations. A relatively large percentage of animals contracted colds or sore throats along the route.

The advance of the 1st Cavalry Division was so rapid that the number of remounts that caught up with it was small. When one considers that, during the period from 22 June to 20 October 1941 when this division was in action, 5,726 of the original 13, 580 horses were lost through death, straying, turned in to the veterinary services, or left behind, the 749 horses received as replacements during that time may be considered as grossly inadequate. Nevertheless some valuable lessons can be pointed out. The first group of replacements comprised 400 horses. Seventy-two horses were lost while they were being moved by an army organization through the Government General[5] to Slutsk. From there the veterinary service of the 1st Cavalry Division

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[5] Generalgouvernement. Administrative region established by Germany in Central Poland in 1939.

walked the horses 350 kilometers to catch up with the troops, losing another eleven animals. A check of the horses at that time showed that only 241 horses were fit for duty. Another smaller shipment was brought directly by rail from the collect-area around Pardubitz to Gomel, where they were taken over by the division's veterinary service and again shipped by rail as far as Unetcha. From that point they were marched to the units to which they were assigned. Three hundred twenty-five horses were in a condition to be immediately assigned to combat units as replacements. This experience showed how losses could be cut by shipping the remounts directly from the collecting area to the units and eliminating the several intermediary stations.

A unique experience in the Russian Campaign was encountered early in 1942 during the so-called horse movement by march echelons, when horses for Army Groups North, Center, and South were to be brought by rail to the most advanced railhead. From there special organizations would move the animals to the advance units. My own experiences were entirely within the sphere of Army Group Center, and I do not know why the plan was not carried out for Army Groups North and South.

The objectives of the undertaking were known to me from the outset. On the strength of my previous experience in

the East, I requested that, in spite of the great differences in climate, the remounts be moved directly from the collecting points in France and Belgium to railheads in Russia. Attention was drawn to the type of organization and equipment needed to accomplish the mission. For reasons unknown to me, my suggestions were not acted upon. The movement was directed by the Headquarters of Army Group Center located in Minsk.

The horses, collected in Western Europe, were sent first to remount depots in Germany and from there they were shipped in lots of 500 by rail to Vilna and Bialystok. One officer, one official, and about 135 noncommissioned officers and men constituted the escort party. Unfortunately, these men were not taken from cavalry or horse-drawn units but were recruited among freshly trained or convalescent personnel of all arms. The equipment provided was inadequate. For the most part it consisted of no more than a rope halter, lines, and a nose bag per horse. Rest stations, which had been established beforehand, provided food and other necessities for both men and horses. The march program called for an echelon to average thirty kilometers a day, with a full day of rest every four or five days. Some horses walked a total of 1500 kilometers. Every fourth or fifth rest station provided complete veterinary services by the local administrative commander.

A considerable number of horses became infected with contagious respiratory ailments and glandular fevers. These infections were almost certainly due to the massing of horses at the purchase point and more particularly to their stay at the chronically infested, permanent remount depots in the zone of interior. An attempt was made to march only those horses which were slightly ill and segregate the more serious cases at some nearby place. Additional equipment, such as halters and ropes, were obtained locally. A motorized veterinary officer was assigned to each three or four march columns, and about every fourth day each echelon passed through a veterinary base where all horses needing medical care were left for treatment. The making-up of casualties through replacements requisitioned locally was strictly forbidden.

This system was successful in getting 96 percent of the horses, all in good working condition, from the railheads to the units. The ill or injured horses were turned in to the veterinary services further in the rear where they might be treated. Deaths amounted to a little less than one percent.

The success of the various echelons materially depended on the understanding and personal interest of the officer in charge and of his noncommissioned officers. Some of the

echelons with a large enough number of experienced personnel arrived in excellent condition. In other echelons led by men who had no previous experience with horses, such as teachers and governmental officials, constant supervision and advice was necessary. Among this varied group some 75 percent had never handled a horse, yet each man was expected to lead and care for four heavy cold bloods. This was obviously possible only by having the superior officers maintain constant supervision. It should be mentioned that the personnel of each echelon had been collected for the sole purpose of assisting in the movement of these horses and consequently the group completely lacked any team spirit. Some even showed a woeful lack of character, and there were a number of cases of desertion and of self-inflicted injury, in which men purposely exposed their hands or feet to the freezing cold.

Difficulties were experienced in establishing the veterinary stations along the line of march which passed through several military administrative areas. The control staff was unable to carry out the necessary movements of personnel and horses between the various stations along the line. It was only after a request was addressed to the Veterinary Inspectorate that trucks were secured for the veterinary officers. These enabled them to organize a

mobile veterinary service for the echelons on the march and at the rest centers. The trucks made it possible to redistribute personnel along the march more efficiently and contributed considerably to the success of the movement.

V. ARMY DOGS

In contrast to their use on the Western Front, dogs were employed to a very limited extent in the East. There can be no doubt that, quite apart from their value as watch-dogs attached to staffs and supply depots, dogs with special training can be used to save human lives. Dogs are particularly valuable in combining partisan-infested areas, since they can give timely warning of the partisans, presence or approach. As far as I have had the occasion to observe, all wirehaired and longhaired varieties were not able to endure the rigors of the Russian winters.

VI. THE ORGANIZATION AND FUNCTION OF THE VETERINARY SERVICES

The mission of the veterinary services included the following: prevention and cure of contagious diseases and every kind of illness; the care and replacement of horses; technical collaboration on questions concerning forage, shelter, and harnesses; the direction of horseshoeing; and the supervision of food supplies of animal origin. The

veterinary services, the veterinary officers, and the horseshoeing crews were organized to perform these missions.

1. The Veterinary Services. A veterinary company was assigned to each full strength division which had horses regularly attached to it. The company was commanded by the senior veterinary officer on the division commander's staff. The company received and cared for all sick horses which were not likely to recover quickly if they remained with the units, was responsible for the collection and distribution of forage required by the division, and was responsible for all veterinary medical supplies and instruments. The veterinary company consisted of an operations section, a collecting section with special horse transportation trucks, a hospital section, a supply section, and a forage and stabling section. The veterinary company was organized in 1938 to replace the previously planned and separate veterinary hospital and remount depot. The decision to bring both functions together into one organization was based on the opinion that it would be more economical to concentrate personnel, motor vehicles, and materials into one organization and that when the hospital facilities were heavily taxed, the activities of the remount depot would be correspondingly light. The expected shortage of personnel in the hospital then might be partly supplemented by personnel

from the remount depot. According to all reports the composition and size of the veterinary company as it had been planned in advance of the war proved completely satisfactory, and only minor changes were made during the war. Under normal conditions a veterinary company was expected to care for 150 horses which might be in reserve or were being treated. In an emergency it was possible to handle as many as 800 horses of both categories. Veterinary companies for mountain troops were organized on a slightly different basis, and a smaller organization was provided for the Luftwaffe field divisions. Veterinary companies assigned to cavalry divisions were of the standard type, differing from those of the infantry divisions only in the fact that their vehicles were drawn by four-horse teams and some additional noncommissioned officers and enlisted men were mounted. Two veterinary companies were assigned to the 1st Cavalry Division and the 3d and 4th Cavalry Divisions had one apiece.[6] The 1st Cavalry Division was also assigned two horse-drawn transport columns for its eastern campaign. The corps headquarters reserve troops had no veterinary services except those established in the winter of 1944-45 for the Cavalry

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[6] The 1st Cavalry Division was organized in 1941 while the 3d and 4th Cavalry Divisions were organized in 1944. The two latter divisions suffered from a shortage of personnel and supplies. (Mueller-Hillebrand)

Corps, which had one veterinary company as part of its headquarters troops.

Other veterinary service units were attached to troops under the Army High Command. Generally these consisted of three or four veterinary hospitals, one or two army remount depots (for horses held in reserve), one veterinary supply depot (for medical and horseshoeing equipment), and one veterinary laboratory to make blood tests and diagnoses and to conduct food research. An army group usually did not have any veterinary services of its own, although army veterinary services might be assigned to an army group under special circumstances.

Within Germany there were permanent veterinary hospitals, one central and several Wehrkreis veterinary depots, veterinary research stations, and a veterinary replacement battalion for each Wehrkreis. The remount depots in the zone of interior were not part of the veterinary services but were under the Inspectorate for Riding and Driving in the General Army Office under the Commander of the Replacement Training Army.

The locations of the veterinary installations varied greatly. Installations of the Replacement Training Army needed suitable spacious shelters near railroad lines. The army veterinary services, because of their size, the number of horses, and the quantity of equipment carried in

its trains, were relatively clumsy organizations, but they too needed suitable quarters. It was customary to distribute veterinary hospitals and remount depots at regular intervals along the entire front. Access to rail facilities was important so that horses might be shipped to the zone of interior. Their distance from the front line varied between 50 and 300 kilometers. They were often located as far forward as the supply and administration branch of the army headquarters to which they were assigned. The horse-drawn columns were generally attached to the veterinary hospitals. The supply depot and the office for veterinary research were also located near the army supply and administration branch.

On the march, the veterinary company usually followed the horse-drawn trains of the division's combat units. Its battle station was located a few kilometers behind the supply station where proper terrain, quarters, fodder and water were available and access to a good road afforded. The care and evacuation of sick horses deviated from the principles laid down in peacetime regulations. The veterinary aid stations were hardly ever set up as planned. It was customary for veterinary officers to treat sick horses at stations where the pack horses and teams were sheltered. If it were possible for the animals to stay with the troops, their

further care was left to the horseshoe personnel. If the horses were to be sent to the division veterinary company, they were evacuated by the most expeditious means.

On the march, veterinary officers stayed with the rear third of the mounted or horse-drawn column. They decided whether horses should be left behind or whether they should be turned in to a veterinary installation which still lay ahead. The veterinary communication channel under field conditions, for example, from battalion veterinary officer through regiment, division headquarter's advance echelon, the supply and administration section, the division veterinarian, to the veterinary company, was so slow that a message on horses being left behind to be picked up by the veterinary service reached the veterinary company several days later. In such cases one could be almost certain that the horses would have died, strayed, been stolen by natives, or been picked up by other troops. It remained for the veterinary officer to exercise his skill and ingenuity and find the quickest way of notifying the veterinary service of his requirements.

Regulations required the veterinary company to establish one or more horse collecting stations both while on the march and at the front. These instructions were contained in Special Regulations for Rear Area Services, and the establishments

were announced in Special Maintenance Regulations. This procedure, except in the cases of major and properly planned march movements when not in contact with the enemy, could not be carried out in practice. Any orientation of the veterinary personnel on the situation and planning was seriously delayed on the march by the difficulties of communication. The issue of comprehensive, special instructions to the rear services of the division was rare and consumed too much time. Similarly, the use of the comprehensive Special Maintenance Regulations, by which contact with the trains and pack horses was regulated, was impossible, since units on the march received the instructions only after they no longer had any application to the situation. Consequently, instructions to the veterinary services within the division were almost always in the form of special and direct orders from the division veterinary officer delivered to the veterinary company by motorcycle or mounted messenger. During major actions it was almost impossible to inform the units of the location of horse collecting stations. The most practical procedure during combat operations was to establish a horse collecting station in the immediate vicinity of the supply and administration section of the division headquarters, for almost all elements of the division knew its location. Since the division veterinary officer can personally attend the

horses at the collecting station, it is not necessary to assign an additional, full-time officer from the veterinary company.

On extended marches, particularly of cavalry forces, the "sieve system" proved most satisfactory. Horse collecting stations, each with a small crew and one truck, were established along the line of march approximately fifteen kilometers apart. These stations must be established in advance of the main body and their locations marked by conspicuous signs, one of which must be placed a few hundred yards before the entrance. In this manner it is possible to collect almost all horses not in condition to continue the march. A veterinary company should follow in the rear of the combat units and relieve the collecting stations which can then be reestablished at the head of the columns. With cavalry troops on long marches, this system can be applied only when motorized horse transport facilities are available, since the trucks and personnel of the veterinary companies alone are inadequate. For smooth working, the horse transport column collecting the horses must be directly controlled by the division supply and administration section. In infantry divisions the veterinary company can accomplish the task providing its trucks are in serviceable condition.

It is a fundamental rule that the horses withdrawn from service be picked up by the next organization to the rear. As a general rule, an invalided horse with front-line troops is picked up by the personnel and vehicles of the nearest horse collecting station and moved according to needs and circumstances by the veterinary company. Animals which are not expected to make an early recovery and whose care would unduly tax the facilities of the veterinary company are picked up by the army veterinary services and evacuated by rail or by motor transport columns. If evacuation to army veterinary hospitals becomes necessary, it is done by rail and with the help of personnel from the zone of interior installations.

It is probable that the replacement situation never permitted the prompt dispatch of an adequate number of remounts for front-line service in exchange for casualties or horses returned to veterinary installations. The most economical use had to be made of available reserves in order that any shortage of horses might not impair the combat efficiency or marching capability of front-line units. It was absolutely essential that the senior veterinary officer coordinate the distribution of horses by a close collaboration with the forward echelons.

Moving horses forward was the reverse procedure of evacuation. The zone of interior installations brought the remounts by rail to a point where they were turned over to the various armies which sent them on to the divisions either on foot or by motor transport columns. For an exception to this procedure see Section IV above.

Veterinary equipment and supplies, including horseshoeing equipment, were obtained through a central agency in the zone of interior and distributed by the veterinary supply depots to the armies according to needs and stocks on hand. Once a month the division, on the basis or requests turned in by regiments, submitted a consolidated requisition to the army. As a rule the army forwarded the requested supplies by rail or truck to the division where the veterinary companies completed the distribution.

2. The Veterinary Officers. The technical veterinary officers were in a dual chain of command. For tactical purposes they were under the control of the commanders to whose units they were attached or assigned, and for professional guidance they were under the orders of the senior veterinary officers. The number of veterinary officers in the Field Army was continually reduced during the course of the war. A cavalry regiment, consisting of two battalions, had, during the latter part of the war, an average of one regimental

and two battalion veterinary officers; an artillery battalion had one veterinary officer with the senior officer acting as regimental veterinarian; the infantry had one veterinary officer to each regiment. The veterinary adjutant in the division and all corps veterinary officers were eliminated. The shortage of veterinary officers made it impossible to fill more than two-thirds of the vacancies.

The veterinary officers at any headquarters were simultaneously the commanding officers of any attached or assigned veterinary service units. Veterinary officers in command of butcher units were under the direction of the headquarters administrative official. The training given to veterinary officers on active service during the year before the war proved adequate, and these officers made the best possible use of their opportunities. Entering the service immediately after their final examinations as veterinarians and being assigned to a mounted unit provided the best guarantee that a beginning veterinary officer would acquire the practical knowledge needed for handling horses. Entering the service at an early age also favored the development of a genuine enthusiasm for his profession. Through a subsequent broad training with the several arms and through attending military and civilian riding and driving schools, the young veterinarian acquired the necessary understanding of the special

requirements of the various arms of the service and for their mutual coordination.

While giving full credit to the unselfish service and the professional knowledge of the many reserve veterinary officers, it is obvious that they were not capable of advising their commanding officers in all veterinary matters, particularly if they were unfamiliar with broader aspects of operations and if they limited their attentions strictly to the care of horses.

Although it is at times necessary for veterinary officers with field units to be motorized in order to visit widely scattered units, I am of the opinion that every veterinary officer in the field, at least up to and including the division veterinary officer, should be mounted and follow the troops on horseback. Only then can he judge the degree to which the horses are being taxed and how well the horses are standing up to the strains. This knowledge is all the more important in modern warfare, since commanding officers are necessarily motorized and are consequently apt to forget what horses can and cannot accomplish.

3. The Horseshoe Personnel. The horseshoe crews are under the technical direction of the veterinary officers. The excellent work accomplished by these teams was largely due to the noncommissioned officer specialists who applied

the knowledge and skill they had acquired in the army training forges. This was all the more important, since blacksmiths drafted directly from civilian life were generally insufficiently trained to shoe army horses properly.

## VII. MEDICAL VETERINARY EXPERIENCE IN THE EAST

In contrast to the experiences of World War I, the dreaded disease of glanders played only a minor part in the Russian Campaign of this war. Although there was still a great number of Russian horses chronically affected with glanders and although this disease assumes serious proportions when it occurs among German army horses, cases of glanders among our horses were very rare. During the Russian Campaign glanders broke out only twice among horses under my care or supervision. On one occasion a few units from several divisions in the Lyssaya-Gora area were infected. Because of difficult road conditions and since I was the nearest division veterinary officer, I was given the task of devising a uniform method of combating the contagious disease. By maintaining strict quarantine methods and through the use of clinical, blood and Mallein tests, it was possible to eliminate the disease in all the affected units within four weeks. On a later occasion, a few cases of glanders occurred in a convoy of replacements from Germany. Again it was possible to isolate the contagion and eliminate it within a few weeks.

Far greater losses were due to the debilitating effects of mange when aggravated by inadequate care and feeding. Since among the horses under my care these matters were properly attended, there were only individual and mild cases of this disease. Early detection and treatment (best results were obtained with $CO_2$ and Durosept) will reduce losses through exhaustion and prevent a further spreading of the mange. On the other hand I have often seen units whose horses were so affected by the mange that their ability to march was seriously hampered. A contagious respiratory disease, often in conjunction with glanders, was common. This disease is characterized by the rapidity with which it spreads and by the fact that its symptom, fever, is not easily recognized. Horses which are worked during their illness will acquire permanent injuries, such as heart trouble, inflamation of the lungs, anemia, or exhaustion. Strictest isolation, complete rest, and properly ventilated shelters constitute the most effective means of treatment. A preventive measure is to avoid as far as possible the massing of horses in transit stations where exposure to contagion is apt to occur. Other contagious diseases occurring during the Eastern Campaign were of minor importance.

Among other conditions, exhaustion, often in conjunction with heart or pulmonary troubles, claimed the most victims.

The main cause was usually traced to overexertion and inadequate food, but sometimes to the consequences of the mange or respiratory ailments. In an earlier section I have pointed out the variable susceptibilities to exhaustion by breed.

Losses due to lameness stayed within bearable limits (see above). On the other hand horses laid up because of saddle sores were rather numerous during operations of the 1st Cavalry Division. Serious injuries of this kind can certainly be avoided even on long marches by proper seating and saddling and by the timely withdrawal and care of horses suffering from any kind of chafing.

## VIII. THE SUPERVISION OF FOOD SUPPLIES OF ANIMAL ORIGIN

Apart from the responsibility of the veterinary officers attached to butcher units, all veterinary officers were responsible for the supervision of food originating from animals. Very frequently units stole cattle and slaughtered it themselves. The failure to examine the meat and a disregard of repeated instructions to the effect that the meat should be served only in small pieces and thoroughly cooked, resulted in numerous fatalities. Motorized units were particularly handicapped, since they were often unable to obtain a veterinary officer to inspect their meat. For this and other reasons, as the war went on, individual veterinary officers

accompanied motorized and armored divisions insofar as they could be made available. In contrast to German cattle, Russian farm stock raised for meat was very seldom affected by tuberculosis. Trichinosis, however, was very common among their swine. Entire units became ill and were out of action for several months after consuming trichinous meat. The pork tapeworm, a parasite now very rare in Germany, was frequently present in Russian pigs, and, when the meat was not properly inspected, its presence was overlooked by our butchers. This resulted in a very considerable rise in the number of tapeworms among the personnel of the units affected, and, while it is not a serious infection in itself, any spread of the infection in an individual frequently results in a serious case of cysticercosis.

## IX. LESSONS AND SUGGESTIONS

The necessity of using horses in Russia, even by modern armies, was quite clearly shown in the course of the last war. Even if a completely motorized army should succeed in obtaining an abundant and continuous supply of vehicles, motors, parts, and fuel, an army would still be largely tied to the few existing roads. The vast areas which in the East lie between the roads will for a time remain accessible only to the infantry and mounted or horse-drawn units and will continue to be their special field of action. Any other

development will remain impossible, if only because the rudimentary road and rail system is inadequate to handle the great quantity of supplies needed for a fully-motorised army, particularly when major strategic or tactical movements or displacements are to be accomplished.

In spite of Hitler's marked opposition to horses, the number of horses serving with our forces in the East grew steadily as the war went on, an indication that the use of horses was a compelling necessity. This conclusion is confirmed by the fact that, although the 1st Cavalry Division was dissolved in the autumn of 1941 by Hitler's orders and converted into an armored division, there were larger cavalry units in existence toward the end of the war than at the beginning.[7] The justification for these units and the lost opportunities caused by the lack of German cavalry forces in the East appear not only in statements of German and Russian military leaders but are confirmed by General Hawkins of the United States Army in "Notes" in the July 1945 issue of The Cavalry Journal, when he wrote, "The Germans did not have any cavalry."

Any responsible planner must take these facts into consideration and avoid being caught unprepared when surprised

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[7] Misleading statement: the increased use of horses and the re-introduction of cavalry was essentially due to the shortage of motor vehicles and fuel. (Mueller-Hillebrand)

by the course of events. Planning must include provisions for personnel, the horses, and all the equipment and fodder needed for the latter. If the practical value of cavalry is recognized, the following passage from Von Seeckt's Thoughts of a Soldier is as valid today as ever and may be of interest. "It is possible to mount hastily trained riders on half-trained horses, and a certain military use can be made of them, but they are not cavalry. Cavalry is not subject to improvisation, and the demands we place upon a mounted force can never be met by a cavalry militia."

1. Personnel. For the performance and maintenance of the horses, intelligent employment, adequate feeding, and painstaking care are of primary importance. To this end it is necessary that even the commanding officers must have a certain understanding of what horses can and cannot do, and that commanders at the regimental level and lower must be familiar with horses and take a personal interest in their care and preservation, bearing in mind that the battle value of a cavalry unit depends on the state of its horses. Finally, the unit commander must not, as was so frequently and regrettably the case, leave the horses to the care of subordinates for whom he had no other use, but he must assign men who have had some experience with horses and who would be likely to treat the horses in their charge with considered care and affection.

In units which were supplied with horses as an emergency measure, this applied particularly to former motorized units, the incidence of sickness and injury among the horses was frightfully high. This was due to the lack of experienced personnel. Even among the infantry divisions, which had the same length of service in the same army, the condition of the horses varied greatly. Along side units whose horses were well fed and in good condition, there were other units whose horses were jaded, exhausted, and mangy. Attempts to help such units by assigning them good horses were almost always in vain; within a short time the fresh horses were reduced to the same unsatisfactory state. Here the decisive influence of the commanding officer was clearly proved. I was often able to observe that, as a result of a change in division or regimental commanders, the horses of a unit would look altogether different within a few weeks. Even in the case of the troops of the 1st Cavalry Division considerable differences could be observed, although originally the condition and training of the men and horses had been the same.

There were units in which the commander down to the youngest driver would sit slovenly with loose reins even during the long marches. Such riding caused the horses to be thrown off balance, since in training the equilibrium of the horse is maintained by tight reins which cause the shoulders,

neck and head to be held high. Slovenly riding produces an unchecked and sloppy gait in horses and results finally in a high rate of lameness, which, in some cases, becomes so serious that a horse has to be permanently withdrawn.

The Spanish Blue Division is not referred to in the above remarks. During their advance in the spring of 1941, they were not allowed any replacements, even when the progress of their advance was threatened. So far as I know, they introduced considerable changes in weapons and equipment while on their way from Germany to the front.

The practice of taking elderly officers from horse-drawn transportation units where they were of little value as commanders and designating them as "officers in charge of horses" seriously impaired the proper supervision over the care and use of horses. These special officers were unnecessary to the commander who had some experience with animals and who had the assistance and advice of a good veterinary officer. (Compare Section VI, 2).

In my opinion cavalry can only be used when they are organized and trained as regular troops in peacetime according to old and proved methods. Although country riding clubs are again blossoming forth everywhere, it is not possible to rely on them in case of emergency. Apart from a lack of military training, the present trend among these clubs displays only

a one-sided interest in tournament riding to the neglect of cross-country and endurance riding, basic essentials in training modern cavalry.

The enlisted men and noncommissioned officers who will be needed for horse-drawn units might be obtained by establishing a large number of riding and driving schools. These schools should be in charge of former officers of mounted units with experience in the East, assisted by former cavalry noncommissioned officers. Civilian trainees should be recruited for them just as soon as authorization has been obtained, and a free eight weeks' training program should be offered.

It would be advisable to attach mounted and horse-drawn sections to the already established motorized units, about a troop of each per regiment, and its personnel trained in riding and driving schools as suggested above. Suitable noncommissioned officers and men from the motorized elements should be assigned to those sections for eight week periods, in order to be trained in the care and use of horses. In this manner it would be possible to build up a reserve of men, who in time of need, would be able to handle horses. In case of war the personnel of the riding and driving sections would remain with the regiment, so that if it were necessary to resort to the use of horses for draft purposes, they could serve as specialists.

2. Horses. As may be gathered from the above, it is not possible to count on obtaining suitable military horses in Russia. Moreover, the trans-oceanic shipment of large numbers of horses requires a great deal of shipping space and generally involves considerable losses. Consequently, in the event of a commitment of forces from the West in the East, horses must be drawn from Western European reserves.

Since the loss of East Prussian breeding areas, suitable horses for cavalry units can no longer be obtained in sufficient quantity in Western Europe. As was made clear above, the average type of native German horse is not tough enough for use in Russia, an inadequacy which is accentuated by the fact that our horses are generally put to work long before they have reached full maturity. As a result, these horses suffer injury to heart, lungs, or legs, in the course of the first two years of such employment, which makes them unsuited to strenuous army service. I consider France as an ideal reservoir for cavalry horses equal to all demands. The possibility of exchanging some of the abundantly available German cold bloods for French warm bloods, which would also be entirely suitable for agricultural purposes, should be examined. In England, where the stock of horses is in the process of reduction, a large number of warm bloods could be made available for the build-up of a western army.

The demand for cold bloods can be met from German, Belgian and Dutch stocks. Particularly desirable, at least for the horse-drawn vehicles of cavalry units, would be the purchase or levy of French Percherons and Postiers, possibly through an exchange of cold bloods.

The registration of horses for possible army use, or in the actual levy, should include the following rules:

a. Unless known to be barren, breeding mares should not be levied.

b. Four year-olds and younger horses should be held in reserve; cold bloods more than eight years old and warm bloods more than twelve years old should not be used.

c. The drafting of extra heavy horses requiring a special diet should not be considered. This includes both cold and warm bloods.

d. To prevent the outbreak of contagious diseases the horses drafted or bought for the army should not be collected in army barracks but should be marched or shipped by rail directly from point of origin to point of destination.

e. The animals should be taken over at the point of origin by personnel familiar with horses.

f. Equipment and supplies should be provided in advance at the point where the exchange is to take place.

g. Arrangements must be made with interested bureaus of agriculture who will take care of the adjustments and exchanges needed to protect the legitimate interest of those who may be affected by forced requisitions.

3. Equipment. The manufacture and stockpiling of the following equipment should be instituted early: horse-drawn vehicles (the farm carts collected at the beginning of the war did not prove satisfactory and soon had to be exchanged for army vehicles); harnesses, complete with reins and bridles, halters, and lines (only breast harnesses should be considered; a snaffle bit for all draft horses is recommended); saddles, complete with cinches and saddle bags; saddle blankets, ropes, halters, chains; cleaning equipment; food and water bags; saddle equipment; standardized horseshoes, calks, and nails; horseshoeing equipment; coal for the forges; veterinary equipment in standard sets; medical instruments, medicines, and bandages.

4. Fodder. The provisions for an adquate supply of horse fodder is essential. So far as I am aware, there is an adequate supply of hay and straw available in Western Europe. To obtain a sufficient quantity of oats, however, imports would probably be necessary. In an emergency the importation of corn might be considered to supplement the oat ration.

APPENDIX D

# EQUIPMENT AND TRAINING OF HORSES-PROPOSALS FOR AN ORGANIZATION FOR SERVICE WITH HORSES

By

Hilmar Hubertus, Freiherr von Seherr-Thoss, Lieutenant Colonel

I. EQUIPMENT FOR MOUNTS AND DRAFT HORSES WITH VEHICLES

When the German Army advanced into Russia in 1941, its horses and horse-drawn vehicles were equipped with so-called general army equipment, which was supplied by the ordnance depots of the armies and by the zone of interior. Armies and army groups established repair shops in their rear areas where they produced many models or horse gear and vehicles for use by the field units. Since it would lead us too far astray to indicate all the models that were tried out, only those articles which were tested and found to be useful in waging war in European Russia are enumerated here.

1. Mounts.

a. Bridle. The watering bridle: three sizes of mouth pieces, with a strong riding halter, also serves as a tethering halter. The mouth pieces, to which the reins are attached, should be fastened to the crownpiece by small carbine hooks with broad springs; small rings with leather supports should be sewn into the crownpiece at the lower end of the cheek sections.

b. Saddle. Army saddle type 25: five sizes with saddlebags; model 34 has front and rear saddlebags adapted to use by the rider. Three pack straps at the rear for the overcoat and blanket of the rider and the rolled fodder bag of the horse.

c. Saddle blanket. Used as saddle pad when folded six or nine times; can also be used for covering the horse.

2. Draft Horses.

a. Double ring Snaffle Bit: for close or loose fastening, has strong crownpiece; driving halter model 43, also used as tethering halter; has oiled leather line for tethering.

b. Breast harness type 25: with adjustable neck strap; breast strap for bringing wheel horses to a halt; back pad and breeching for wheel horses and single horse. The strong, twisted hemp traces have a few links of chain in front and larger links at the rear are covered with leather sheaths and are attached to the singletrees. In the case of six-horse teams, the extension traces for the four front horses are attached to the front singletrees. For use in one horse vehicles there is a wider, well-padded back pad, the Sellet, with strongly sewn rings for buckling on the thill straps which go twice around the ends of the thills; the reins for one horse carts are simple lead lines.

c. Saddle. Army saddle type 25: same as above and used in place of removable back pad when driving from the saddle. It is useful to have the off horses equipped with saddles in order to change horses.

d. Saddle blanket. Same as above used for covering the horse; placed beneath the saddle, folded six or nine times, when driving from the saddle, or under the back pad of horses pulling one horse vehicles.

e. Reins. Crosslines: inside lines are buckled to outside lines in order to adjust the pulling power of horses of different temperaments. The same reins with longer handpieces are used for the lead team when driving with four horses and for the swing team when driving with six horses. Since driving from the saddle zeans an additional lead on the horses, particularly on muddy ground, it should only be done in the case of horse-drawn guns, where the crews are mounted on the limbers, and horse-drawn telephone construction vehicles.

It is easy to learn to drive four horses, particularly when the horses are covering long distances daily and are consequently quiet. The assistant driver, necessary for each vehicle in a train, can be trained to drive by riding and handling the lead team while the main driver controls the wheel horses from the box.

3. Pack Animals.

a. Pack saddle type 23: especially for pack animals with mountain troops; has the front and rear saddle gear necessary in mountainous country; has several times folded

saddle blanket which is also used as a covering for the horse.

b. Packsaddle type 33: packsaddle with special frame.

In muddy periods and during periods of positional fighting when the supply trains are located further to the rear, it is easier to use the horses as pack animals and relieve them from pulling the additional weight of the vehicles. Any German army saddle can easily be transformed into an emergency packsaddle with the aid of strong straps and baskets. It is necessary to divide the load equally on either side of the horse and see that the pack does not chafe the horse. The saddle blanket must always lie between the horse and the pack. Since any riding horse or draft horse can be used as a pack animal in an emergency, all bridles and harnesses must be constructed so that they can be adjusted to fit all sizes of animals.

4. Vehicles. The German horse-drawn field vehicles, with the exceptions of the small No. 3 and the light No. 1, were far too heavy for Russian terrain which was usually unfavorable. For that reason a great variety of vehicles were built in the rear areas of the armies and army groups and forwarded to the combat units. The Russian army vehicle,

when available from captured materiel, was preferred by the troops and proved to be the best substitute. While I was riding and driving staff officer of the Eighteenth Army, Army Group North, from 1942 to 1943, I had a great number of these vehicles built at Riga and incorporated in them a few improvements of my own. The thirty infantry divisions for which I was responsible were exceedingly satisfied with this model.

The chief requirements of a horse-drawn vehicle for use in Russia are listed below:

a. Not too heavy, a capacity of 1,000 pounds is sufficient.

b. Sufficient road clearance to prevent getting stuck in muddy terrain.

c. Sufficient maneuverability to turn around easily on narrow roads and corduroy roads in the swamps.

d. Hinged axle to prevent its breaking on rough roads.

e. Front and rear wheels of the same size to facilitate the supply and exchange of wheels; broad rims to prevent them from sinking into the mud.

f. Wagon tongue nine feet long is adaptable to all sizes of horses. At the front of the shaft is a strong ring with two chains and hooks that snap into the breast straps of the wheel horses' collars.

g. Stationary singletrees, adjustable by crosslines to meet the requirements of individual horses, are attached to the swinging doubletree hooks. The length of the singletrees should be enough to fit all animals even the heavy cold bloods.

h. Strong ring at the tip of the wagon shaft to which is attached the doubletree and singletrees for use by a four-horse team.

i. The most suitable sized wheel is that of the Russian army vehicle.

j. The right and left hardwood shafts must be strongly joined and riveted to the permanent cross-piece by metal reinforcements. The width of the shafts must be suitable for both warm and cold blood horses.

The Russian army vehicle is too heavy to be drawn by a single horse. If a single horse is to be used, it is advisable to build a smaller vehicle with only half the load capacity, 500 pounds. The Germans also used other types of one horse vehicles, for instance, the Pleskau model, manufactured in a town of that name in the rear area of Army Group North. All the vehicles built by the Germans had one or more drawbacks, and none were ever as good as the Russian army vehicle.

The Germans also used two-wheeled carts for luggage, ammunition, and infantry machine guns. Their road clearance was too low. All one horse carts used in Russia must have large, broad-rimmed wheels. If the cart is not well balanced it will cause the horse's back to become chafed. Sleds must

not be too heavy, and if built too high they will overturn on uneven roads. Since the many narrow paths of the Russian forests are too wide for two horse carts, the single horse sled was best. One horse sleds must have a capacity of 500 pounds and be suitable for being pulled by two or three horses harnessed in line. Most German sleds were too heavy for one horse, and it was too difficult to rebuild them for use with two horses; Russian roads were too narrow anyway.

Appendix K, Section II contains an extract from the Manual for Instructors in the Service with Horses which was issued during the war on the basis of experiences acquired in the East. It deals exhaustively with the employment of riding and draft horses, their equipment, and vehicles.

## II. MAINTAINING THE MOBILITY AND STRIKING POWER OF COMBAT UNITS

1. Service with Horses. When the Russian Campaign started in 1941, only those German horse-drawn divisions indicated in the mobilization plan moved into Russia. In these units there were a sufficient number of officers, noncommissioned officers, and enlisted men fully trained in service with horses. Many of them had been farmers; in Germany farmers had always worked with horses and are still working with horses today. The care of horses and

the maintenance of horse-drawn vehicles and equipment was no problem for them.

This picture gradually changed as the personnel trained in service with horses became casualties or were transferred to other units, particularly to the infantry. Everyone who could handle a rifle and could stand on his feet was transferred to the infantry, since it had suffered the most losses. Many motorized divisions in order to move ahead, particularly during the spring and autumn rainy seasons, when the supply service deteriorated because of bad roads and the inferior railroads were unable to furnish motor vehicles and fuel, began to use Russian horses and vehicles. Divisions which formerly had been entirely motorized now had hundreds of horses. Since only the senior officers understood anything about service with horses and since the younger officers, noncommissioned officers, and enlisted men, most of whom came from cities and industrial areas, seldom had any knowledge of horses, the mobility and striking power of the combat units suffered seriously.

In 1942, twenty-one Luftwaffe field divisions were organized from air force ground personnel and employed as infantry divisions, each equipped with brand new vehicles, equipment, and horses. At that time, in my capacity as staff officer for riding and driving at Eighteenth Army Headquarters

near Leningrad, I had five such divisions in my army area. Ignorance of service with horses was very great in all ranks from the division commander to the enlisted men in the infantry, artillery, and supply trains. Once, for instance, the chief of staff an air force field corps telephoned me in the middle of the night at his wits' end, because the artillery of one of his divisions, which was required to make a change of position for tactical reasons, was unable to do so, since the men driving from the saddle, although able to travel at a snail's pace over good roads, were unable to move over snow-covered fields and forest paths or across country. Similar cases occurred in the zone of interior or occupied areas when newly organized infantry divisions were sent to Russia by rail after only a few weeks of training.

Until 1941 the Inspector of Riding and Driving in the Army High Command, with the rank of division commander, supervised only the riding and driving program in the Replacement Training Army. He traveled continuously through the zone of the interior to the Wehrkreis riding and driving schools and to the replacement training units which were being equipped with horses. Under his direction through the corps headquarters, the commanders of the Wehrkreis riding and driving schools supervised training. The schools had

been continued during the war as a precaution, because the training of remounts was continued and also because it was essential to support the continued breeding of good horses.

The schools trained young horses for the replacement units, with the exception of the cavalry, artillery, and transportation units which trained their own remounts even in wartime, and conducted short courses for riding and driving instructors. At first the training period was three months long, but later it was shortened considerably. Until 1941 the training of horse-drawn units was carried out in accordance with the regulations used in peacetime. However, the instructors made the mistake of following too closely the antiquated methods, which were not at all suitable in war and lost much time during the ever-shortening training periods, without ever reaching the specified objectives. The effect of these errors was immediately felt by the infantry divisions which were being revamped. As a consequence of these shortcomings and of the growing losses in horses, vehicles, and equipment by the field forces, the service with horses was more strictly organized in 1941. The authority of the Inspector of Riding and Driving was extended to cover the Field Army and especially the newly organized units. An experienced, special senior staff officer for riding and driving was assigned to every army

including the panzer armies. This officer, who had been specially trained in an army riding and driving school, traveled throughout his army area in order to supervise the service with horses and took advantage of any lull in combat or the rest period of a unit to hold short officer instructor courses on riding and driving. In every division a training officer, whose selection was advised by the special staff officer, supervised the service with horses. The special staff officer gave courses in riding and driving to instructors, feed supervisors, and the horse police. I, for instance, organized among my staff an army school for service with horses in which my assistant conducted short courses of three to fourteen days duration. These courses did not lay as much stress on riding and driving as they did on service with horses: on the maintenance of mobility and striking power of the combat units by learning the ins and outs of horse management in all its aspects-including the care of horses, vehicles, and equipment. The army staff officers for riding and driving frequently changed places with the commanders of the Wehrkreis riding and driving schools in order to make use of their combat experiences in the Replacement Training Army.

The Wehrkreis riding and driving schools offered a continuous program of four weeks courses in accordance with

the Directives for Riders and Drivers in the Replacement Training Army. One officer and fifteen noncommissioned officers were continuously available as instructors for newly organized units. All the training detachments of the Wehrkreis riding and driving schools were by the order of the Inspector of Riding and Driving trained by me in fortnightly courses in accordance with Directive for Riders and Drivers in Newly Organized Units.

The Inspector of Riding and Driving published an abbreviated training plan for the riding and driving training in the Replacement Training Army, which, although it was a three months course, was arranged in such a way that it could be shortened or lengthened at will. The two weeks training plan for new organized units could also be lengthened if desired. These two training plans were published as a manual for the Replacement Training Army and the Field Army. The text was intentionally restricted to combat matters. Riding with a curb bit, although mentioned in the manual,[1] is not desirable, since in combat it proved preferable to use a snaffle bit.

2. Selection and Training of Personnel. Although for service with horses it was desirable to obtain men who had been farmers and had experience with horses, the training

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[1] Training Courses for Riders and Drivers in the Replacement Training Army and in Newly Organized Units. See Appendix F.

plans were prepared in such a way that any physically fit factory worker, forty to fifty years of age, who never in his life had anything to do with horses, could learn the essential facts about service with horses in a short time. It is my experience that it is very important to make training sportsmanlike and interesting, for this awakens interest and anthusiasm. This is really the chief secret in any training of men. The best training method is to explain how things are done both correctly and incorrectly.

III. REMOUNT TRAINING

1. Organization. In peacetime the Wehrkreis riding and driving schools employed good teachers, and the young army mounts were trained for one to two years before they were handed over to the field forces. The commanders of the schools also supervised riding and driving training in their military districts except for the training of men and horses of the cavalry, artillery, and transportation services which did their own. Animals intended for the horse-equipped infantry, signal, and engineer branches were trained for one year. The training of officers' horses lasted two years. Three year old animals were bought in the open market by the remount purchasing boards of the Inspectorate of Riding and Driving from breeders who specialized in raising army remounts. They were kept for one year on large army farms with

extensive pastures and good winter stables until turned over to the field forces at four or five years of age. In peacetime and during the first years of the war, the training program of the young horses was determined by the riding and driving regulations. There was a pronounced difference between the training of mounts and draft horses.

Horse trainers for the cavalry, the artillery, and the transportation service were given one and two year courses at the cavalry school, later called the Army Riding and Driving School. The school also had shorter riding and driving courses for instructors from the infantry, signal, and engineer services. Remount training at the Wehrkreis riding and driving schools was changed during the war, and all horses were trained for both riding and driving, since at any time a mount might have to pull an ammunition or supply vehicle on bad roads or across country. During the war the training periods were generally shortened to either three or six months duration. Losses of horses, through enemy action but more particularly through ignorance in the handling of horses, were great, and it was often necessary to transfer young horses after only a short period of training to replacement units where they were used in the training of riders and drivers. Replacement units, in turn, had to hand over their older horses to the

field units. Later, young horses were delivered directly to newly organized units after only a few months of training. The cavalry, artillery, and transportation replacement units continued to train their own horses at least partially during the war.

During the war, particularly during the last two years, all horses purchased by the remount boards were two years old and were transferred to the Wehrkreis riding and driving schools at three years of age or even younger. Until that age they remained at the remount depots, although some of the depots lacked sufficient food. During the training period the horses received only half the amount of fodder allotted in peacetime.

2. Horse Training Objectives.

a. Mount. The trained mount must stand still and let the rider mount and dismount. It must not want to stay with other horses or in the stable. The horse must be trained to carry the rider with the reins at ease and to move at a slow trot on roads, paths, and across country always obeying the directions of the rider. It must learn to move in a march column one behind the other, and in formation or alone, to travel through deep, soft soil, forests, underbrush, through rivers, brooks, and ditches, and up steep slopes. Cantering is learned in formation with

loose reins in open country. The gallop and marching in formation on roads and paths is learned automatically as needed. If more than three months or six months training time is available the speed of the gallop and the trot is increased. The young horse while being trained to maneuver will learn to carry more of the rider's weight on its hind legs which will enable its front legs to withstand fatigue longer. It is unnecessary to teach jumping since it is seldom done in wartime, although it is useful to let horses jump small obstacles while the trainer is holding an allonge. The horse must be trained not to be gun-shy, and the frequent blank firing of carbines and machine guns in the immediate vicinity is part of the training program.

b. Draft Horses. The draft horse must be trained to pull at a slow pace an average load, in a team of two horses controlled from the driver's seat or in a six-horse team when driven from the saddle, on roads and paths, through flat or rough terrain, through ditches, water, and mud without becoming unruly. It must learn to start pulling a load quietly and easily in order to get the vehicle moving. The training is carried out in strict accordance with German driving regulations in the following order: double allonge; lengthened traces; pulling a sledge; vehicles on roads and paths; vehicles on soft ground and cross-country with gradually increasing loads.

As soon as the horse will stand the touch of the double allonge on its legs and not kick against it (if there is any kicking it will soon stop), the horse is trained to bear pressure against its breast, which is accomplished by having a few men pulling on long ropes. The horse is then taught to set a load in motion and pull it forward at a slow pace. It is then hitched to a vehicle in a team of two horses and driven from the driver's seat; later in a team of six horses it is driven from the saddle. The training is by individual horse and accomplished in accordance with the principles of the German driving regulations. These regulations have stood the test of war in every respect for the short-term training of young horses.

Trained in this manner every horse will fulfill his role. It is essential that a good mount, perhaps the unit leader's horse or even that of the commander, be capable of being harnessed in an emergency to an ammunition or supply vehicle. For that reason alone, all young horses should be trained for both riding and driving.

Every horse trainer should bear in mind the aims of riding and driving training in war and master the ways of attaining them. During the war I employed the short-term training method for periods of three to six maths with hundreds of remounts in my Wehrkreis driving and riding

school. None of the horses failed to meet the requirements of riding and driving training whether they were rough, young warm or coldbloods or even young or older purebred race horses.

Since there were no good male riders and drivers left in the Wehrkreis riding and driving schools during the last two years of war, women were employed. Since I employed only such women as were already good riders, they only had to learn horse training, driving, and harnessing. The women worked under the supervision of good male riding and driving teachers, and even alone. Among my thirty female trainers, there were some who rode and drove far better than many of my former riders, and on the whole I fared very well with them.

## IV. PROPOSALS FOR AN ORGANIZATION FOR SERVICE WITH HORSES

Although every army of the Atlantic Pact states will be motorized in peacetimes, military operations in European Russia will probably require the employment of horses. Since the preparations for the wartime use of horses must be made in times of peace, I propose the following suitable measures to accomplish that purpose:

1. <u>An Organization for Service with Horses</u>. In every country an inspector of riding and driving with the rank of general should be appointed. He would supervise his nation's riding and driving schools, direct the selection and training

of personnel, the procurement of horses in close cooperation with the country's riding and driving teachers, and obtain the production of equipment for horses and vehicles. He will need the following personnel on his staff: a chief of staff and an adjutant particularly as a traveling companion; one specialist each for riding and driving training, for the procurement of horses, for the procurement of personnel, and for the production and testing of equipment. He must be given adequate command authority to accomplish his assignments. In war he would supervise service with horses in the field forces and in the replacement training army.

In each military district of a nation, a riding and driving school would be organized to train the personnel and horses of the divisions which are stationed in the military district. For each division there would be in the school at least one troop for horse training and one troop for personnel training.

The commander, with the rank of colonel, of a military district riding and driving school would conduct the training at the school and supervise the execution of the directives of the inspector of riding and driving. See chart on page 318. In war he would serve as the staff officer of riding and driving at an army headquarters and supervise service with horses traveling extensively in the

army area. An assistant staff officer would conduct at army headquarters short courses on service with horses of three to fourteen days length whenever the combat situation permitted. In the zone of interior the commander's position in the school would be filled by the senior staff officer, a lieutenant colonel. The two officers would exchange places every six months in order that the lessons learned from combat could be made use of at the school. It would be useful to have a veterinary officer to assist the officer conducting the service with horses courses at the army headquarters.

The head of the school's two training troops would be a staff officer with the rank of major. During a war he would supervise service with horses at a corps headquarters and be the officer in charge of the corps' horse training program. The head of each training troop in the school would in war become the officer in charge of a division's horse training program and supervise service with horses within the division. Each officer would be replaced at the school by a suitable substitute from his troop. The school's training officers would be suitable as the horse training officers of regiments and independent battalions and could supervise service with horses in such units if they were equipped with horses. They would be replaced in the riding

and driving schools by other suitable officers either from the school or from the replacement training army. It is also advisable to interchange at half-year intervals the horse training officers of the corps, divisions, regiments, and independent battalions of the field forces with those in the replacement training army in order to make combat veterans available as instructors in the schools in the zone of interior.

PROPOSED ORGANIZATION FOR SERVICE WITH HORSES

An Inspector of Riding and Driving

One Riding and Driving School in each Military District

| Personnel in Each School: | Alternate Position in Combat: |
|---|---|
| Commander | Staff Officer for Riding and Driving at an Army Headquarters |
| Battalion Commander | Staff Officer for Riding and Driving at a Corps Headquarters |
| Troop Commander | Division Horse Training Officer |
| Troop Officers | Regiment and Battalion Horse Training Officers |

2. Selection and Training of Personnel. Each battalion will send two officers and each company or battery of a division would send three noncommissioned officers and ten to twenty enlisted men for the long term courses, the duration

of which would be determined by the duties to be learned, to the riding and driving schools of the military districts. It is advisable to choose men who were members of rural riding and driving clubs, who come from the farmer class, or other circles which work with horses. These men must not be kept away too long a time from the regular training period of the parent unit. Courses of two to three months, according to the directives to be found in Appendix F, are sufficient.

This program will produce enough officers, noncommissioned officers, and enlisted men of all branches trained in service with horses for emergencies, and they can be employed whenever units are to be equipped with horses on the outbreak of war or may equip themselves with horses requisitioned in the theater of war.

Qualified line officers may be called in to lecture to personnel who may be intended to serve as army or corps riding and driving staff officers or for division horse training officers. These are the officers who are to be given a more thorough training in case of a possible war. Courses lasting from a fortnight to a month will be sufficient if the student officers have enough elementary knowledge of service with horses. Courses in service with horses can also be held for unit leaders of three to six days duration

and for unit commanders of eight to fourteen days. They would thus have some knowledge that could be passed on to troop commanders in case of war. Schedules for such courses can be found in Appendixes G and K.

3. Requisitioning and Training Horses. In each military district of a nation, there would be a senior officer with the rank of colonel who as a horse expert will make a preliminary inspection and registration of horses. He would be assisted by a veterinary officer and the necessary clerks. He would travel regularly through his district and register and classify all horses as mounts and light and heavy draft horses. Any sale of horses which had been classified for military purposes would be reported to the registration officer[2] of the military district, and, if the sale had been made outside the district, the name and address of the new owner would also be reported. In this case the information would be forwarded to the military district where the horse was located. Such sales would be checked for correctness by the registration officer. The registration officer must be well acquainted with the horse requirements of a wartime army.

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[2] The title, officer for preliminary inspection and registration of horses, has been shortened to registration officer.

In war it is advisable to have a registration officer at each corps headquarters of the field forces who under certain circumstances could buy horses in the corps' area and make an immediate allotment of them.

I must earnestly advise against requisitioning cold bloods most of which are not hardy enough to withstand battle conditions in European Russia. They need too much hay which causes supply difficulties, and, although called pace horses, they cannot trot long distances, or, if obliged to do so, will drop out in large numbers. Of the European cold bloods, only the French-bred Postiers are fit for military purposes in war. They performed excellently for the German Army in Russia. They have sufficient blood, are not too big and heavy, and can trot long distances without getting tired too quickly.

In order to advance horse breeding among the member states of the North Atlantic Pact and to train horses for use by the combat arms, it is advisable to organize several remount purchasing boards, each serving several military districts, at the headquarters of each inspector of riding and driving. The board should consist of a senior line officer as horse expert, one assistant officer, one veterinary officer, one paymaster, and one clerk. The boards would

annually purchase as many three year old horses as are necessary to replace the horses in the riding and driving schools.

Each country must have army remount depots under the command of experienced senior line officers. The depots would be able to stable and feed the newly purchased animals at all seasons of the year. It is advisable to assign the remount depots to the control of the inspector of riding and driving.

After a year's stay the young horses, now four years old, would be handed over to the riding and driving schools, where they would be thoroughly trained for a period of one year, but during war for only a few months. At the end of the training period those needed at the riding and driving schools would be retained and the remainder sold to the public and registered in the appropriate military district. The older and well trained mounts and draft horses would also be sold and registered for possible requisition. Prices at which these horses are sold must be adapted to market valuations in each country and must not be placed too high or the sale of them will be difficult.

During a war horses could be supplied to replacement training units in the zone of interior or to newly organized mounted or horse-drawn units of the field forces. Trained horses as replacements could also be supplied.

4. Stockpiling Equipment for Horses and Vehicles.

Since the armies of the Atlantic Pact states will be largely motorized and have scarcely any horse-drawn or mounted units, and since the riding and driving schools will not likely have been able to store sufficient equipment for horses and vehicles for use in case of hostilities nor will there be sufficient equipment available for purchase, it would be advisable to organize in each military district of the member states large equipment depots under the command of experienced senior line officers. These depots would stock equipment and vehicles which could be sent at any time to any place. In such cases the materiel would be forwarded to army equipment depots and from there to the units of the field forces which are to be equipped with horses.

The riding and driving schools and those units which are already equipped with horses and horse-drawn vehicles would receive their supplies from these equipment depots. Innovations in equipment must be thoroughly tried out in the riding and driving schools before they are manufactured in great numbers and stored in the depots. If officers conducting the registration of horses find some particularly efficient and serviceable piece of equipment for horses or vehicles in their military districts, they should register it for future use.

The organization and activities of service with horses described here are only proposals. They are, however, in my opinion, feasible proposals for every Atlantic Pact nation and will accomplish the desired objectives, which is the maintenance of mobility and striking power of the combat forces through a proper organization of service with horses.

In conclusion, I must urgently warn against the employment of veterinary officers either as instructors of personnel or trainers of horses; they should not be authorized to select personnel for service with horses or purchase horses for the field forces. They should not be used as trainers in the riding and driving schools, as chiefs of remount purchasing boards, remount depots, or equipment depots. They should not be appointed as registration officers to make preliminary inspections of horses, nor as inspectors for riding and driving, nor as staff officers for riding and driving in a field army, a corps, or a division, nor as regimental horse training officers. All these positions must be filled by experienced and sufficiently trained line officers.

Motorized armies will have only a few veterinary officers, and these will be urgently needed in their medical field. Particularly in war, veterinary activities are spread

over a large area. Horses will not all be nicely stabled, but will be widely scattered mostly in inferior accomodations, where they will suffer many injuries, chiefly from the men who handle them and who understand nothing about horses. Treatment will require much time because of the great distances to be covered. A reserve veterinary officer, who has been recalled to service, knows too little of the requirements of the troops ever to be employed in training or supervisory positions. Nor would he be capable, as a chief of an army remount depot, of carrying out an efficient distribution of horses supplied to an army area. When veterinary officers are employed for training personnel and horses, the interest of troop commanders and unit leaders is undermined, and out of laziness they will leave everything to the veterinary officer.

I shall give two examples as warnings:

A division veterinarian chiefly occupied himself during a lull in combat in Russia by giving riding lessons to the officers of the division staff, because he enjoyed it more than applying himself to his professional duties. He did not know that the horses of one unit in his division had caught a contagious disease. Since it was discovered too late, it spread to all the horses of the division and the division lost its mobility for a long period. If he had

visited frequently the units of his organisation and had left riding lessons to the division horse training officer, a line officer, he would have maintained the mobility of his division by taking early steps to arrest the contagion.

Another veterinary officer, who was chief of an army remount depot, supplied light draft horses to a heavy artillery battalion, horses which were hardly able to pull the heavy guns because of the bad terrain conditions in Russia. If this position had been filled by an experienced line officer, the blunder would not have been made.

# APPENDIX B

## PACK ANIMALS

By

Dr. Georg Gaggermeier

I. THE IDEAL PACK ANIMAL

In spite of the tremendous progress made in the field of motorization, there are still areas which can be traversed and occupied only with the aid of horses. Such areas include mountains which have not been opened to traffic or if so inadequately, the extensive marshy regions and the arctic tundra where there are no roads at all. Some areas are impassable in the rainy season, although accessible enough at other times. The extensive, continuous forests with underbrush remained closed to motor traffic until roads were cut through them. In terrains of these kinds, pack animals became man's indispensable assistant, insuring the delivery of essential supplies.

The qualities to be looked for in pack animals are many. They should be of a quiet disposition, easy to feed and care for, insensitive to changes in temperature, and relatively immune to diseases. The ideal physical structure of a pack animal includes: a short, straight, strong and slightly sloping back; long, narrow withers but not too prominent and fleshy; a short loin section and a deep, ovaled but not too barrel-shaped chest; strongly developed hindquarters and a slightly sloping rump; muscular limbs with strong bones and joints and firm hoofs suited to climbing stony slopes. Sure-footedness is absolutely essential for animals used in

the mountains. Sharp-angled hocks are not a fault in pack animals. At the point between the shoulders, the withers should not be more than sixty-two inches from the ground; the ideal hight is between fifty-four and sixty inches.

An animal with a nervous disposition is not suitable. An animal with a long back, perhaps including a long loin section, and with the back and pelvis too far apart is undesirable. A sway back, long legs, narrow chest lacking in depth, and a pot belly are all pronounced faults, as are flat, thin hoofs of poor quality horn. A barrel-shaped chest is unsuitable because it affords too little support for the saddle, which develops a tendency to slide. Overdevelopment of the hindquarters is in itself not a serious fault. A large animal measuring sixty-two inches at the shoulders is not suited for carrying heavy loads in mountainous country. On rocky ground the tall horse is easily thrown off balance, since its center of gravity is relatively too far from the ground. A large animal offers the further disadvantage of being difficult to load, a task often beyond the strength of a single handler. Additional helpers are unavailable in combat.

II. TYPES OF PACK ANIMALS

In this section the types of horses and mixed breeds which meet the requirements of pack animals and which proved their value in the Russian Campaign are discussed.

The most suitable, all-purpose pack animal is the mule, the offspring of a jackass and a mare. This hybrid approaches most nearly the fulfillment of the requirements for hardiness, easy feeding habits, sure-footedness, and endurance. Its only disadvantage is its small hoofs, an occasional handicap in swampy terrain. Its frequently apparent distrust of man and its resulting contrariness can generally be traced to poor treatment. A quiet, considerate handling of mules is even more important than with horses. With the one exception mentioned, mules proved satisfactory in every kind of terrain and under every climatic condition.

During the Russian Campaign almost every type of mule bred in Europe was utilized, but most of them were of German, French, or Italian origin. The mules which had been imported from America, Kansas, Missouri, Nebraska, and Illinois, at the time of the organization of the 1st Mountain Division were also satisfactory. The latter were imported as young animals, generally three to four years old, and assigned to the division when they were between four and five years old. The firm of Wohlers in Hamburg imported the

required types and delivered them in good condition. Plates 1 and 2 show mules of North American origin, the type of pack animal that comes closest to the ideal.

In the case of the French Poitou mule, bred primarily as a draft animal, a careful selection was necessary, but the animals which were chosen proved very satisfactory for carrying heavy loads. The somewhat more dainty Italian mule could be used for every purpose. The mules bred in Germany after 1936 to the end of the war, providing a careful choice had been made of the parent animals, proved fully satisfactory. The same statement would apply to mules of Spanish origin.

It is important that pack animal drivers remain calm and use good sense in handling mules. The younger these animals are when they come to trained handlers who treat them properly, the easier it is to accustom them to contacts with other men. This fact was strikingly demonstrated in the case of Italian mules. Since Italian mules are treated with little consideration when young, they proved the most difficult to handle. The choice of mule handlers must be made with particular care, if serious trouble is to be avoided.

With the possible exception for use in high alpine regions, the donkey and the hinny, a cross between a stallion and a she ass, are least suitable for pack animals, since

their pace is so slow they cannot keep up with moving troops. These animals are seldom available in quantity.

Several breeds of horses are suitable as pack animals and are bred for that purpose. They proved entirely satisfactory during the Eastern Campaign. Among these breeds the Hafling occupies first place: a sturdy horse, fifty-six to fifty-eight inches high, a broad, deep chest, low withers, a steep, well-divided rump, and strong, sinewy, and well-spaced legs. The particular characteristics of these generally chestnut brown horses are the short, wedge-shaped heads with small, mobile, mouselike ears and the lively, big eyes. They are noted for an almost inexhaustible endurance in the face of climatic extremes, toughness, longevity, and long stride. Their strong build enables them to carry heavy loads. Their particularly valuable qualities of good-naturedness and good will makes it possible to entrust them to men with little experience in handling horses. See Plate 3.

The breeding ground of the Hafling, apart from its original homeland, is the highland plateau northwest of Bolzano, extending into the Austrian and Bavarian Alps. The breeding of these animals has declined, since its chief buyer, the German Wehrmacht, no longer exists. It would be very regrettable if this excellent mountain horse, valuable also as a draft horse for light vehicles, should disappear altogether.

TWO TYPES OF PACK MULES

PLATE 1 PLATE 2

HAFLINGS, THE MOST POPULAR ALPINE BREED USED AS PACK ANIMALS

PLATE 3

Another excellent, sturdy pack horse suitable for medium and lighter loads, depending on the size of the horse, is the Bosnian, which has a considerable admixture of oriental blood. The Bosnian, forty-eight to fifty-six inches high, has a muscular neck, with pronounced and often high withers, a strong, broad, deep chest, sloping shoulders, steep rump, and for its size a long stride. The positioning of the haunches and hind legs are often rather cowlike in appearance, but this tendency if not too pronounced is not a fault. Its geographic distribution extends from south of the Save and Danube rivers to southern Yugoslavia and extends into Bosnia, Montenegro, the Sanjak, Albania, Bulgaria, Macedonia, and Greece. The important thing is that it originated in mountainous country and has become famous for its hardness, frugality, and nearly inexhaustible endurance. Two types are distinguishable: the predominant nobler and lighter type and a heavier, coarser type.

The same valuable qualities are found among the Huzules, a small, tough, industrious mountain horse, fifty to fifty-six inches high, which can get along on very little food and which is raised in the Carpathian Mountains west of Cernaut. The Huzule proved eminently suitable for lighter loads. A strong back and a compact loin section made the Huzule an admirable pack horse. Because it is somewhat

undersized, an attempt was made in Hungary in the period between the two world wars to increase its size and weight by breeding Huzule mares to Hafling stallions.

Another horse which possessed all the necessary qualities for a pack animal and which was a favorite among our troops is a native of northern Europe, the Westland or Fjord horse of Norway. See Plates 4 and 5. One of the oldest European breeds, it is seen in varying shades of dun. It has a mane that stands erect along its neck, has a dark stripe along its spine, and has more or less pronounced zebra stripes on its legs. In height it varies between forty-eight and sixty inches. The Westland horse is hardy and unassuming, has great endurance, and is a willing worker. As a pack horse it is often handicapped by an excessively short and soft back and by poorly constituted, occasionally flat hoofs. These defects can be eliminated through a more careful selection of stallions and by proper care during the growing years. The horse is an excellent and long-winded climber. For use as pack animals a careful selection must be exercised and those which have faults must be culled.

In the northern valleys of the Caucasus there is another alpine breed which is suitable both as a riding horse and a pack animal in mountainous country. The Kabardinian horse has an average height at the shoulders of fifty-eight to

sixty inches and is characterized by its deep, broad, often barrel-shaped chest, its raised, long withers, its endurance, frugality, and outstanding climbing qualities.

Among other small horses which, if properly selected, can be used as pack animals without much training, is the Mur Island horse, raised in southeastern Styria on Mur Island and in Burgenland. Before they can be used in high mountains, however, the Mur Island horses must receive special conditioning.

All of the horses mentioned were used to good advantage in the East. Naturally enough, the horses which are normally bred in alpine regions should be considered first for service in mountainous terrain, for these animals have already accustomed themselves as they grew up to difficulties which would be serious handicaps to other horses.

In this connection an institution should be mentioned which proved valuable in training pack animals: the horse raising establishments of the Austrian Army, which were taken over and expanded by the Germans in 1938. Young foals, chiefly Haflings and mules, purchased by the remount boards when about nine months old, were sent to these special farms where they remained until delivered to the German Army when four years old. During this period the young animals spent two summers in the high mountains where they were trained for

service with mountain troops. Preparatory training saved the combat units from having to take time to acclimate the young animals to mountain conditions. Additional training consisted of getting the animals accustomed to the packsaddle and loads and to train them to make quiet, orderly ascents or descents on mountain trails in single file.

When the need is great, an operation on a plain may be supported by the temporary use as pack animals the small Latvian and Finnish horses and selected specimens of the little Russian panye horses. When these horses are used, a careful and expert selection is very important, if excessive losses later on are to be avoided.

In order to select proper pack animals, it is important to know in advance the kind and weight of loads they are to carry. The weight of the load is important, because even the strongest horse will not last long if overburdened.

## III. EQUIPMENT FOR PACK ANIMALS

Very special attention must be given to pack animal equipment, for much depends on its suitability. The most important item of equipment is the packsaddle which must be fitted to each animal properly and its fitting frequently checked. The horse blanket, folded six times, serves as the padded base for the saddle. In order to fit the saddle correctly,

the animal must stand on level ground with its weight evenly distributed on its four feet. Two men place the saddle in position, but without the blanket, while a third man holds the animal's head in a normal position. The saddle pad must not extend over the shoulder blades. The weight of the saddle must be evenly distributed, resting flat on both sides of the back with at least four fingers space between the lower hollow of the saddle fork and the animal's back. Particular care must be taken to leave no space between the saddle pad and the animal's back, using if necessary extra padding. The withers must remain free of any pressure.

If factory made packsaddles with adjustable frame ribs are available, such as the German mountain troops' packsaddle 23, the frame ribs should be carefully adjusted to the animal's body. The new designs of packsaddle 23 came into two sizes and each weighed approximately 70 pounds. See Plate 6. The frame in each model was the same and could be fitted to the animal's back by means of adjusting screws. The saddle pads were available in two sizes, for either large or small animals. There were three types of carrier boards, for normal, slightly concave, and soft backs.

Experiments were conducted to reduce the weight of the support frames of the packsaddle through the use of lighter material, such as duralumin. These were discontinued during

PLATE 4: THE WESTLAND OR FJORD HORSE OF NORWAY

PLATE 5: THE WESTLAND OR FJORD HORSE OF NORWAY

PLATE 6: GERMAN ARMY PACKSADDLE 23 AND MOUNTAIN CART

the war but ought now to be resumed. The use of horsehair instead of short animal hairs would permit a considerable reduction in the weight of the saddle pads. Horsehair pads do not require such frequent renewal and also reduce the number of saddle sores, since the horsehair pads do not become as compressed and lumpy as quickly as others.

The front and rear harness must be properly fitted and adjusted to the packsaddle. The breast strap, which is on line with the shoulder joints, prevents the packsaddle from sliding backwards when the animal is ascending a hill. On level ground it should be possible to insert a fist between the strap and the animal's body. The breeching strap should pass about a hand's width below the rearmost bulge of the rump (ischium) and should always be kept fairly tight. If it is not the pack will slide forward when the animal is walking over level ground.

A makeshift saddle can be made quickly from easily available materials by any able handicraftsman. This saddle is suitable for carrying side loads only and not top loads. It was often used during the Eastern Campaign, either because units were not equipped to use pack animals when suddenly required to do so in mountainous country as in the Carpathians, or when unforeseen conditions in the plains compelled their use. In such cases experienced non-commissioned officers were detached from mountain units to assist in the instruction.

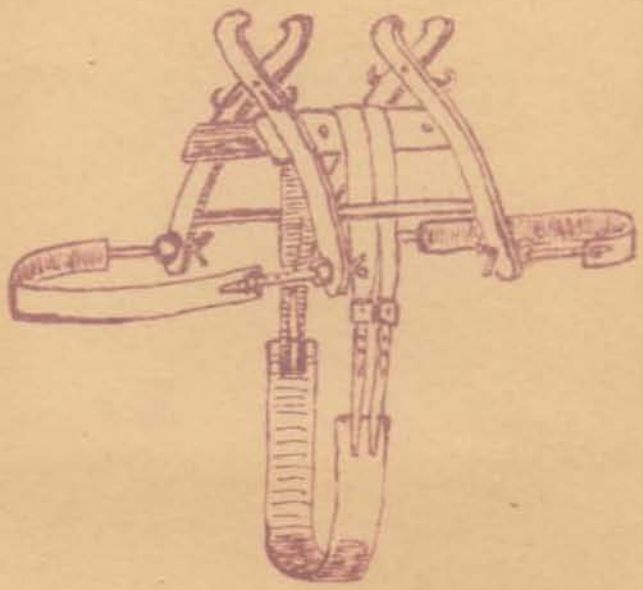
An improvised packsaddle (See Sketch 1) is an imitation of the wooden packsaddle commonly used by peasants. It consists of a front and a rear section, or pommel and cantle. The hardwood frames are bent to fit the shape of the animal's back and are crossed at the top. At the point of intersection they are held together by a removable bolt and nut. Two frame ribs connect the pommel and cantle sections at the top, and two flat strips of wood or metal similarly hold the lower ends of the saddle frames together. Slots or iron rings are located at the lower end of the pommel and cantle sections into which the breast straps and breeching straps are fastened. The saddle girth is fastened to the frame ribs.

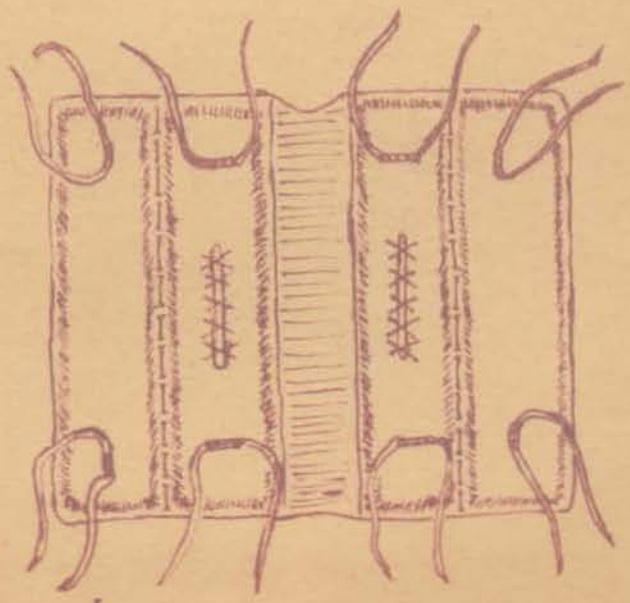
Particular care should be taken in fashioning the saddle pads. A satisfactory bag can be made of canvas, which is divided into two parts by a double or triple row of stiches to prevent the padding material from becoming unevenly distributed, and filled with fine wood-shavings or similar material. Two straps or ropes are attached to each bag and are used to fasten the pads to the saddle frame. See Sketch 1.

Saddling must be done with special attention. Since horses and mules like to roll on the ground, the animal's back must be thoroughly cleaned and the hair smoothed. The blanket, which has also been cleaned and folded six times, is unrolled from the neck to the rear by the handler standing on the

IMPROVISED PACKSADDLE

*Behelfstragsattel*





*Gefülltes Sattelkissen*

STAFFED SADDLE PAD

animal's left side so it hangs equally on both sides. The breast strap, the breast collar strap, the cinch strap, the breeching strap, and the right saddle girth are unbuckled and thrown over the saddle. The attendant approaches the animal from behind and quietly places the saddle into position. Whenever possible saddling should be done by two men. The horse blanket should extend a hand's breadth beyond the saddle pads, but turned back so that the withers are completely uncovered. When the saddle girth is fastened, care must be taken to avoid making any folds in the blanket or pulling it out of place. The breast strap and breeching strap are then fastened. The breeching strap must not be fastened too tightly, since it might cause the ribs to be pressed, thereby affecting breathing. The saddle girth must pass under the breastbone.

Loading is also being done carefully. The two side loads will, of course, be approximately the same weight. If chests, crates, or baskets have rings for fastening to the packsaddle, loading will present no difficulty. See Plate 7. The loads must be attached from each side simultaneously to keep the saddle from slipping; the same procedure must be followed in unloading. If containers are not available, the loads must be tied so they will not slip. For this purpose each packsaddle should be provided with four strong ropes, each about four yards long.

PLATE 7: A PROPERLY SADDLED AND LOADED PACK ANIMAL

PLATE 8: PACK TRAIN CAMP PROTECTED FROM WINDS BY PROPER LOCATION

The driver of a string of pack animals is assisted by two to four men, who load the animals one after the other. March schedules must take loading time into consideration.

Not only is the carrying capacity of an animal to be considered but also its temperament. The strongest animals are assigned the heaviest loads, but valuable loads are assigned to quiet and sure-footed animals and not to those which are nervous or easily frightened. A pay load for full-sized mules and horses is fixed at approximately 200 pounds, for mediumweight animals at 160 pounds, and for lightweight animals at about 120 pounds. It must be noted that the performance capacity of each animal depends largely upon its physical condition as well as the terrain over which it moves. When draft horses are temporarily used as pack animals the load must be reduced.

As far as possible all pack animals should be loaded during daylight, in order that all defects in loading may be recognized and corrected. Loading by night without adequate lights may cause serious losses and delays, especially when the loading is done by men without special training. Once loaded the column must start off without delay, since any prolonged standing about may cause injuries. Drivers must learn to estimate correctly the weight of loads in order to insure equal loading.

The winter equipment of a pack train should include a number of small, one horse sleds with runners sixteen to twenty inches apart, which are made in toboggan style and which are capable of carrying a load two or three times as heavy as the load of a pack animal. In deep snow men in snow boots and snow shoes, followed by a few empty or lightly loaded sleds, should establish a beaten track for the main pack train. Since winter trails are quickly obliterated by drifting snow, they should be marked by small poles. A succeeding column can then easily reestablish a trail by sending a small party ahead.

A particular advantage lies in the use of sleds. It is impossible to prevent snow from packing under the horses' hoofs; neither soft soap on the hoofs nor straw soles will prevent it. A loaded horse which is handicapped by snow-packed hoofs has to exert a much greater effort in maintaining balance than an animal which is pulling a sled but is free from any pack. If a horse which is pulling a sled does occasionally lose its balance and falls, it has no difficulty in gaining its feet, but a loaded horse cannot rise without having its pack removed.

IV. TRAINING PACK ANIMALS

The training of pack animals must be carried out with great patience and care, since mules are apt to become stubborn if not properly handled. Rough handling and beating is forbidden. For this reason only men of even temperament are selected, men who already have proper training and experience and who do not lose their composure when sorely tried by the animals' obstinacy. Frequent changes of personnel should be avoided. The training of mountain horses and mules can generally be limited to accustoming them to packsaddles and loads. Lowland horses, if they are to be used in mountains, must be trained in climbing, if the risk of sustaining excessive losses from falls is to be avoided. Usually these animals begin to climb too rapidly and become nervous and unsteady in difficult places. This not only endangers themselves but the other animals and the drivers. They must first be trained to follow a quiet, mountain-wise animal while carrying nothing more than an empty packsaddle.

During the war, in order to provide a continuous flow of replacements, a training unit was established at an alpine station to train drivers and pack animals. This arrangement proved practical and effective. Pack animals are gradually trained. They are first led on level ground

equipped with only a blanket and later a packsaddle. Loads, beginning with light ones, are increased in weight gradually and are fastened firmly so that no bucking will throw them off. Any resistance to carrying a load can soon be overcome by patience; generally it is enough to lift the animal's front leg, cover its eyes, or raise its head.

The animal is then trained to walk quietly in column, at first on level ground then in hilly terrain. The training marches should gradually include longer and steeper ascents. In about two weeks the animals are ready for all day marches, which should include frequent loading and unloading exercises. Particular attention is paid to maintaining a quiet and even pace and keeping the animals perfectly in line.

It is then time to train the animals in trackless country. They learn to make deliberate approaches to obstacles of various kinds: fallen trees, stone ledges, swampy stretches, brooks, fords, ditches, and steep slopes; all of which they must overcome calmly and without haste. The correct ascent and descent of steep and narrow trails must be emphasized, at first without a load. As they become accustomed to such trails, the loads are gradually increased to each individual's capacity. The pack animal must be trained to follow the steps of the driver and adjust its

pace to his. Animals trying to forge ahead are waved back by the driver's free hand. Since the discipline of the pack train is maintained during both the ascent and descent of a slope, the animals learn to walk confidently, adjusting their pace and gait to the occasion and need. If an attempt is made to restrain a horse by tight reins while negotiating a steep and dangerous spot, it may lose its balance and fall down a precipice. In such a situation, if the animal wants to pass the dangerous spot at an accelerated pace, it is better for the driver, if he cannot keep abreast, to keep the rein loose or throw it over the horse's neck. On steep slopes or swampy stretches it is often best to keep ahead or away from the lead animal. In negotiating obstacles of this kind it is a mistake to try to restrain the pack animals. Pack animals should be trained to march in strings of two or more, tied one behind the other. The connecting line should be fastened to the halter of the lead animal in such a fashion that it can be quickly released by a pull on the loose end of the slip knot.

Since some equipment must be carried in vehicles, it is an absolute necessity to train pack animals to haul vehicles. Whether equipment should be moved in trucks or horse-drawn vehicles while operating in level country, is a question that must be decided chiefly on the type of terrain or on road

conditions. A suitable vehicle for these purposes is the German light field cart (Mf 3) or any similar local cart. It should be sufficiently sturdy but not so heavy that it cannot be hauled by teams of two or four pack animals. Teams may include animals with minor harness sores on the withers or on the back. This permits animals originally intended for these teams to be used as pack animal replacements.

V. MOUNTAIN RIDING HORSES

The supply of riding horses for officers on duty with mountain troops is best accomplished through the use of strong mountain horses such as Haflings. The main objective in having officers mounted is to increase and facilitate the mobility of commanding officers during mountain operations, to spare their strength, and to leave them more capable of accomplishing their duties upon arrival at their destinations. In an emergency these animals are available as pack horses.

The training of alpine mounts is the same as for pack animals, the only difference is that they must also learn to walk and climb when mounted. The usual army saddle is used but is held in position by a breast strap and a breeching strap. A curb bit is not used. The horse is allowed to

develop the free and easy gait of its natural stride and posture, with head well forward and is permitted to pick its own way. Jump training is omitted so the horse will not get into the habit of leaping obstacles in the mountains.

In operations on level terrain, other type horses may be used as mounts if they are not too large and heavy. They should not exceed sixty-four inches to the top of the shoulders in height. Mountain riding horses should receive the same feed and care recommended for pack animals.

## VI. TRAINING PACK ANIMAL DRIVERS

The selection of pack animal drivers is made with the same care as is used in the case of animals. If the drivers are intended for service in the mountains, they must also be mountain bred and familiar with the special conditions and difficulties of alpine living. In view of the great physical strain to which drivers may sometimes be subjected, they should not be too old. They must be capable of enduring forced marches of great distances. Any man with a physical weakness is unsuited for handling pack animals.

The drivers must first of all be trained to care for their charges; they must be taught to drive and to lead; they must receive instruction in the nature and care of equipment, how to fit and adjust a packsaddle and harness, until they can do it in the dark.

The pack animal driver, walking in front at a steady and even pace, leads his charge with a loose line which passes through the left ring of the snaffle bit and is fastened to the ring on the right side of the bit. To halt, the driver steps to the left side of the animal, shortens his grip on the lead line and holds the animal's head in a normal and natural position.

In difficult terrain the pack animal must be given a completely free head, and left to pick its own way. Continuous training in leading pack animals, overcoming obstacles, march and camp conduct, and critical situations must be carried on in every kind of terrain with gradually increased loads and march objectives, until realistic field loads and conditions are attained. When necessary personnel must be given extra training in marching and climbing.

Before beginning a march the pack animals should be regularly checked as to physical condition, sores or other injuries, feed and water, and tight and properly secured shoes. A similar check must be made of the equipment. Constant care must be taken to insure that the animals are saddled according to regulations with special attention given the proper positioning of the saddle pads and blankets. The drivers should be able to do all these things by night and under the

pressure of urgency. The position of the blanket, the saddle, and the load must be checked continuously during the march to insure against chafing and pressure on the withers.

The direction which a pack train takes is almost completely independent of the terrain, but its speed is always determined by the animals' pace. This fact must be borne in mind when a pack train is attached to other army units. A pack train must be given a head start or a shorter route. The actual speed of the train will depend on road conditions, the weather, the physical condition of the animals, the loads, and steepness of the route. It is more difficult to estimate march time in mountainous country than on a plain. When roads are bad and include steep slopes, one may figure on seventeen to twenty minutes per kilometer or about forty to sixty steps per minute. An extra hour must be added if the route climbs 1200 feet in altitude or descends 2000 feet in altitude.

On good roads with only minor hills the march speed will be around four and a half or five kilometers per hour. If the march lasts six hours or more, a one or two hour halt, during which the animals must be unloaded and fed, must be included in the estimation. This stop should be made after the larger part of the route has been covered. If in mountainous country and if the situation permits, the line

of march should be reconnoitered to determine its suitability for pack animals.

The condition of an unexplored route or even a known one depends largely on the season of the year, the weather, and other chance elements. Since a mountain road is subject to very rapid and very great changes, it may be necessary to send a road detail with entrenching tools ahead of the column to make the road passable and safe. The pack column should be halted far enough back to permit a possible alternate route to be taken.

An experienced officer, who is responsible for the maintenance of the march schedule, the rest periods, and the feeding and watering, must be in charge of every pack train. Everything that happens along the way should be reported to him. Security must be provided ahead of the column. In the mountains pack trains generally procede in single file, with about a yard between each animal. On roads, if the traffic allows, double columns shorten the line and facilitate supervision. The driver of the leading animal is responsible for setting an even pace. He should be given a quiet animal with a good stride. At the start of a march the head of the column must move slowly until the whole line is properly formed.

Before starting an ascent the breast strap should be tightened a little, and the same should be done to the breeching strap before descending. A short halt is always called for this purpose, at which time the packsaddles and loads are checked and faults corrected.

Gaps in the column are eliminated by having the animals gradually close up. If one of the animals has to stop it should, if possible, be lead out of the way of the rest and rejoin the column at the next halt. The animal should not be forced to trot to catch up with the column. In difficult terrain the distance between each animal should be increased in order to permit free movement of each driver and animal. Where the trail ascends in short zigzags, intervals should be spaced so a falling animal will not endanger those that followed behind.

Nothing which might frighten the animals is allowed to cut-through the column. Pedestrians who meet the train must pass on the lower or downgrade side and should do the same if they overtake the column. Passing on the upgrade side might cause a timid animal to lose its footing and tumble downhill.

A brief halt should be called after the first half hour in order to check saddles and loads and to make necessary adjustments. Under normal conditions a trained unit will

make its first rest stop after not less than three hours of marching. Thereafter halts are repeated every two hours. The rest periods should not be for less than an hour. Shorter rests are of no value, since it takes considerable time to remove the load and gear and reload again. During a rest the saddles should be removed, and, if the weather is bad, the animals covered. The resting place should, if possible, be on level ground, provide shade and shelter against sun and high winds, concealment from the air, and located as close as possible to drinking water. Frequent watering, especially on hot days, is very important.

The officer in charge must constantly supervise the physical condition of the animals, their saddles and loads. If a road is steep or otherwise difficult, short breathing stops should be allowed every ten minutes. As a rule the animals show their need for a rest by stopping of their own accord. Stops on very steep places should be avoided as much as possible. If the pack animals seem to be getting out of breath, indicated by rapid movement of the nostrils and flanks, by perspiration and frequent stopping, the pace must be slowed down and a long rest taken as soon as possible. The veterinary officer should then examine the animals and recommend the action to be taken. Pack animal reserves, always well-worth bringing along, should be used promptly to

replace tired animals. Animals which drop out must be removed from the trail and follow at the end of the column. They may resume their place after the next rest.

An experienced noncommissioned officer and a horseshoer follow at the end of the column. When several animals have dropped out, extra men should be assigned who can also act as a security guard to cover the rear. The column may also need flank security.

To prevent overloading personal belongings may not be added to an animal's load without special permission from the officer in charge.

If the saddle shifts during the march, the animal must be unloaded and the saddle removed before reloading. Whenever possible a suitable place somewhere along the route should be chosen where extra men may be stationed to assist in reloading and where a second animal may be left to keep the other quiet. After the animal has been reloaded it will proceed without increasing speed and resume its place at the next halt.

As mentioned earlier, a short pause is also made before an ascent or descent to tighten or loosen the breast and breeching straps. It should not be forgotten to refasten the straps correctly. A descent may be made easier for an animal if the driver takes hold of the tail or breeching strap

of the front animal and allows himself to be pulled along. A heavy, high load may be prevented from pressing against the withers by ropes tied to the cantle and held by one or two men.

In dangerous and particularly in narrow places on steep slopes but also in snowdrifts and swampy places, it may become necessary to unload the animals and employ all available men to carry the loads past the dangerous spots. In all such places the pack animals are led with loose reins at full length to permit the animals to pick their way and adjust their steps to the circumstances. In especially dangerous places ropes may be tied to the animals to provide an additional measure of safety.

If an animal does lose its footing, the animal and its load must be rescued separately. If the animal is in danger of falling again when rising to its feet, it should be secured with lines. To prevent the animal from attempting to get back on its feet too rapidly a man may sit on its head or neck. The noncommissioned officers and men must receive special training in the use of ropes and equipment for these cases.

Swamps, powdered snow more than sixteen inches deep, loose stones, rocky ledges more than a foot high, slippery stone slabs, all greatly reduce the normal speed of a pack train. Such places should be avoided, or, if they are too

extensive in area, they should be improved. Narrow turns on a serpentine mountain trail may have to be widened to prevent stumbling and falling. Swampy places, if not too deep, may be made passable by ballasting the trail with branches and stones. In deep snow a trail-breaking crew wearing snow boots and snowshoes can beat a track. Slopes without trails must be reconnoitered and climbed in wide curves. If there are loose stones on the slopes, they are avoided and a greater distance is kept between animals. Icy stretches can be roughened and sprinkled with sand or earth. When passing over weakened bridges or frozen bodies of water and when fording rivers, the interval between each animal is increased. Here, as in the case of overcoming obstacles, any stopping of the animal or the pack train must be avoided.

At the end of the march and after occupying the shelters or quarters provided, the unharnessed animals should be examined at once for sores and cuts and loose shoes under the supervision of an officer. If the back cannot be dried thoroughly the blanket must be left on. The harness and other equipment is closely examined and the necessary repairs made. If camp is made outdoors (See Plates 8 and 9), the animals are tied where there is protection against the wind. If necessary they should be covered. When it rains they should remain saddled, but the cinches are loosened.

PLATE 9: PICKET LINE WITH SADDLES AND GEAR NEARBY

At every resting and camping place there must always be someone watching over the animals. Mules or horses which are inclined to kick or bite are segregated. The loads and saddles must be placed near the animal to which they belong so saddling and loading can take place even in the dark. See Plate 9. After camping in the open air, the animal's back, since the animals are fond of rolling on the ground, and saddle blanket must be thoroughly cleaned. When saddling is done at night a visual check is made as soon as it becomes light enough to do so.

The floors of barns, stables, or of any other quarters should be checked and tested for strength before being used. All protruding nails are removed, and such things as farm equipment are either removed or secured so they might not cause an injury. Ill-tempered animals are kept away from the others. The saddles, harnesses, and other gear must be arranged so they may be picked up in the proper order even in the dark. Whenever more than five animals are stabled together a special stable guard is assigned to them.

Before entering the stable every animal is trotted past the officer in charge, who also checks feeding and other phases of the care of each animal. Injuries are reported to the forage sergeant or to one of the horseshoeing crew.

If necessary the veterinary officer is notified. Until he arrives first aid is rendered by the horseshoer personnel.

If pack animal units have to be organized in a hurry for use in mountainous country or other difficult terrain, experienced personnel must be assigned if many serious troubles are to be avoided. Trained animals must also be supplied. If experienced pack animal personnel and trained animals are available, the unit can be ready for the field in six or eight days. If trained personnel are not available another eight days must be allowed for their preliminary training, which will be sufficient time to learn the essentials, providing the personnel has had experience in handling horses. Preliminary training can be combined with increasingly extended march exercises in which both the new animals and new drivers participate. Only instructors who are well informed in theory and who also have practical experience can accomplish rapidly an adequate training program. The timely establishment of training cadres in mountain areas would render a valuable service by avoiding the initial difficulties encountered by units whose organization must start from scratch. Allowances in tables of organization for pack columns must provide sufficient replacements of both personnel and animals.

## VII. CARE AND FEEDING OF PACK ANIMALS

The care and feeding of pack animals is governed by the same regulations which apply to army horses. It is understandable that mules, distrustful by nature, may require special care and handling. However, if mules are treated sensibly, they are no more difficult to handle than horses.

If pack horses are kept in stables, the winter temperature of their quarters should be kept at 50 degrees Fahrenheit. This will keep the animals from getting too soft and will keep them in condition for employment at any time. This is a matter of particular importance if the horses are to be used in mountains where great variations in temperature can be expected. It is possible that various climatic zones may be crossed within a short time, in extreme cases from a region of tropical heat to a region of eternal ice.

The forage sergeant must see that each animal gets its allotted ration on time. In the German Army the ration for the heavy pack horse was the same as that of the riding horse. It was permissible to substitute four pounds of hay for two pounds of oats. During the war the usual ration consisted of seven pounds of oats, ten pounds of hay, and ten pounds of straw, although the straw, which was mostly used for ground covering, was often unavailable.

The simple and unassuming demands of mules are almost proverbial and are too well known to require special mention, but this knowledge should not be an excuse for neglect, and the mules forced to forage for themselves after completing their work. If heavy work is expected of them, they must be correspondingly well fed and cared for. Both mules and mountain horses can get along with whatever is available in the way of fodder, and during temporary shortages they will not immediately show a weakened physical condition and a reduced performance record. Nor are they very fussy about the quality of their fodder. If the situation requires it, they will make the best possible use of less nourishing feed. In times of need and emergency this quality may prove invaluable.

Mules, mountain horses, and most of the other small horses, being by nature able to withstand heat and cold equally well, perform entirely satisfactorily in every climate. An example of this fact is the mountain division which was moved directly from the tropical August climate of Greece to northern Finland, where it arrived in the second half of September, just as the first frosts had come and winter was setting in. There were no casualties worth mentioning as a consequence of the move.

In extreme cold there is a danger that the fetlocks of the pack animals will be frostbitten. To protect the animal, the hair around the fetlocks should not be clipped, as is often customary. The hair can be cut back a little if it is too long.

Pack animals are not so hardy, however, that they need not be sheltered from winter winds. This is particularly necessary in bivouac during snow storms. If nothing else avails, a good protection against wind may be obtained by building snow walls. They can be fashioned very quickly from snow blocks cut with shovels. Using poles and trees as supports for a canvas roof, a superior shelter, built like a lean-to with its wall against the wind, can be constructed. In the mountains adequate protection can also be obtained by digging into snowdrifts. If time and men are available a windbreak with four snow walls can be erected. This shelter may also be roofed over. Emergency shelters were usually made large enough for eight to ten animals.

In summer, in areas where trees are scarce but the ground is suitable, shelters can be dug into the hillsides, roofed, and camouflaged. These shelters protect the animals against flies and the burning sun. In the Kuban the dugouts were covered with reeds. In the tundra of northern Finland,

shelters large enough for two or three horses were made of large stones. Two parallel walls were built abutting a cliff or a rock and the rear left open. A thick roof was constructed of birch twigs. None of these emergency shelters could be detected from the air. Even in an uninhabited or sparsely inhabited country, a resourceful mind can always find a way of providing a fairly adequate shelter, however primitive it may be, against the elements for himself and his four-legged companions.

Russian style emergency stables also afforded protection against the extremes of the weather. These were of a more permanent nature and presupposed the availability of logs. In a suitable place a hole was dug, seven to eight yards wide and about six feet deep. The number of animals to be stabled determined the length. The animals were tied in rows along each side and a passage at least two yards wide was left in the middle. There was an entrance at each end. Along the sides and down the middle, eight inch tree trunks were set at intervals of nine to twelve feet, about eight feet high at the sides and slightly higher in the middle row. They served as the supports for a slightly slanting roof. Planks were nailed to the outside of the wall supports, and, if possible, a double wall was built. Earth was banked against the outer sides of the shelter. The space between the double

planking was filled with moss or heather. This type of shelter is warm in winter and cool in summer, is inconspicuous, and gives adequate protection against the frequent, very unpleasant winter storms. The ground water level must be considered and drainage provided if necessary.

If there is no possibility of making even a makeshift shelter of any kind, as in the case of an advanced unit posted on mountainsides above the timberline, specially made tents can be used. Those which were made for the German mountain troops served their pupose very well. They could be carried on pack animals and were large enough for twelve to fourteen horses.

## VIII. VETERINARY SERVICES

The veterinary services attached to mountain troops require men of energy and enthusiasm for their work. Veterinarians chosen for this arduous work must be young, be in perfect physical condition, and should have had some mountain experience.

Since the marching units are often stretched out in very long lines, and since the components of a pack column often take up quarters far from each other, veterinarians must be mounted or, in level areas, motorized. The motorization of the veterinary services proved very valuable in the Russian Campaign.

Veterinary service with mountain troops calls for one veterinary officer per three or four hundred horses. Senior veterinary officers with special experience in mountain service should be assigned to higher headquarters in staff positions. In these capacities they supervise the operations of the veterinary services and the shoeing of all animals in the subordinate units. They requisition replacements of veterinary officers, horseshoe personnel, and animals, and they exercise authority over the personnel of the veterinary services in the performance of technical duties.

Veterinary officers serving with units in the field care for the sick animals if long hospitalization is not needed, look after the physical condition of the animals generally, check into the nature of the fodder which is provided, and give professional advice to the commanding officer. The animals are examined at regular and frequent intervals. Veterinary officers also advise and instruct the horseshoeing crews and supervise their work. Drivers are instructed on the ailments and diseases of horses, on the special characteristics of pack animals, and on the importance of correct saddling and loading.

Each veterinary officer has for his professional use the veterinary's saddlebags and a set of two medicine chests.

The farrier wagon carries the veterinary chest and a reserve supply of medicines and bandages.

## IX. HORSESHOEING

The smithy must be carefully equipped to meet the needs and special requirements of the horseshoeing service. A horseshoe crew has a first aid kit, some of the most commonly required medicines, and bandages. A bag of horseshoeing tools for use on the march is also available. Each animal carries at an easily accessible place on its saddle a previously fitted front and rear shoe.

A portable smithy, which can be loaded on not more than two pack animals, is also taken. It consists of a forge, which can be carried in two sections, a tool chest, a chest of coal, and a chest of horseshoes. At least one portable smithy is provided for each fifty animals, although one farrier may suffice for 250 animals.

The veterinary supplies and horseshoeing equipment are carried in a light farrier wagon drawn by two horses. It generally remains with the section or train following the lowest and best route, although it may be sent wherever it is needed. A forge, which is set up at more permanent stations, is also carried.

The horseshoes, in various sizes, are made for cleats and have threaded holes for screwing on calks. For work in the mountains and to insure good footing, pack animals are equipped with blunt calks in summer and with sharp ones in winter. In level or swampy terrain no calks of any kind are needed during the summer time. The sizes used are the customary ones in the German army. The calks may need to be changed frequently, since both rocks and ice wear them down rapidly. New shoes are necessary every four to six weeks. Horses and mules may be permitted to go without shoes for a considerable length of time on soft ground, providing the horn of their hoofs is in good condition.

X. DISEASES

Diseases of the joints, tendons, and hoofs occur more rarely among mules than one might expect; the same is true of mountain horses, which from the time they were foals were accustomed to move about in upland regions. The hoofs, however, need to be of very strong horn, which is almost always the case with mules.

A lameness which is rare among horses generally, but which now and then occurs among pack animals, is a crippling of the shoulders. Animals affected by it require a long time to recover.

What might be called occupational diseases among pack animals are the various types of sores and cuts caused by packsaddles. They range from the most harmless sore to a serious injury of the withers, which requires treatment for many months and occasionally results in the animal becoming useless. Cuts, which are the result of chafing, usually occur on the back, particularly near the withers, and are caused by poorly fitted saddle frames. Cuts and sores on the ribs are usually due to inexpert saddling. The breast collar strap produces cuts on the shoulder blades.

Sores produced by pressure also occur on the withers and the back. If they are not promptly treated and attended, they may later require extensive treatment, often an operation for which they must be sent to a veterinary station. It can, therefore, never be sufficiently emphasized that the serviceability of a pack train largely depends on a careful fitting of each animal's saddle and harness.

Among the internal diseases the most common is colic, although it must be pointed out that the incidence of this sickness is decidedly less among pack units than in other units. The toughness of pack animal training eliminates all weak and susceptible animals beforehand.

Now and then because of excessive demands, an animal suffers damage to its heart and lungs. Troubles of this kind may be avoided by placing reasonable limits on maximum loads and march objectives.

Among contagious diseases glandular infections and inflammations of the upper respiratory organs to which young animals are particularly susceptible must be mentioned. The mange and glanders are chiefly wartime diseases, but regular blood tests have practically eliminated the danger of the latter. Glanders in mules occurs in an extreme and deadly form, but the same disease among horses is generally chronic and less dangerous.

Regular inspections permit the timely recognition and treatment of mange. During the last war, in contrast to previous wars, the effectiveness of units relying on horses was not endangered by the mange. Through the use of portable gas tents or field equivalents, mange is curbed in its early stages and its spread prevented.

Babesiasis, which is spread by ticks, was prevalent in southern Russia during the summer months and was treated by the usual methods. To avoid heart injury, however, the infected animals should be withdrawn from service for a period of convalescence.

# APPENDIX F

## DIRECTIVES ON THE TRAINING OF RIDERS AND DRIVERS IN THE REPLACEMENT TRAINING ARMY

I. TRAINING ARMY

1. Introduction. The training program for riding and driving in the Replacement Training Army must be confined strictly to wartime necessities, must safeguard valuable and irreplaceable horses, and insure they will be properly employed and maintained in serviceable condition.

If this objective is to be attained, personnel must be indoctrinated in the conscientious care of horses. An exact knowledge of every aspect of harnesses, saddles, and other equipment, including proper fitting and maintenance, and the care and maintenance of horse-drawn vehicles is the most important part of the rider and driver training course.

The following manuals--with reservations made for curtailments and changes set forth in subsequent directives--are the standard guides for this training and include regulations for riders and drivers with pack trains: Army Manual 12, "Riding Regulations;" Army Manual 465, "Driving Regulations;" Army Manual 11, "The Army Horse;" Army Manual 375, "Pack Animals, Mountain Riding horses, and Ox Teams;" Army Manual 476, "Army Equipment;" and Army Manual 319," "Improvised Construction in Wartime." These publications must be in the hands of every instructor. The instructors must have a practical and a theoretical knowledge of their subject. A fundamental rule is that every riding instructor

must also be a driving instructor, every rider a driver; every riding horse a draft horse.

It is the function of the Wehrkreis riding and driving schools to train in a four week course an adequate number of qualified riding and driving instructors for service with the Replacement Training Army. All officers with mounted or horse-drawn units must be able to direct and supervise the training of riders and drivers. The riding and driving instructors who received their training at the Wehkreis schools must take additional courses after assignment to the Field Army. Officer candidate courses in riding and driving require special direction and supervision. A twelve week course for riding and driving, which includes training for mountain pack train service, is shown below. Unforeseen difficulties, such as illness among the horses or their inadequacy as mounts, may require modifications in the plan.

2. Instruction in Service with Horses. The trainees must not only acquire the necessary technical and practical knowledge of service with horses, but also acquire a feeling for the needs of the animal entrusted to their care and a realization of the importance of maintaining the performance level of this valuable and irreplaceable assistant. Riders and drivers will not acquire these qualities through instruction alone. They must have practical training, sometimes

under the difficult circumstances of time limits and complete darkness, in saddling and unsaddling, harnessing and unharnessing, the stabling and care of the animals, and the care and repair of equipment.

3. Training in Riding.

a. Points for the Instructor

(1) The riding period is used for riding only. Everything which can be taught or practiced in the class room or the stable with charts, equipment, or even a real horse is prepared in advance. The same applies to preliminary training on foot. Particularly important subjects are saddling and harnessing (Army Equitation Manual, pp 22-291), position and posture of the rider (Army Equitation Manual, pp32-37), and aids[1] (Army Equitation Manual, pp37-45).

(2) A detailed plan is prepared for every hour of practical work and classroom theory.

(3) Correct command terminology (Army Equitation Manual, pp 9-21).

(4) The correct location of the riding instructor; selected so that he can not only observe students from the flanks but also from the front; a position from which he can see all

[1] Pressure of hands and knees used to direct and control the mount. (Ed)

the riders and reach them with his voice; in irregular formations he should ride at the rear, in march formations he should ride at the flank of the training battalion.

(5) A sensible step in the organization of the training battalion, following a preliminary check of riders and horses, is to assign difficult horses to trainees with previous experience and assign the quiet mounts to the beginners. In these assignments the temperament of the horse is taken into consideration. To find the right horse for the least talented rider or for the late arrival is a skill which the riding instructor should cultivate.

(6) Proper fitting of the stirrup. The stirrup must not hang too low. It is at the proper height when the upper edge of the rider's heel is four fingers below the instep of the stirrup, when the legs are allowed to dangle loosely in a natural position. In cross-country riding the stirrups must be raised an inch or two. A system of marking the stirrup straps is recommended.

b. Training Recruits.

(1) The horses of all recruits, including those of the officers and the noncommissioned officers, are trained with the bit. Particularly difficult horses must subsequently be trained with the curb bit[2] which is attached to snaffle

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[2] All statements relative to training in riding with curb bits refer only to cavalry. For all other services curb bit training is superfluous and sometimes harmful.

rings. In jumping and climbing exercises the checkreins are detached.

The side checkrein is shortened so the horse will arch its back and produce a good seat for the rider. The nose of the horse should generally be kept perpendicular. A horse with a pronounced sway-back and a ewe-neck must be checkreined relatively shorter and lower. The length of the checkreins must be constantly adjusted, and they must not be buckled so short as to interfere with a horse's gait.

(2) Training Procedures. (Army Equitation Manual, pp 170-184). The first objective is to teach young riders to acquire an easy and natural balance at all three gaits. A recruit may hold on to the pommel of his saddle, but never use the reins for support. It is a mistake to insist too early on correct saddle posture, or to insist on the maintenance of precise intervals in formations with knotted reins. A great deal of time should be spent practicing the various types of riding with and without stirrups and in drill exercises. (Army Equitation Manual, p 176). Riding back and forth over three or four poles lying crisscross on the ground will help loosen up the rider. (Army Equitation Manual, p 181)

As the rider acquires a greater sense of security in his seat, he is trained in the art of aids. During the second

week trainees begin to ride at will, first at a walk and turning in one direction only. Riding skill is developed week by week by instruction in theory and by progressive training until walking and trotting and left and right turns have been learned. In learning to ride an individual has to acquire many of the details through practice, such as stopping at designated points, halting in front of the instructor and dismounting and remounting, and passing from one gait to another; all these have the objective of acquiring the technique of aids.

Since the long, free strides of long distance trotting, which uses energy sparingly, is very important in the field, trainees must receive special training in order to develop it. It is important to master a light trotting gait quickly. Riders must practice this gait with frequent pauses. The everyday working trot should be kept at 275 steps per minute (Army Equitation Manual, p 20). A plodding walk or a prancing trot are both wrong. New riders need special instruction and practice in setting and maintaining a given pace.

Learning to gallop depends on the rideability of the horse. If the horses at the school are well broken, instruction in galloping may begin early, not later than the second week. Galloping may be practiced in circular

formations and in close formation. With less experienced mounts, the recruits must defer galloping until later, and, in cases of horses not previously trained, must confine their galloping to riding at will, to open formations on a large riding field, or to cross-country riding.

After the fifth week of training at the earliest and after the sixth week at the latest, riding with a curb bit is practiced. The correct position and use of the curb bit must be thoroughly explained beforehand in the classroom.

Frequent changes from riding in formations and riding at will over the whole course or in two circles develop attentiveness and skill. Riding in battalion formation should not be attempted before the sixth week and should never be practiced for more than ten minutes in any one period. Careful attention must be given to exact spacing and precise lines. Only a strict discipline over men and horses will develop a proper formation.

In about five weeks, after a correct seat has been acquired and proper control of the horse learned, practical work in cross-country riding is begun. This consists of dispatching an individual rider at a trot to a nearby point where he dismounts, carries out a special assignment, remounts, and returns to the troop. The troop practices riding in step with loose reins.

The demands on the horses and riders are gradually increased by climbing slopes, crossing streams and marshy areas, but avoiding jumping over too high or too narrow obstacles. In difficult terrain exercises the reins must be separated and the curb bit unbuckled.

During combat training every opportunity must be taken, even if only for short periods, to practice the riders in square formations, riding with and without stirrups, and at alternating gaits.

c. Advanced Training. Training units should be composed of individuals who are at the same stage of training. Noncommissioned officer classes should not mix experienced riders with beginners or repeaters.

All riding lessons, including those given to advanced students, should begin with sitting exercises without stirrups in closed ranks. The performance of horses is improved by the riders maintaining proper posture and bearing. As early as possible every horse should be encouraged to pull at the reins with upward and downward sweeps of its head. Exercises which encourage ease of movement and precision include trotting, stepping over poles lying on the ground, and changing the tempo of the trot. Riding in circles while changing the rate of speed should be frequently practiced. Galloping should not be attempted until the riders have gained the confidence of their horses; first, horses should

go to a gallop from a trot in exercises extending over the whole training ground; later, individual galloping exercises in which the horse moves from a walk to a gallop should be practiced and improved.

Every opportunity should be exploited to improve the riding qualities of the school's training horses and to increase the instructors' knowledge of theory and practice. For this purpose the period between the completion of one riding course and the beginning of the next can be used advantageously for instructor refresher courses.

4. Training in Driving.

a. Driving from the vehicle. At the beginning of the first week of training, instruction in the theory of driving should be started by using stationary driving equipment and confined to the correct handling of reins in accordance with army regulations (Army Manual 456/3, Sections 16-20), the shortening of lengthening of one or both reins (Sections 21 and 23), the making of right and left turns (Sections 30-38), and starting and stopping (Sections 27-28).

At the end of four or five hours of instruction, practical driving lessons may be begun. These should be limited to driving exercises at a walk, because the aim is to give the driver a mastery of the details which will give him control over his team. The exercises should include stopping and turning at specified points.

Instruction on harnessing and care of equipment and vehicles should begin in the first week. Instruction in the theory and principles of driving follows, in which emphasis is on obtaining equalization of strain and pull by adjustment of the traces.

As soon as drivers have learned to control their teams on the driving lot, practical training should turn to cross-country driving, where the correct procedures on the part of the drivers and their teams must be insisted on from the beginning. Faults include restraining the team when they need freedom to pull and any inappropriate or even cruel use of the whip. The aim and final objective of the twelve week course must be to teach a driver, even when in difficult terrain, to know how to keep his team in its proper position in the column and still conserve the team's strength and energy.

The column can move at a trot on ground which is not too soft, but a walking pace must be maintained on every ascent and descent. During the rest periods, which occur even during combat exercises, instruction in theory and practice may be given, particularly on the care of horses. The correct harnessing of the teams is checked frequently.

Every driver should be familiar with the theory and practice of breaking young or difficult horses as prescribed in Army Manual 165/2. Since the mounts of the Replacement

Training Army have to be broken, an excellent opportunity for practical work is offered.

b. Driving from the Saddle. The principles for driving a team and wagon while mounted on one of the horses are found in Army Manual 465/1. The ability to drive from the saddle is completely dependent on previous training in driving. Without excellent training skilled driving is an impossibility.

II. TRAINING COURSES FOR RIDERS AND DRIVERS

1. Instruction in Service with Horses. Assisted by the veterinary officer.

A schedule of instruction is presented for all recruits who are to be trained to handle horses or pack animals. Each week's subject matter is reviewed and expanded during succeeding lessons.

First Week:

Saddling, bridling, and harnessing. Care of horses: stabling, feeding, and watering. (Army Manual 11/1)

Second Week:

Physical structure of the horse. (Army Manual 11/2) Study and nomenclature of army saddle model 25, breast harness model 25, bridle model 22, or packsaddle models 23 and 33, other mountain equipment. Care and fitting.

Third Week:

Care of hoofs and hair. (Army Manual 11/1) Nature and use of breast harness model 16. Captured enemy equipment, chiefly French, Polish, and Czech saddles and harnesses, as available to the Replacement Training Army.

Fourth Week:

Bandaging horses. (Army Manual 11/1) Repair and reconditioning of saddles and harnesses. Exercises in buckling harness and fitting unbuckled harness. Day and night exercises in form of contests.

Fifth Week:

Study and nomenclature of army vehicles, particularly models 1, 2, and 3. Care and maintenance. Handling of temperamental, stubborn, or timid horses. Fodder and feeding. (Army Manual 11/2)

Sixth Week:

Repair and reconditioning of army and civilian vehicles. Care and maintenance of brakes. Fitting brakes on non-equipped civilian vehicles. Loading vehicles with special attention to weight distribution.

Seventh Week:

Rescue of fallen horses. First aid when veterinary service is unavailable. (Army Manual 11/2)

Eighth Week:

Care of horses and pack animals on the march and during rests, in quarters, or in bivouac. (Army Manual 11/1) Preventive care and practical exercises. Measures to be taken during gas attacks; handling of protective media; treatment of horses affected by gas. (Army Manual 11/2)

Ninth Week:

Feeding and care of exhausted horses and pack animals. (Army Manual 11/2) Establishment of emergency field shelters. Fire prevention in improvised stables. (Army Regulation 319/1)

Tenth Week:

Chief diseases and their symptoms of horses and pack animals. Preliminary treatment pending arrival of veterinary officer. Segregation of horses with suspected contagious diseases. (Army Manual 11/2)

Eleventh Week:

Field equipment for riding horses, mountain riding horses, pack animals, and cart horses. Improvised stabling in combat. (Army Manuals 319/2 and 260/9)

Twelfth Week:

General Review.

2. Training in Riding. (See also Section II, 5)

a. Training in the Use of the Snaffle Bits.

First Week:

To acquire a sense of balance and confidence in oneself and in one's horse.

Riding on the exercise ground or indoor hippodrome with and without stirrups, one behind the other, using knotted reins and following a well-mounted and specially trained leader; walking and trotting over three or four poles lying on the ground; initial galloping exercises, if horses are broken and sufficiently well-trained. Sitting exercises. General exercises. Exercises are practiced which aim at developing skill and confidence, such as crossing the legs forward and backward while mounted on a moving horse; kneeling or standing on the horse when it it halted is possible only on a steady, reliable horse.

First exercises at an easy trot. Exercises in leading a horse by the bridle at a walk.

Second Week:

Objective the same as the first week, plus elementary instruction in aids. Close formation riding with general exercises, checking the posture of riders, alternately with and without stirrups.

At a walking pace the first riding at will; bringing an exercise to a sudden halt.

Third Week:

Objective same as second week. Riding at will at a walk with one hand; turns and halts of formations at specified points. One cross-country movement in formation at a walk behind a lead horse.

Fourth Week:

To control and guide the horse with and without stirrups; additional training in aids. Sitting and general exercises in close formation. Walking, trotting, and galloping without stirrups and without reins.

Riding at a walk and a trot over poles laid crisscross on the ground.

Riding at will; turning in one direction only at a walk and a trot. Proceeding from one gait to another; turning while in a particular gait. While trotting in a circle, begin galloping when the circle approaches the barrier of the inclosure. With a little practice the gallop can be begun when a corner of the inclosure is approached.

Formation cross-country riding at a walk and a trot, but avoiding steep climbs.

Individual jumping over obstacles to twenty inches in height; good jumpers lead the poor jumpers.

Fifth Week:

To control and guide the horse by the use of the stirrups, to progress in the use of aids, and to ride at will.

Sitting and general exercises; riding at will at a walk with both left and right turns; left or inside turns at a trot; changes within the trot. Making volts and figure eights at a walk and a trot. Continue practice of galloping as barriers of the inclosure are reached.

Straightening a line by taking two or three steps backward.

Riding with an off horse.

Holding a horse for a superior officer.

Riding singly over a known distance course at four and a half miles per hour. Several miles should be covered during the week.

b. Training in the Use of the Curb Bit. Should not begin earlier than the sixth week.

Sixth Week:

To use the curb bit as a supplement to the snaffle bit to lead with single and alternate reins.

Review of materials of the fourth and fifth weeks; no increased demands on trainees; a great deal of straight line riding across country.

At the beginning of each riding period, conduct sitting and general exercises. Practice all gaits in close formation with knotted snaffle reins and with curb bit reins hanging loosely but attached to the saddle.

Trotting and galloping on cross-country exercises. Riding with two off horses.

Seventh Week:

Make curb bit turns, beginning with left turns after lengthening the outer curb bit rein.

Frequent changes of gait and speed. Frequent individual assignments on cross-country exercises, including mounting and dismounting. Night riding.

Individual practice in cross-country climbing and jumping, using divided reins and detached curb bit reins. Recruits should not undertake jumps more than twenty-five inches high.

Riding through water courses in formation behind leaders. Riding alone over known distance courses at a speed of four miles per hour for a distance of four miles.

Eighth Week:

Changes to a gallop from a trot or walk. Frequent changes of gaits while in formation. Changes of speed while trotting or galloping.

Short rides in battalion formation for periods not to exceed ten minutes.

Frequent changes from one gait to another in cross-country riding.

Riding with three off horses.

Troop and individual jumping to twenty-five inches high and one and a half yards wide.

Individual riding through water courses; ascending and descending steep slopes.

Ninth Week:

Loading horses into freight cars and trucks. Riding nine miles at four miles per hour on known distance course by individual riders with full field equipment. Part of the course is covered while wearing a gas mask and at night.

Tenth to Twelfth Weeks:

Review.

Many individual exercises at specified points in an inclosure or on cross-country riding.

Short periods of riding in battalion formation.

Practical training in the care of horses. Theoretical instruction put into practice during march exercises.

3. Training in Driving.

a. From the Saddle

First to Fifth Weeks:

Riding instructions, preliminary to driving from the saddle, takes place during the sixth and twelfth weeks of the course, Training in Riding, see Section II, , and during the sixth through twelfth weeks of the drivers' training course for several periods per week. Instruction in driving horses from the saddle begins in the sixth week.

Sixth Week:

Bridling horse, including heavy warm bloods with curb bits; bridling cold bloods with double ringed snaffle bits.

Saddling and harnessing.

Mounting and leading the off horse.

Hitching and unhitching.

Mounting and dismounting.

Lining up a multiple horse team to a mounted lead horse.

Attaching reins and guide lines.

Pulling in the hindquarters of the off horses.

Use of the whip.

Starting, alternately walking and trotting at will and in columns.

Seventh Week:

Driving turns and doubling back.

Driving to and from a gun limber (hitching practice).

Backing an empty vehicle or limber on firm, level ground.

Cross-country driving, day and night.

Crossing obstacles such as mounds, shallow ditches and small streams.

Reverse turns.

Road discipline.

Driving while wearing a gas mask.

Eighth Week:

Alternately trotting and walking in formation.

Driving at normal rates of speed; alternately trotting and galloping.

Driving heavy cold bloods at alternating gaits of trotting and walking. No galloping.

Surmounting major obstacles: steep slopes, deep, broad ditches and streams.

Ninth Week:

Loading horses and vehicles on freight cars and trucks.

Tenth to Twelfth Weeks:

Review. Extensive riding as outlined in Section II, [2] during sixth to twelfth weeks.

Individual exercises within an inclosure; short periods of not more than five or ten minutes in battalion formation.

Instruction in holding and leading two to three off horses.

Riding under supervision on the known distance course for a few miles at a rate of four and a half miles per hour.

Practical training in the care of horses; theoretical instruction put into practice on marches.

b. From the vehicle. (double teams)

First Week:

Exercises on stationary equipment: various positions on the seat, handling reins and lines, starting and stopping, right and left turns, use of the whip.

Practical driving of horses begins after four or five hours of instruction with stationary equipment:

Harnessing, bridling, and driving.

Hitching and unhitching.

Handling crosslines.

Mounting and dismounting.

Individual driving on training ground at a walking pace, starting, stopping, and making right and left turns.

Second Week:

Review of theory.

Basic principles of the art of driving; adjusting crosslines for equalizing pull.

Third Week:

Exercises on stationary equipment: use of driver's aids; pulling from the left and alternately the right.

Practical work on the training grounds.

Fourth Week:

Classroom instruction and exercises on stationary equipment: driving with one hand, making sharp turns, errors commonly made in driving double teams from the driver's box and their corrections.

Driving on the training grounds: left turns only, walking and trotting, making sharp turns, backing empty vehicle on level, firm ground.

Fifth Week:

Classroom instruction in traffic regulations.

Individual driving: making right turns, walking and trotting on training grounds, country roads, and cross-country.

Practical exercises in equalizing pull by adjustment of traces, particularly in double teams of different temperaments.

Saluting from the driver's seat while driving a double team; making a reverse turn on the road.

Driving in columns on the road.

Sixth Week:

Practical exercises in driving at a trot in column.

Individual driving in traffic or difficult terrain while executing assigned exercises.

Seventh Week:

Pulling in and out of formations.

Practical exercises in marching and halting.

Driving with half loads in columns on difficult terrain in the dark.

Eighth Week:

Individual and formation driving alternately walking and trotting at prescribed speeds, occasionally with gas masks. Individual practice in maintaining an even rate of speed.

Breaking young or difficult horses, using the double line and a drag with long traces.

Practical work on improvising repairs on harness and equipment.

Ninth Week:

Driving fully loaded, field-equipped vehicles on cross-country exercises.

Loading horses and vehicles on freight cars and trucks.

Breaking a young or difficult horse to a light vehicle on level, firm ground by pairing it with a reliable horse.

Tenth Week:

Driving with full equipment in a mixed column by day and night and with gas masks.

Breaking young or difficult horses to stand quietly and to pull with confidence.

Eleventh and Twelfth Weeks:

Review.

Numerous individual assignments in traffic and on difficult terrain; pulling steep slopes; driving through forests.

Relay systems.

Practical training in care of horses during practice marches.

Breaking young or difficult horses to the cart.

Increasing the pulling capacity of young and newly broken horses.

4. Training in Riding Mountain Horses. This is a twelve weeks course similar to that given to other riders. See Section II, 2.

During the first four weeks the horses have both snaffle bits and martingales; thereafter only the snaffle bits. Also during the first four weeks riders are taught to sit firmly when trotting; light trotting is practiced from the fifth to the twelfth weeks. Galloping, jumping, and clocked riding over known distance courses are not included in this course. All riding is done at natural walking and trotting gaits. The leading of only one off horse is practiced; on narrow paths the off horse follows behind. Students must receive training in loading horses on freight cars and trucks.

5. Training Drivers of Pack Animals and Carts.

First to Fourth Weeks:

Loading and unloading.

Harnessing and hitching.

Care of saddles, gear, and carts.

Driving pack animals in columns or in mountain formation on roads and paths, on level terrain and in hill country, occasionally wearing gas masks.

Handling two or three pack animals tied with connecting lines. Employing pack animals as draft horses in teams. Driving horses in teams or in strings in march order on roads, trails, and cross-country, occasionally wearing gas masks.

Fifth to Eighth Weeks:

Driving pack animals in difficult mountain terrain.

Use of restraining ropes.

Turning and doubling back on roads and trails, on level terrain and in hilly country, occasionally wearing gas masks.

Driving teams hitched to carts on difficult terrain and in darkness, also with two horses hitched tandem, occasionally wearing gas masks.

Bivouacing and resting; use of improvised shelters.

Ninth to Twelfth Weeks:

Day and night marches with full field equipment at different altitudes, occasionally with gas masks.

Practical training in the care of horses and pack animals on the march. Loading horses, pack animals, and carts on freight cars and trucks.

## III. SHORT TRAINING COURSE IN RIDING AND DRIVING FOR NEWLY ORGANIZED UNITS

Since it often happens that the noncommissioned officers and men and occasionally even the officers of newly organized units have had no experience with horses, a short training course for them is indispensable. The objectives of such a training course for riding are:

1. To teach the rider to sit properly in the saddle and to acquire correct military bearing and rider efficiency.

2. To teach the rider to control the horse by such aids as are required in individual cross-country riding.

The objectives of the training course in driving are:

1. To teach the driver to control a horse by the proper use of the reins.

2. To teach the driver to equalize the pull of his team by adjusting the traces.

3. To teach the driver to control single and multiple horse teams in cross-country operations by the use of such aids as reins, whip, and brakes.

Training for service with horses should include instructions for both riders and drivers on the following topics:

1. The care of horses in the field, on the march, in transit, in permanent stables, on bivouac, and on rest halts. Forage. Improvement of shelters. First Aid. Handling of difficult or nervous horses.

2. Bridling, saddling, harnessing, and hitching, with special emphasis on nomenclature, uses, and adjustments.

3. Emergency repairs on all equipment.

It is absolutely essential to find time for training in these subjects. The instructor staff must arouse in the trainees an affectionate interest in horses, for this is the best way to insure an understanding care of the animals. The short course also establishes the foundation for a later, more highly specialized course in handling horses and their equipment.

The following fifteen hour course stresses practical training in riding and driving. If more hours are available the program can be expanded.

1. Riding Instruction.

First to Third hours: To give the rider confidence in his horse and to teach him the balance necessary to acquire poise.

Beginners should receive their preliminary instruction on the best, most rideable horses, using knotted snaffle reins. If only curb reins are available, they should be tied to the suspension straps of the saddle. No spurs should be used, but a short riding whip may be substituted. A trained rider leads the class in a circular formation and begins the sitting exercises without stirrups. Toward the end of each period riding

with properly adjusted stirrups (they must not be too long) is begun. In the same period there are exercises in mounting and dismounting from a standing horse. The light trot is practiced from the beginning. It is advisable to use a neck or stirrup strap which the rider can hold.

In the second half of each period, the riders are taught the use of aids to direct and control horses. They receive instruction in the use of reins. They are shown how to halt the walking column at a specified point, and then to resume the walk and to turn. At the end of each period, the trainees are sent to the stable, singly or in pairs, where dismounting is supervised.

All preliminary instruction is given prior to the practice period either in the stable, while saddling is going on, or in front of the stable. Live horses, not models, are used in demonstrations. The riding period must be kept for riding only.

Fourth to Sixth Hours: To learn to ride with and without stirrups and to control mounts by aids.

The first half of each period is given over to sitting exercises in open formation. After about ten minutes of practice, individual corrections are made. Although perfect form is not required immediately, proper seat and the correct positions of the thighs, the body, and finally the hands are

insisted upon. Riding with and without stirrups is alternated in quick succession. Stirrups are kept short.

During the second half of each period the trainee's general ability as a rider is developed by individual assignments in cross-country riding. At first this consists of riding from a central location to a specific place, halting, dismounting, remounting, and returning in a straight line to the instructor.

Seventh to Ninth Hours: To teach the proper use of stirrups and other aids by individual instruction.

Easy assignments are given involving cross-country riding and riding at will on the training grounds. In the second half of each period alternate walking and trotting both in and out of formation is practiced. Simple circles and turns are practiced at a walk.

Tenth to Twelfth Hours: To give instruction in the restrained use of the curb bit.

The snaffle bit remains in primary use; practice in riding with divided reins and with one hand is continued. Training is now given on natural terrain, although each period begins with a check on correct positions and handling. The scope of individual exercises is widened to include controlled pace, ascending and descending moderately steep inclines, crossing ravines, riding through forests, and leading off horses.

Individual assignments are supervised by assistant instructors.

Training in galloping and jumping depends on the availability of trained horses. Under no circumstances should trainees jump over obstacles which are too narrow or over twenty-five inches high. If horses are inexperienced, this type of training will not be given. For field service it is far more important that army riders be trained to negotiate ravines and slopes and to ride through swamps, after determining whether or not they are passable.

Galloping with heavy or difficult horses is not to be done in the training course. With poorly trained horses, galloping is restricted to cross-country movements in open formation.

Thirteenth to Fifteenth Hours: Review and extension of previous work. Sitting exercises continued. Riding exercise in full-field equipment.

2. Driving Instruction.

a. Instruction in Driving from the Saddle. Drivers should have at least ten to twelve hours of riding experience. With this prerequisite, a few lessons in driving, turning, leading off horses, using the whip, managing multiple teams, and learning to give commands and directions quietly from the lead horse position will suffice to prepare drivers to

meet every eventuality encountered later on in a battery or a column.

b. Instruction in Driving from the Box. Each training unit must be provided with stationary training equipment with which the instructor can teach the use of reins and lines to a class of ten to twenty students. Crude but adequate equipment may consist of reins passing over horizontal poles with stones attached for weights.

Instruction in the theory of driving is limited to the holding of lines, shortening or lengthening lines according to need, driving to a given point and stopping, making right and left turns, and equalizing pull by adjustment of the crosslines. This instruction can be completed on stationary equipment in ten or twelve hours. The additional training as provided in the standard driving course is omitted.

All practical training in driving, singly or in columns, runs concurrently with instruction on stationary equipment. After the first few lessons instruction is transferred to the training areas, which have natural terrain conditions. It is on the training ground that most of the mistakes are made and there that they can be corrected. The chief errors include holding the horses back when they must exert themselves, overuse of the whip and poor manipulation of the brakes.

# APPENDIX G

## SHORT TRAINING COURSE FOR TRAINING WITH HORSES

I. A THREE DAY COURSE FOR REGIMENTAL COMMANDERS

1. Training of Mounts and Inspection of Riding in the Field.

Thirty-five minutes: The horse must learn to submit to mounting and dismounting and must learn to walk or trot on the training grounds and across country or wherever the rider directs.

a. The horse is saddled and walked or trotted alongside the lead horse. The saddle should not be cinched too tightly, nor so loosely that the saddle blanket slips. Stops are made during which the horse is fed from feed boxes.

b. When the horse is quiet an experienced assistant helps the advanced rider to mount, letting the horse feed while patting it. The lead horse is meanwhile held diagonally across the front of the mount. The horse should be ridden forward as soon as possible, since a horse in motion bears the weight of the rider more easily.

c. The rider keeps his mount alongside of and then behind the lead horse, at first on level terrain and then across country. The rider makes no attempt at coercion, particularly with the reins.

d. Horses which balk at being saddled should not be cinched too tightly at the beginning and not while in the stable. Once mounted they should be immediately urged forward, with the rider alert to check any plunging.

e. A horse inclined to rear should be ridden forward immediately. If this is not possible, the assistant places one hand behind the animal's front knee forcing it to turn in a circle. When the horse stands still again, it is urged forward. The reins are never used for this purpose.

f. A horse which tends to stick close against another while being ridden or driven should be led away from the others or from the stable between two lead horses who gradually are guided away.

g. If a horse is inclined to kick at the spurs, they should be dispensed with and a crop used instead.

Fifteen minutes: When holding a riding inspection and conducting individual tests, the rider approaches the reviewer from a distance of about one hundred yards at a light trot, parades past the reviewer at a distance of ten horse lengths, and comes to a halt three lengths away. After the horse stands still, the rider dismounts and remounts, proceeds at a walk, changing to a trot, to a specified point, and returns. Individual riders are directed to ascent slopes and cross water courses or swampy places. If the terrain is too swampy to cross, the rider is expected to recognize and report it.

If the commanding officer passes by the instruction area, he should stop and ask the instructor which lesson in the short course is being taught. He should determine whether the instructor is following the plan and whether the instructor is expecting too much from the class for the state of training reached.

2. Training of Drivers. (One hour of instruction with stationary two-horse and four-horse team equipment).

Ten minutes: Explaining the principles of army driving.

Ten minutes: The correct way to hold reins with a two-horse team; the various positions which can be assumed by the driver.

Ten minutes: Shortening and lengthening the reins; the use of the single rein; driving to a specified point and stopping; left and right reverse turns.

Ten minutes: The correct way to hold reins with a four horse team; the correct position on the driver's seat. Lengthening and shortening reins: all reins, front and rear reins only, single rein.

Five minutes: Right and left reverse turns.

3. Practical Driving: Demonstrations. (Two hours with one, two, and four-horse teams; also hitched tandem.)

Ten minutes: With one and two horses: Driving to a given point, right and left turns, stopping.

Five minutes: With two horses tandem: One driving line, driving to a given point, right and left turns, stopping.

Ten minutes: With four horses tandem: two driving lines, driving to a given point, right and left turns, stopping.

Ten minutes: Tandem hitches: Driving, right and left reverse turns, stopping. One man driving, two men driving.

Five minutes: Tandem hitches: One man on foot leading front horse.

4. Cross-Country Driving: Demonstrations. (With one, two, and four-horse teams; also hitched tandem.)

Fifteen minutes: Driving up and downhill and over soft ground with one and two horses.

Fifteen minutes: The same with four-horse teams and in tandem.

Ten minutes: Driving through forests with one, two, and four-horse teams and in tandem.

Ten minutes: Driving over rough terrain and through water.

5. Driving Six-Horse Teams from the Saddle: Demonstrations.

Ten minutes: Mounting and dismounting; driving with three men as assistant drivers.

Five minutes: Lining up with a lead team, driving to a specified point, halting behind the lead team.

Five minutes: Driving downhill.

Five minutes: Right turns.

Five minutes: Left turns.

Five minutes: Driving over uneven ground.

Five minutes: Driving uphill.

6. Training Draft Horses and Inspection of Driving in the Field: Practical Instruction.

Ten minutes: Use of double reins.

Ten minutes: Use of lengthened towlines.

Five minutes: Use of the drag.

Ten minutes: Use of vehicles.

Fifteen minutes: Harnessing to vehicle; standing still in harness; starting with a quiet and steady pull; pulling quietly at a steady walk.

7. Horses and Pack Animal Equipment.

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| **First Period** | |
| Bridle model 22, complete (one half hour) | Size of bit, fitting, chin chain, headstraps. |
| Army saddle model 25 (five horses) | One horse with saddle incorrectly adjusted. One horse with army saddle and watering bit, complete. One horse with simplified type of bridle model 22. |
| Packsaddles (one half hour, six horses) | Packsaddle, Russian pack-saddle; three packsaddles improvised from army saddles. |
| **Second Period** | |
| Breast harness model 25 (four horses) | One double team harnessed correctly and incorrectly One double team harnessed to a vehicle correctly and incorrectly. |
| **Third Period** | |
| One horse vehicles and sleds (eight horses) | Harnessed to wagon and ih tandem to Russian farm cart; hitched to sleds in haphazard manner |

Fourth Period

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| Four horse teams (one half hour) | Lead horse with saddle; improvised reins. |
| Six horse teams (one half hour, fourteen horses) | Ten relay horses with reins and saddles. Back pads and saddles on off horses. |

Fifth Period

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| Various types of harnesses (11 horses) | Captured French and Russian harnesses; harnesses of varied types. |

Sixth Period

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| Harness repair and restoration (one half hour, six horses) | Repair of harness under combat conditions by exchange of standard parts. |
| Care of equipment | Three-horse teams. Cleaning, washing, oiling, and reconditioning. |

8. Administration. The commanding officer is responsible for seeing that all equipment is complete and in proper condition for use in the field. The supply and administrative officer is charged with the execution of these extensive administrative duties. On each regimental staff there should

be a supply and administrative officer in charge of horse-drawn vehicles, and for an artillery regiment an armorer-artificer,[1] and a clerk. The officer should have had practical experience with horses and their equipment.

All Wehrmacht equipment is classified in groups and is listed and stamped with a capital letter which stands for the service branch in which the item is principally used. Infantry equipment, for instance, but used by engineers would still be marked with a capital I. A distinction is made between equipment obtained from commercial sources and equipment manufactured exclusively for the Wehrmacht. Equipment is also classified collectively according to type, for instance, all hand weapons. These classifications are numbered 1 through 95. Requisitions for items on a current, authorized table of equipment are submitted in accordance with this system of letters and numbers and Army Manual, 398.

All units draft their requisitions in duplicate. The battalion consolidates the list of unit requirements and forwards them in five copies through channels. Regimental units send their requests directly to regimental headquarters. The agency which prepares the final requisition is responsible for

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[1] Waffenmeister: a civilian ordnance official with rank of second lieutenant.

the correct form and nomenclature. This agency on the advice of its technical experts decides whether or not the item requested is necessary. A record of all requisitioned items is kept.

a. Inventory. Each field unit keeps at least two inventories: a list of all equipment to which it is entitled and a list of protective equipment against gas attacks. A record of a soldier's individual pay card is also kept. Everyone responsible for any equipment must keep his own list.

b. Inspection. The commander or his representative must conduct spot checks to verify and inspect equipment on hand. The frequency of inspections depends on the situation. A complete inventory is made once each month and after any substantial loss of equipment through enemy action or other circumstance. Possession of weapons and equipment in excess of the basic table of equipment is not permitted without special authorization.

c. Ordnance Sergeants. The duties of ordnance sergeants are important and involve responsibility. His requisitions are most carefully considered to ascertain whether or not the items are absolutely necessary. The ordnance sergeant must be carefully chosen to insure that he possess the technical and personal qualifications, because it is on him that the condition, completeness, and combat efficiency of equipment will depend.

The ordnance sergeant should as far as possible be retained permanently in his position and not sent to the front. Measures should be taken to insure a qualified successor.

d. Turning in Equipment and Obtaining New Supplies. Units which are being organized, reorganized, or equipped with new weapons do not submit requisitions, since in these cases the equipment is supplied without request or by special instructions. Requests need be made only when deficiencies occur, either to conform with changes in the authorized table of equipment or to replace equipment lost or damaged through wear or enemy action.

When reorganization or an issue of new weapons produces a surplus of equipment, it must be immediately turned in to the nearest depot in exchange for a property receipt. The same is true for equipment which is no longer usable and for equipment, either German or enemy, which is collected on the battlefield, unless it is immediately required in the salvaging unit as replacement.

e. Report of Losses. Whenever equipment is lost through fire, flood, theft, sabotage, or negligence, a report of loss and an inventory of items is forwarded without delay to the next higher echelon.

9. Types and Care of Vehicles.

a. Advantages and Disadvantages of Army Vehicles. Several types of construction are used in assembling army vehicles: the limber system, the limber and pin system, the long beam system, and the underswung system.

The limber system allows the greatest cross-country mobility, but, because of its small loading space, it is used only for special type vehicles such as guns, field kitchens, signal trucks, and type 5 infantry vehicles. The limber and pin system does not provide ideal cross-country mobility but is fairly adequate. These vehicles have the advantage of a much larger loading space and a construction which allows the vehicle to be started without jerking. The thrust of the wheel is upward and is determined by the alignment of the axles. The alignment of the spokes is such that bending or breaking is almost impossible. Wheel bearings are interchangeable. The shafts are attached so as to permit sharp turns and allow a maximum of up and down movement. The front and rear wheels are the same size. Starting is controlled by leather rings with lock washers attached to the blanks at the ends of the axles. Driving is possible only from the driver's seat; it is impossible for a rider to mount a horse because of the shafts. The axles can be moved forward or backward independently of each other. The vehicle can move on three wheels, if a

block of wood is substituted for the missing wheel. All parts of the vehicle can be easily replaced or improvised.

The long beam system, because of the length of the vehicle is unsuited for cross-country use, but its large loading space makes it useful for hauling supplies. The underswung system is usually used in conjunction with the limber and pin system in army vehicles, type 7/11. If not, its use is restricted to garrison stations.

b. Replacement of Vehicles. All army vehicles can be replaced or indigenous type farm vehicles substituted.

c. Care of Vehicles. Vehicles should be washed at least once every eight days with plenty of water. Drying with a cloth is forbidden since the paint may be rubbed off. Vehicles should not be washed in the hot sun, for the paint will peel off. All points of friction are cleaned and greased but never polished. No body parts are polished with an oily cloth, since the oil will affect the paint and may lessen the effectiveness of camouflage colors. Minor adjustments and repairs are made during cleaning. The grease box must always be kept full. The wagon shafts should be checked for correct width from time to time; this is thirty-two inches. All leather straps used for securing accessories such as an axe or shovel are kept soft and preserved by frequent applications of special oil. Buckles must be kept from rusting so the rollers

will work easily. Wormy or damaged wood should be replaced. If the leather rings no longer prove sufficient to ease the starting of the vehicle, holes are bored in the extension of the axles. The holes for axle pins are bored close to the hubs. Old holes are welded closed. Another solution is to weld a small ring to the blank at the end of the axle. Worn axles are repaired by welding. Paint and varnish on the wooden structure of the wagon should be renewed frequently. If the proper paint is available, the canvas is also painted. The metal rings for the towing hooks may need to be replaced or strengthened. The shafts are checked for the correct length. A careful examination for cracks and breaks in the running gear is maintained as it is the most important part of any vehicle.

d. Emergency Repairs and Reconditioning of Army Vehicles. Loose spokes are tightened by hardwood wedges. Wheels with loose trusses are strengthened by the addition of four to eight spokes inserted between the hub and the felly in opposing pairs. Split spokes are bound with wire. Bent spokes are splinted and bound with wire. Broken spokes are replaced with emergency spokes bound to the spoke stubs with wire. Other repairs include the replacement of broken or split shafts, doubletrees and singletrees, and towing hooks. Limber pins, axle pins, and chains are replaced. New towing

shafts can be attached. Cart tilt holders are replaced.

e. Army Vehicles and Captured Vehicles. The steel frame army vehicle type 7/11 is too heavy for combat troops. Its net weight of 2300 pounds condemns it to immobility except for hard-surfaced roads. Its width between wheels, sixty-three inches, is too great for Russian roads. Troops with field experience reject it as they consider it a burden rather than an aid. Army vehicle type 2 is also too heavy for practical use. It is used only with the artillery and to a limited extent with the baggage trains.

The Russian farm vehicles, capable of carrying loads up to 800 pounds, were best suited to the needs of the combat troops. They were well adapted to Russian road conditions and could be pulled by the small Polish and Russian panye horses. A disadvantage was the wheels, which were different sizes, weak and without pegged spokes or rims, and often constructed of unseasoned wood. Suitable shafts could be improvised. If properly rebuilt, these vehicles were indispensable during the muddy season.

The lightweight Russian army vehicle was in great demand by the German troops. It carried a heavy load, was narrow, fifty-one inches, and solidly constructed. Its disadvantages included different sized wheels, an unsuitable singletree, a low frame, and shafts which were difficult to remove.

Opinions differ on the value of the small Czech farm vehicle. Its width, forty-four inches, was too narrow and its wheels were unequal in size. It weighed 946 pounds and could carry a load of 1550 pounds. It was very easy to drive on paved roads.

## II. A TWO WEEK COURSE IN RIDING AND DRIVING FOR RESERVE OFFICER CANDIDATES AND VETERAN NONCOMMISSIONED OFFICERS

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| | First Day (Monday) |
| 0800-0900 | Welcome by commanding officer or course leader tour of school installations. |
| 0900-1000 | The army saddle and watering bit. |
| 1000-1100 | Riding theory: mounting, positions and aids; demonstration on live model. |
| 1100-1200 | Driving (follows the short training course); proper way to hold the lines. |
| 1300-1330 | Practical demonstration: bridling and saddling. |
| 1330-1500 | Riding (the short training course, lessons 1 to 3). |
| 1500-1600 | The use of the army saddle, bridles, watering bit, and driving halter. |
| 1600-1700 | Care of horses in the stable. |
| 1715-1800 | Fatigue. |
| | Second Day (Tuesday) |
| 0700-0800 | Driving (follows the short training course); shortening and lengthening one or both lines; starting and stopping. |
| 0800-0900 | Veterinary: The horse and its physical structure. |

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| 0900-0920 | Intermission. |
| 0920-1000 | Riding theory: position and aids used at various gaits. |
| 1000-1030 | Practical training: saddling and bridling. |
| 1030-1200 | Riding (the short training course, lessons 1 to 3). |
| 1300-1400 | Breast harness model 25 as modified for combat use, other types of breast harness. |
| 1400-1500 | The right and the wrong way to fit and adjust harness. |
| 1500-1600 | Review. |
| 1600-1700 | The care and supervision of horses in stables. |
| 1715-1800 | Fatigue. |

Third Day (Wednesday)

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|---|---|
| 0700-0800 | Driving (short training course): how to equalize pull by adjustments of the cross lines. |
| 0800-0900 | Harnessing and hitching. |
| 0900-0920 | Intermission. |
| 0920-1000 | Veterinary: The care of horses and hoofs. |
| 1000-1030 | Practical training: bridling and saddling. |
| 1030-1200 | Riding (follows short training course, lessons 1 to 3). |
| 1300-1400 | Army vehicles types 1, 2, 3, 6, and modifications. |
| 1400-1500 | Driving: right and left turns. |
| 1500-1600 | The use of breast harness model 16 and captured equipment. |

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| 1600-1700 | Instruction in service with horses. |
| 1715-1800 | Fatigue |

Fourth Day (Thursday)

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| 0700-0830 | Review of army vehicles types 1, 2, 3, 6, and modifications; also replacement of field wagon type 40 by captured vehicles. |
| 0830-0930 | Review. |
| 0930-0950 | Intermission. |
| 0950-1100 | Practical instruction: harnessing and hitching. |
| 1100-1200 | Driving with field wagons. |
| 1300-1400 | Review: harness and harnessing. |
| 1400-1500 | Practical duties in the harness room. |
| 1500-1530 | Practical training: bridling and saddling. |
| 1530-1700 | Riding (follows the short training course, lessons 4 to 6). |
| 1715-1800 | Fatigue. |

Fifth Day (Friday)

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| 0700-0800 | Review: equalizing pull by adjustments of the cross lines. |
| 0800-0900 | Secondary harness and stable equipment; assembling harnesses. |
| 0900-0930 | Intermission. |
| 0930-1030 | Veterinary: feeding and watering, rations and food substitutes. (Army Manual 11/12) |
| 1030-1100 | Practical training: harnessing and hitching field wagons. |
| 1100-1200 | Cross country driving with field wagons. |
| 1300-1400 | The use of packsaddles and improvisations. |
| 1400-1500 | Practical duties in the harness room. |

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| 1500-1515 | Practical instruction: bridling and saddling. |
| 1515-1630 | Riding (follows the short training course, lessons 4 to 6). |
| 1630-1700 | Unsaddling and care of horses. |
| 1715-1800 | Fatigue. |

Sixth Day (Saturday)

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| 0700-0800 | Stable duties. |
| 0800-0830 | Practical training: driving, harnessing, and hitching. |
| 0830-0930 | Cross-country driving with field wagons. |
| 0930-0950 | Intermission. |
| 0950-1015 | Practical training: riding, bridling, and saddling. |
| 1015-1130 | Riding (follows the short training course, lessons 4 to 6). |
| 1130-1200 | Care of horses, participation in noon stable duties. |

Seventh Day (Sunday)

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| 0700-0730 | Practical training: driving, harnessing, and hitching. |
| 0700-0900 | Cross-country driving with field wagons. |
| 0900-0930 | Intermission. |
| 0930-1030 | Veterinary: feeding and watering during long and short rests and during transit. |
| 1030-1200 | Harnessing and hitching multiple teams; the use of reserve horses. |

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| 1300-1400 | Review: the care and use of the various types of harnesses. |
| 1400-1500 | Practical duties in the harness room. |
| 1500-1515 | Practical training: riding, bridling, and saddling. |
| 1515-1630 | Riding (follows the short training course, lessons 7 to 9). |
| 1630-1700 | Unsaddling and care of horses. |
| 1715-1800 | Fatigue. |

Eighth Day (Monday)

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| 0700-0800 | Practical training: driving of six-horse teams; harnessing and hitching. |
| 0800-0930 | Cross-country driving. |
| 0930-1000 | Intermission. |
| 1000-1200 | The use of packsaddles. |
| 1300-1400 | Practical duties in the harness room. |
| 1400-1430 | Practical training: riding, bridling, and saddling. |
| 1430-1600 | Cross-country riding (follows the short training course, lessons 7 to 9). |
| 1600-1700 | Instruction in service with horses: Improvised stables. |
| 1715-1800 | Fatigue. |

Ninth Day (Tuesday)

| | |
|---|---|
| 0700-0800 | Driving instruction and review. |
| 0800-0900 | Practical instruction in the use of infantry and mountain carts. |

| | |
|---|---|
| 0900-0920 | Intermission. |
| 0920-1000 | Practical training: driving six-horse teams; harnessing and hitching. |
| 1000-1130 | Cross-country driving. |
| 1130-1200 | Unharnessing and care of horses. |
| 1300-1430 | Veterinary: methods of protecting horses against poison gas. |
| 1430-1500 | Practical training: riding, bridling, and saddling. |
| 1500-1630 | Cross-country riding (follows the short training course, lessons 7 to 9). |
| 1630-1700 | Unsaddling and care of horses. |
| 1715-1800 | Fatigue. |

Tenth Day (Wednesday)

| | |
|---|---|
| 0700-0730 | Practical training: handling six-horse teams; harnessing and hitching. |
| 0730-0900 | Cross-country driving. |
| 0900-0930 | Intermission. |
| 0930-1100 | Emergency repairs to harness and vehicles. |
| 1100-1200 | Practical duties in the harness room. |
| 1300-1430 | Practical training: use of sleds; harnessing and hitching. |
| 1430-1500 | Practical training: riding, bridling, and saddling. |
| 1500-1630 | Riding (follows the short training course, lessons 10 to 12). |
| 1630-1700 | Unsaddling and care of horses. |
| 1715-1800 | Fatigue. |

Eleventh Day (Thursday)

| | |
|---|---|
| 0700-0800 | Instruction in service with horses: the march, rests, selection of stabling facilities. |
| 0800-0820 | Intermission. |
| 0900-1030 | Cross-country driving. |
| 1030-1130 | The harnessing and hitching of one or more horses to different types of vehicles, including Russian farm wagons and carts. |
| 1130-1200 | The care of harnesses, saddles, and vehicles in combat. |
| 1300-1400 | Review and practical work in the use of infantry and mountain carts. |
| 1400-1500 | Veterinary: first aid to wounded or injured horses pending the arrival of a veterinary officer. |
| 1500-1515 | Practical training: riding, bridling, and saddling. |
| 1515-1630 | Riding (follows the short training course, lessons 10 to 12). |
| 1630-1700 | Unsaddling and care of horses. |
| 1715-1800 | Fatigue. |

Twelfth Day (Friday)

| | |
|---|---|
| 0700-1030 | Training march. |
| 1030-1100 | Intermission. |
| 1100-1200 | Emergency repair of harness. |
| 1300-1500 | Practical duties in the harness room. |
| 1500-1600 | Veterinary services. |
| 1600-1700 | Review: driving theory and practice. |
| 1715-1800 | Fatigue. |

Thirteenth Day (Saturday)

Special program.

## III. A SIX-DAY COURSE ON SERVICE WITH HORSES FOR COMMANDERS OF MOUNTED AND HORSE-DRAWN UNITS IN THE REPLACEMENT TRAINING ARMY

First Day (Friday)

| | |
|---|---|
| 0730 | Joint breakfast in officers' mess. |
| 0800-0900 | Speech by commanding officer or instructor of the training course. |
| 0900-1000 | Practical demonstrations with stationary driving equipment (follows the twelve week course, lessons 1 to 3). |
| 1000-1100 | Practical demonstrations in fitting bridle and saddle. |
| 1110-1200 | Instruction by the veterinarian on the following subjects:<br>1. The horse and its physical structure.<br>2. First aid to injured horses when a veterinarian is not immediately available.<br>3. The feeding of horses.<br>4. The management of horses during war.<br>(The first two lessons may be given in front of the barracks and the second two indoors). |
| 1215 | Joint noon meal. |
| 1400-1500 | Practical instruction in mounting and on relationship of rider and horse. Instruction on posture and the aids used in the various gaits. |

1510-1600 Observe trainees beginning training on the twelve week course.

1610-1700 Practical demonstration on the care of horses and the stable: feeding and watering, the care of hoofs and legs.

1715 Joint evening meal.

Second Day (Saturday)

0630 Joint breakfast.

0700-0800 Practical demonstrations of stationary driving equipment (follows the twelve week course, fourth to seventh weeks).

0810-0900 Practical demonstrations of draft horses in double teams; correct and incorrect ways of adjusting harness and lines.

0910-1000 Practical demonstrations with vehicles in front of the barracks.

1010-1100 Observe trainees, taking the twelve-week course, in the fourth or fifth weeks of training.

1110-1200 The duties of a commander of a mounted or horse-drawn unit, includes the following subjects:

1. What to watch for during a day's rest.
2. What to watch for when a unit is starting out.
3. What to watch for during the march.

1215 Joint noon meal.

Third Day (Sunday)

0730 Joint breakfast.

0800-0900 Practical demonstration with double teams, driving from the seat.

0900-1000 Practical demonstration in the harnessing and use of six-horse teams, driving from the saddle, also with supplementary horses; the same with four and six-horse teams, driving from the saddle, and from the wagon seat using auxiliary lines.

1010-1100 Practical instruction in the driving of four- and six-horse teams from the wagon seat using auxiliary lines. In contrast to the preceding demonstration in front of the barracks this is an actual driving demonstration given on suitable driving grounds.

1110-1200 The duties of a commanding officer, with emphasis on the following:

a. What should the commanding officer watch for during long rests? During short rests?

b. What should the commanding officer look for in selecting suitable quarters for stabling his horses? In selecting a place suitable for a bivouac?

1215 Joint noon meal.

1400-1500 Observe trainees, taking the twelve week course, in the sixth or seventh weeks.

1510-1600 Display and practical demonstration of captured enemy equipment, harnesses, saddles and reins, and breast harness model 16.

1615-1730 Evening meal.

Fourth Day (Monday)

0600 Joint breakfast.

0620-0920 Practical instruction in the driving of double teams from the box and six-horse teams from the saddle; the latter with lines to the wheel and swing teams, or to the lead horses. Demonstration of improvised stables.

0930-1000 The care of army equipment.

1010-1100 Demonstration of the harness and equipment used by pack animals.

1110-1200 Instruction by the veterinarian on the following subjects:

1. What to do during gas attacks; protective measures; decontamination of horses.
2. The feeding and care of exhausted horses and pack animals.
3. The principal diseases of horses and pack animals; how to recognize symptoms; provisional treatment and care pending the arrival of a veterinary officer. The segregation and isolation of horses suspected of having a contagious disease.

1215 Joint noon meal.

1400-1500 Observe trainees, taking the twelve week plan, in the eighth week.

1510-1600 Practical demonstrations of draft horses as single teams or in tandem to infantry carts, sleds, and Russian farm wagons.

1610-1700 Stables: Emergency field stables and precautionary measures taken against fire. Erection of temporary stables in combat. Permanent stables.

1715 Joint evening meal.

Fifth Day (Tuesday)

0730 Joint breakfast.

0800-0830 Practical demonstration in the training of wagon drivers.

| | |
|---|---|
| 0840-0910 | Administration and care of army equipment and the duties of the ordnance sergeants. |
| 0920-1100 | Observe training of riders, taking the Short Training Course for Riders and Drivers in Newly Organized Units. |
| 1110-1200 | Practical instruction on the training of riding horses; the handling of temperamental or stubborn horses and animals which shy easily; holding riding inspections; training in galloping and jumping in the short training course. Demonstrations on natural terrain. |
| 1215 | Joint noon meal. |
| 1400-1500 | Practical demonstration in the training of draft horses and the holding of driving reviews. |
| 1510-1620 | Practical demonstrations on emergency repairs to vehicles and other equipment. |
| 1630-1700 | Care of vehicles and other equipment in combat. |
| 1715 | Joint evening meal. |

Sixth Day (Wednesday)

| | |
|---|---|
| 0530 | Joint breakfast. |
| 0630-0750 | Demonstrations of cross-country riding by training in the twelve week course. |
| 0800-0830 | Practical instruction with stationary driving equipment in the handling of four-horse teams from the wagon seat. |
| 0830-0900 | Practical instruction in the driving of four-horse teams from the wagon seat. |
| 0910-1000 | Practical demonstrations in the handling and driving of three-horse teams. |

| | |
|---|---|
| 1010-1030 | Practical instruction in the operation of field kitchens and in the use of special equipment and appliances of the auxiliary services such as lighting, workshops, sanitation and tents. |
| 1040-1100 | Practical demonstration in holding review and inspection. |
| 1110-1200 | Closing address by the commander of the school or the course leader. |
| 1215 | Joint noon meal. |

IV. A FOUR WEEK COURSE IN THE CARE OF HORSES

First Day

| | |
|---|---|
| 1 hour | Stable service and guard duty. |
| 1 hour | Feeding and care of horses. |

Second Day

| | |
|---|---|
| 1 hour | Types of harnesses, bridles, and snaffles. |
| 1 hour | Practical instruction in bridling. |

Third Day

| | |
|---|---|
| 1 hour | The use of army saddle model 25. |
| 1 hour | Practical instruction in saddling. |

Fourth Day

| | |
|---|---|
| 1 hour | The use of breast harness model 25. |
| 1 hour | Practical work in saddling and bridling. |

Fifth Day

| | |
|---|---|
| 1 hour | The use of improvised harnesses and stable equipment. |
| 1 hour | The horse and its physical structure. |

| | |
|---|---|
| Sixth Day | |
| 1 hour | The proper way to hold lines. |
| 1 hour | The use of army vehicles types 1-3. |
| Seventh Day | |
| 1 hour | The use and adjustments of breast harness model 16. |
| 1 hour | The shortening and lengthening of one or both lines. |
| Eighth Day | |
| 1 hour | Starting and stopping. |
| 1 hour | Simplified adjustments of breast harness model 25 and bridle model 22. |
| Ninth Day | |
| 2 hours | Practical demonstrations of harnessing and hitching to wagons. |
| Tenth Day | |
| 1 hour | Right and left turns. |
| 1 hour | Service with Horses. |
| Eleventh Day | |
| 1 hour | Army vehicles types 1-3. |
| 1 hour | Emergency repairs of vehicles and their care. |
| Twelfth Day | |
| 1 hour | Equalizing the pull by adjustment of cross lines. |
| 1 hour | Veterinary instruction in feeding, watering, fodder and fodder substitutes. |

Thirteenth Day

| | |
|---|---|
| 1 hour | Replacement of wagon type 40 by commercial and captured vehicles. |
| 1 hour | Adapting harnesses to commercial and captured vehicles. |

Fourteenth Day

| | |
|---|---|
| 1 hour | Starting and stopping. |
| 1 hour | Harnessing and hitching. |

Fifteenth Day

| | |
|---|---|
| 1 hour | The use of infantry carts. |
| 1 hour | Veterinary instruction in what to do in case of gas attacks, protective media, and the decontamination of horses. |

Sixteenth Day

| | |
|---|---|
| 2 hours | Practice in driving double teams from the box. |

Seventeenth Day

| | |
|---|---|
| 1 hour | The care of horses in combat; on the march, in transit, in bivouac, and during rest periods. |
| 1 hour | Emergency repairs to harness. |

Eighteenth Day

| | |
|---|---|
| 1 hour | The use of packsaddle models 23 and 33 with emphasis on proper fitting. |
| 1 hour | Adaptation of army saddle model 25 for emergency use as a packsaddle. Demonstrated on a live horse. |

Nineteenth Day

| | |
|---|---|
| 2 hours | Driving double teams from the box. |

Twentieth Day

| | |
|---|---|
| 1 hour | First aid to wounded horses pending arrival of veterinarian. |
| 1 hour | Harnessing multiple teams and driving four-horse teams from the box with driver on lead pair. |

Twenty-first Day

| | |
|---|---|
| 2 hours | Driving double teams from the box cross-country. |

Twenty-second Day

| | |
|---|---|
| 1 hour | Handling difficult and shying horses. |
| 1 hour | The use of sleds; demonstrations. |

Twenty-third Day

| | |
|---|---|
| 2 hours | Demonstrations of wagons pulled by three-horse teams with an additional off horse or fourth horse, driven from the box with an assistant driver handling the lead team with extended, improvised lines; three-horse teams with the lead horse properly saddled and pulling. Demonstration of using an off horse in the center, completely saddled and bridled. Using a captured horse without harness in the same position. |

Twenty-fourth Day

| | |
|---|---|
| 2 hours | Practical instruction in service with horses: assembly of harnesses under adverse conditions. |

Twenty-fifth Day

| | |
|---|---|
| 2 hours | Demonstration in harnessing and hitching multiple horse teams; driving six-horse teams from the saddle, and from the saddle and the box. |

Twenty-sixth Day

| | |
|---|---|
| 2 hours | Review of harness types and uses. |

Twenty-seventh Day

| | |
|---|---|
| 2 hours | Review of vehicles and uses. |

Twenty-eighth Day

| | |
|---|---|
| 2 hours | Review of equipment. |

TOTAL TIME PER SUBJECT

| | |
|---|---|
| Service with Horses | 5 hours |
| Harnesses | 17 hours |
| Saddling, Bridling, and Harnessing | 5 hours |
| Veterinary Instruction | 4 hours |
| Driving Instruction | 6 hours |
| Vehicle Instruction | 8 hours |
| Practice in Driving | 6 hours |
| Demonstrations | 2 hours |
| Equipment | 2 hours |
| Total | 55 hours |

V. A TWO WEEK COURSE IN DRIVING FROM THE SADDLE FOR A HUNGARIAN CHEMICAL BATTALION

| | |
|---|---|
| **First Day** | |
| 2 hours | The care of stables and horses, feeding and watering. |
| 1 hour | Harnesses, bridles, and saddles. |
| 1 hour | Riding (follows the short training course, lessons 1 to 3). |
| **Second Day** | |
| 2 hours | Harnesses, breast harness model 25, the correct and incorrect ways of fitting. |
| 1 hour | Riding (follows the short training course, lessons 1 to 3). |
| 1 hour | Limbers and long beam vehicles. |
| **Third Day** | |
| 1 hour | Review of use and fitting of breast harness model 25. |
| 1 hour | Riding (follows the short training course, lessons 1 to 3). |
| 2 hours | Use and fitting of commercial and captured harnesses. Practical work in the harness room. |
| **Fourth Day** | |
| 2 hours | Assembling and adjusting harnesses. |
| 1 hour | Riding (follows the short training course, lessons 4 to 6). |
| 1 hour | Review of vehicle instruction. |

Fifth Day

| | |
|---|---|
| 2 hours | Bridle model 22 or 43 for one riding horse. Practical work in the harness room. |
| 1 hour | Riding (follows the short training course, lessons 4 to 6). |
| 1 hour | Emergency repairs to vehicles. |

Sixth Day

| | |
|---|---|
| 2 hours | Harnesses for six-horse teams . |
| 1 hour | Riding (follows the short training course, lessons 4 to 6). |
| 1 hour | Practical training in the care of harness. |

Seventh Day

| | |
|---|---|
| 1 hour | Harnessing and hitching six-horse teams. |
| 2 hours | Driving six-horse teams on training grounds. |
| 1 hour | Riding (follows the short training course, lessons 7 to 9). |

Eighth Day

| | |
|---|---|
| 1 hour | Harnessing and hitching, using infantry carts. |
| 2 hours | Driving six-horse teams on training grounds and in town. |
| 1 hour | Riding (follows the short training course, lessons 7 to 9). |

Ninth Day

| | |
|---|---|
| 1 hour | Harnessing and hitching multiple teams. |
| 2 hours | Driving six-horse teams in town and country. |
| 1 hour | Riding (follows the short training course, lessons 7 to 9). |

| | |
|---|---|
| Tenth Day | |
| 1 hour | Emergency repairs of harness. |
| 2 hours | Driving six-horse teams cross-country. |
| 1 hour | Riding (follows the short training course, lessons 10 to 12). |
| Eleventh Day | |
| 1 hour | Use of sleds. |
| 2 hours | Driving six-horse teams cross-country with improvised lines from the wagon seat. |
| 1 hour | Riding (follows the short training course, lessons 10 to 12). |
| Twelfth Day | |
| 1 hour | Care of vehicles and harnesses in combat. |
| 2 hours | Driving six-horse teams cross-country with off horses. |
| 1 hour | Riding (follows the short training course, lessons 10 to 12). |
| Thirteenth Day | Special program. |

# APPENDIX H

## FORAGE FOR HORSES

# FORAGE FOR HORSES[1]

## I. PRINCIPLES OF FEEDING

In order to maintain effective performance and good health, it is supremely important for the horse to have a proper supply of forage and water. Not only may contaminated forage cause serious illness and many casualties, but also perfectly good food can produce the same effects if it is not fed correctly and in the proper amounts. In every war it has been necessary to use fodders from foreign countries and substitues. Great care must be taken in these instances. A knowledge of even the most unusual foods which could possibly be used in war should be required of every unit commander, feed supervisor, rider and driver.

The statements made here are generally valid for all the types of fodders listed in Section II below.

1. Forage must be free of dust and sand.

2. The personnel in charge of horses must always determine which animals have good stomachs or are subject to colic. In cases of colic even oats and hay in excellent condition should be given only in small but frequent feedings.

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[1] The information contained in this study was used during World War II in courses on care and feeding of horses.

The same is true of water. After great exertions even horses with good stomachs must be fed and watered sparingly.

3. When very fresh or green forage such as oats, barley, wheat, and corn and especially grain which is partly spoiled are fed, the greatest care in watering must be exercised.

After exertion, especially in summer, horses should be watered frequently but sparingly. Water should be sprinkled over the hay or green fodder. When partially spoiled fodder, including hay, green forage, and potatoes, is fed and when the horses are not accustomed to the food being used, special care is necessary in watering. Again, the animals are watered often but sparingly. To obtain continuously good performances horses should be watered at every stop. The more rested a horse is, the better it can digest its forage, and this is true of water also.

If the grain available for feeding is not too good, high quality hay, particularly clover, has the same food values as grain substitutes and is preferred to other forage. Hay is least likely to upset horses inclined toward sickness.

4. Since rests for feeding are often not possible during marches, scythes are carried in the vehicles and used to mow a few armfuls of green forage at every halt which is offered to the horses. One side of the bit is loosened to enable the horse to eat more readily. Young reeds are an excellent green fodder.

5. Since green forage has such a high water content, a horse needs six or eight times as much green fodder as it does hay or straw in order to satisfy its appetite. A correspondingly longer time is needed to eat green fodder, and if this not provided the animal will not receive sufficient roughage.

II. FODDERS

1. Grain.

a. Oats.

(1) Stored oats in good condition have a thin, shiny husk. The color is golden yellow, although some foreign oats are brown or black. Oats should be stored after harvesting for six to eight weeks, should be free from offensive odors, and should be free from sand and dust. The kernels should be large, hard, and dry.

(2) If the oats are moist or mouldy they will cause indigestion. However, moldy oats can be used safely if they are soaked in salt water, one teaspoon of salt to two quarts of water, drained, and dried in the sun, turning frequently.

(3) Oats which are in good condition but which are freshly harvested, that is stored for less than six weeks, are difficult to digest, have a slight laxative effect, and

cause increased sweating. Uncured oats can be fed in small but frequent feedings, providing no water is supplied for two hours after the feeding.

(4) Oats which are not in good condition(sandy or moldy), and which have not been stored for six weeks or more are detrimental to the health of the horse. They can be cleaned by pouring them into a pail of water and stirring vigorously. The sand will settle to the bottom and the spoiled grains and dust will come to the top and can be poured off with the water. The oats can then be fed in small amounts, but no water is to be given until two hours after the feeding.

(5) There is no reason why good unthreshed oats should not be fed to horses with good stomachs as long as the kernels are dry. Horses must be watered either before the feeding or not until two hours afterwards. Since the kernels are difficult to digest, the oat hay is fed only in small amounts but frequently.

(6) It is forbidden to feed oat sheaves in which the grain is wet and mashed together, green or black in color, and has an earthy, moist odor. These oats can be fed if the sheaves are spread in a thin layer in a dry, airy spot and turned frequently, thoroughly dried, winnowed to remove impurities, and the moldy clumps painstakingly removed.

Watering of the animals should always take place before feeding oats of this nature. Since the oats cannot be fed immediately, only hay or green forage should be used as a substitute.

(7) Green, unmowed oats are a perfectly good forage, if they are not fed when covered with dew. Water should not be given until two hours after feeding.

In feeding it is often merely a question of whether the fodder is to be given to healthy horses, which can digest anything they are offered, or whether the fodder is to be given to horses which are exhausted, weak, or susceptible to colic. Extra care is always necessary for the weaker horses. They should never be given water which is too cold, and even then water or grass should be laid in the water.

Only fresh green forage is used; never when it is in a stage of decomposition. If the oats are mowed for later use, they can be fed only when dry. Only the best portions of the oats are selected; then fed in small amounts. Even oats in good condition should be issued and fed in small amounts. This is even more true of substitutes, since, as a general rule, substitutes are dangerous to any horse which is not working. Horses on the march digest forage more easily because of better blood circulation in the digestive organs.

Precautionary measures must be taken when feeding horses oats mixed with barley, rye, or other grains. Most grains other than oats must be soaked in water before feeding. It is extremely important that all the water which is used in soaking be completely drained off before feeding the grain.

If a grain substitute for oats is to be used, the horses must be gradually accustomed to it. Any sudden change of diet must be avoided. During the first few days of the changeover the usual fodder is mixed with small quantities of the new variety.

b. Barley. Because of its indigestible, tough husk, barley is used as a substitute grain only in exceptional instances. Good barley is light yellow in color and has large, long, dry kernels. Fresh barley, like moldy or moist barley, is easily recognized by its peculiar odor. All fresh grains can be recognized by their typically earthy odor. Barley should be crushed or ground, but, if this is impossible, it may be soaked in water for twenty-four hours. The water is drained off before feeding. Freshly harvested barley, six to eight weeks old, is particularly difficult for horses to digest and should always be soaked for the twenty-four hour period. For processing barley hay and green or spoiled barley use the procedures described above for oats.

c. Rye. The color of good rye is greyish green and on rare occasions yellowish. Rye is very difficult to digest and its use can cause pernicious colic and digestive disorders. Only by exercising the greatest caution can horses be accustomed to eating rye, especially horses suceptible to colic. Rye can be fed only after it has been boiled, scalded, or soaked in water for six hours, which makes it easier to digest. The water is poured off before using. Rye should never be fed before the horses have been watered. The feeding of rye by itself should be avoided. In order to get horses used to eating it, rye grain may be mixed with oats at a ratio of two to one.

Freshly harvested rye is always detrimental to the horses' health and can never be fed. When feeding dried rye hay, a fungus called ergot must be watched for. It can be easily recognized as a dark grey or dark bluish grey growth as long as a matchstick growing on the ears. The processing of damaged rye is the same as the procedure described above for oats.

d. Wheat in good condition has a shiny yellow or yellow brown color. The grains have a curiously compressed appearance. When wheat is used as a substitute for oats, it has the same disadvantages as rye. The same precautionary measures are taken.

e. Corn is closest of all substitutes to oats in digestibility and nutritive value. Ripe corn has a gleaming golden yellow color, and when dry it has a slight oily sheen. The kernels are larger than peas. Because of its husk, corn is usually ground or soaked in water. Ground corn soon gets rancid and can not be stored. When fed in large amounts it causes diarrhea. The horses should be watered either before feeding or not until two hours after feeding.

Corn stalks and corn cobs are liked by horses, but they can be fed only in small amounts without damage; large amounts cause diarrhea. If damaged corn is to be used it is treated in the same manner as damaged oats.

f. Millet is a small brown or yellow grain about half the size of a matchhead. It is hard to digest because of the hard husk, but it is a tolerably good substitute for oats if it is soaked for twenty-four hours or, better still, if scalded or boiled. Prepared in this manner, millet is particularly digestible when mixed with chopped straw and can be fed in any amounts.

g. Buckwheat is fed in the same fashion as wheat. Since the husk is very tough, it should be ground or soaked. Animals are watered before feeding. Buckwheat should be mixed with a great deal of chopped straw. Feeding more than three pounds a day per animal is detrimental.

h. Peas, beans and vetch are high in nutritive values, but they are difficult to digest and are considered detrimental when fed in large quantities. The best procedure is to mix a few handfuls with oats daily as a supplemental food. More than three pounds should never be issued and even three pounds only after the horse has undergone great exertion. Watering should always take place before feeding. Peas, beans and vetch should be soaked in water for twenty-four hours before they are used. These grains should be at least one year old before using. For this reason any other kind of forage, including coarse fodder is preferable.

i. Bitter lupine is poisonous and must first be boiled for an hour and then soaked for forty-eight hours in frequently changed water. It is then crushed, well mixed with oats and chopped straw, and fed as a mash. The horses should be gradually accustomed to eating lupine. The maximum daily ration should be one half of the oats ration. Sweet lupine is a good forage and can be fed as a mash without any other preparation. Nevertheless, all other grains and coarse fodders are preferable to lupine.

2. <u>Bulbs and Roots</u>.

a. Potatoes. It is very important to water the horses before feeding potatoes. Potatoes are an acceptable substitute, but horses must be gradually accustomed to them

They must be thoroughly washed of sand to prevent colic, and all the sprouts must be removed to prevent poisoning. If fed raw, potatoes should be cut into small pieces, and no more than five pounds should be fed at one time. They are most nutritive when served boiled or steamed and mixed with chopped straw. Some salt should be added, about one teaspoonful to each ten pounds of potatoes. After they have become used to potatoes, heavy work horses can eat as much as forty pounds a day without ill effects.

Frozen potatoes may only be fed if steamed. Rotten potatoes are detrimental. Raw or cooked potato peels can be collected from the kitchens and fed to the horses.

b. Turnips are considered more as a supplementary food than as a substitute. This is true also of beets, rape and carrots. When fed in large quantities, they cause diarrhea and enervate the horses. Turnips should be washed before using or at least shaken free of dirt. Soil can easily cause colic. The turnips are cut into small pieces and mixed with grain and chopped straw in order to make the latter more appetizing. When turnips are the only forage available, they should be chopped and fed in small quantities mixed with leaves, or if possible chopped straw. To prevent diarrhea much hay but little water--not more than one pail ful at a meal--must be given. If a rest of several days

duration is possible, the laxative effect of the turnips can be decreased by feeding powdered charcoal.

3. Coarse Fodders.

a. Hay. Hay is an exceedingly nutritive and indispensible fodder. Hay in good condition is glossy green in color, has a pleasant, aromatic odor, is rather rough to the touch, and contains flowers and sweetgrass, but does not leave a cloud of dust when pitched out for feeding. The sour hay which grows in damp and marshy meadowland is of less value. It consists mostly of rushes, sedge, and marsh horse-tail, whose knobby stalks easily differentiate them from more valuable plants.

Hay which has been exposed to wet weather for a long time before being stored is recognizable by a dark color and a noticeable lack of aroma. Hay which is less than two months old and which has not been properly cured, will cause serious colic. If it must be used, it must be mixed with older hay or with straw, but green forage would be a better substitute. Impure, musty and moldy hay is detrimental and can cause serious indigestion.

If there is no forage on hand in good condition it is better to feed the horses spoiled hay rather than to let them starve. If spoiled hay must be fed, it should be shaken out well in the open air, moistened with water, pressed dry, and fed immediately.

Because of transportation difficulties, compressed hay often reaches the combat units in a moldy condition. The bales should be broken open immediately, well shaken up, the damaged hay removed, and stored in a dry, well-aired place where it can frequently be turned and the moldy hay removed. Hay which is not quite in such poor condition should merely be spread in the sun. In rainy weather it should be soaked in salt water for as long a time as possible before feeding.

Careful watering is necessary when feeding hay in large quantities. Freshly mowed, green forage is preferred to hay which is not in perfect condition.

b. Green Forage. It is very easy to digest but has a high water content. The best way to utilize green forage is to let the animals graze. Herders must be present to prevent any injuries caused by biting and kicking. Known biters and kickers as well as mares in heat, should be kept on a picket when grazing.

The following precautionary measures must be carefully followed:

(1) Gradual transition from dry to green forage. During the first days of eating green forage; the horses should not be permitted to satiate themselves. It is advisable to mix the green forage with hay.

(2) Green forage, if mowed, must be cut twice a day, two or three hours after sunrise and in the evening before the dew falls.

(3) Green forage wet from the rain is not dangerous, but green forage, especially clover and alfalfa, causes colic if covered with dew.

(4) Cut green forage must be fed immediately. Any surplus is spread in thin layers so that it will not start to decompose. It should be shielded from the sun.

(5) Horses should not be watered for two hours after having been fed green forage.

c. Straw. As a forage straw has slight value in itself but it assists the digestion of grains and hay. Good straw is golden or pale yellow in color, has a sweetish taste and a pleasant, aromatic odor. Summer straw is softer and more digestible than the winter product. Barley straw and the vines of peas, beans, and sweet lupine can cause light cases of indigestion. Rye and oat straw are most suitable.

d. Chopped straw. If there is only a little straw available, it should be chopped and added to the concentrated fodders. Chopped straw makes the horses chew more and increases the activity of the digestive glands. Only straw which is in perfect condition should be used. Straw which is chopped too fine easily causes indigestion. It should be cut in equal pieces two to three centimeters long.

Moldy, musty, or wet straw should be used only if the same precautions are taken as with hay.

e. Substitutes for Hay and Straw. Twigs, wood, sawdust, and shavings can serve as supplements. They help to fill the intestines and quiet the torment of hunger. Twigs from deciduous trees and bushes are better for horses than those from evergreens, whose resin irritates the urinary ducts. Old growth conifers are preferable to new growth however. The twigs must be chopped as finely as possible or mashed with a hammer.

Twigs and wood of poisonous plants, such are yew, boxwood, ivy, acacia, and luburnum, are not to be used under any circumstances.

Pulp from paper mills can be mixed with hot water and potato peels and fed as a mash. The stomach contents of slaughtered cattle can be washed and when dry fed as a roughage.

4. Other Foods.

a. Treacle. The syrupy byproduct of sugar beet manufacture can be mixed with straw, clay, or peat. Horses like treacle. It has a laxative effect, however, and should not be fed in amounts above two pounds per day. The high sugar content of treacle increases thirst, and accordingly horses must be given more water.

b. Sliced Sugar Beets. Horses like beets but they do not have sufficient food content to be fed alone. Dried beets should be soaked for a few minutes before feeding. The horses should be watered before feeding. Sliced beets can be mixed with oats and chopped straw.

c. Oil cakes, made of sun flower seeds and linseed, are soaked in water or broken into small pieces and mixed with grain or fed with chopped straw. The daily ration may consist of one to two pounds.

d. Stale bread which is not moldy is an important extra food.

# APPENDIX I

## TRAINING YOUNG REMOUNTS WITH INEXPERIENCED RIDERS

## TRAINING YOUNG REMOUNTS WITH INEXPERIENCED RIDERS[1]

I have been assigned by the Inspector of Riding and Driving to present a short lecture on the training methods used with the young remounts at the Schlosshof Riding and Driving School, while taking into consideration present-day training methods. I had discovered last year that terrain conditions there were quite unfavorable. Enclosed riding areas where the ground had some degree of elasticity were not to be found. The stony, muddy soil, but which was as hard as cement in the summer, injured the hoofs of the young horses. Only two hippodromes were available for exercises and organized training, although they were good sized and covered. I was compelled to locate an area which was disease free and suitable for exercising the horses until they were mature enough for military service. Last year it became possible to lease twelve acres of suitable land in the vicinity of the school, and, after a lot of trouble, to obtain lumber and divide the area into enclosures and

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[1] A lecture by Colonel von Flotow, commander of a Wehrkreis riding and driving school, given on 29 October 1942 at the Army High Command in Berlin to staff officers who supervised horse transportation in the various armies and to commanders of Wehrkreis riding and driving schools.

pastures. The enclosures were just finished when the remounts arrived.

The basic thought behind our training method is to prevent any difficulties which would result from detachment or transfer of good cavalrymen and instructors during the year by developing the physical condition and dispositions of the remounts to a point where they could withstand any handicaps imposed by inadequate care and poor riders.

Training began early in July upon the arrival of the remounts and their division into groups. The remounts included Hanoverians, horses from the Warthegau and Brandenburg, and East Prussian horses. They were permitted to run freely every day without a saddle. Two groups at a time were brought into a closed ring divided by a railing into two sections. The trainers led the horses with their left hands, and, after the reins had been knotted short, the horses were released. There was no shouting, no use of whips, only extreme calmness; accidents and injuries did not occur. After a few days of such training, the horses were galloping and trotting smoothly. On the second or third day the horses were saddled but without blankets, since the saddle does not have to be cinched tightly when the blanket is not used. Our purpose was to avoid having a blanket come loose, slip down and frighten the horse. On the third and fourth days,

mounting and dismounting was practiced. On the fifth and sixth days, the mounted horses always with feed bags were paced on lead reins. We were satisfied with small results and obtained them by being completely calm and patient, by not shouting, and by dismounting frequently.

Depending on the duty roster, the horses were kept in the enclosures in the mornings and afternoons of the rest days and also during the noon hour. They were fed after their arrival in the enclosure.

The infantrymen, who arrived about fourteen days after the horses, were divided so each group consisted of twelve to fourteen horses and six to eight men. Almost none of the trainees had previous experience. Everyone rode from the very beginning, mounting and dismounting frequently. Each horse was equipped with neck straps and the riders were instructed to hold on to the neck straps at all times. If the horse was moving counterclockwise around the ring, the rider grasped the neck strap in his right hand, that is, the hand which was on the outer side of the ring, and also kept the extended snaffle rein in the same hand. The left snaffle rein was held quite loosely and if necessary the rider could still grasp the saddle with his left hand. The rider should never raise his hand and force the horse's neck upward when he begins to trot, nor should he rock backwards

in the saddle when a quicker pace is started. Either of these two movements can cause the horse more pain than we have commonly believed, and the horse assuages the pain by shaking its back. When the neck and head are forced upwards, the horse becomes uneasy and the rider frightened. When the trainees were told to mount, to find out if they had riding talent the horses remained astonishingly quiet.

Particular stress was laid on the value of tapping as a turning signal: the left hand for the left side and the right hand for the right side. These gestures loosen the rider and make him more flexible. The rider's legs will assume a correct position automatically. If the horses become quiet and lower their heads and necks, it is because the riders have involuntarily lightened the load on their back and reduced the tension. The neck straps must be held. Everything is done to develop the expansion of the horse's neck.

Light trotting is undertaken on the first day of training; it is not very difficult to teach. The horses are first trained in a group behind a suitable lead horse. The proper interval between horses is developed naturally. The horses should be trotted in a curved line and not made to turn sharply. The gait should be frequently changed, and riders must not curb the horses too tightly. If curbing is

necessary, it can be done by using the right hand on the neck straps. The stirrups should not be too long. When turning the horse the hand is held low, away from the animal, and is not pulled to the rear. When mounting the reins are held out and the horse is quieted by stroking or by carefully putting an arm about its neck.

Since a horse also enjoys a feeling of freedom, it prefers to carry the rider's weight on its shoulders, just as a man who puts a heavy load on his shoulders does not like it when it slips down on his back. A rider quickly learns to handle the short riding stick and to direct the horse by tapping the shoulders or the rump.

After about three weeks of training, the horse is equipped with a very long, low-buckled martingale which forces the neck and head of the animal backward and forward. Training with the martingale is accomplished without difficulty. Control is maintained by the length of the martingale; none of the horses resisted by jerking its head upwards. By using the neck straps for reins, trotting is learned in a remarkably short time.

The riders must learn to use the neck straps[2] for assistance in starting, moving into a trot, or slowing down

[2] In addition to the neck halter, a breast strap or unbuckled stirrup can be used as neck straps. In an emergency the rider can also hold onto the suspension straps of the saddle, although these are actually too far to the rear to be of much use.

preparatory to shifting into a walk. The rider quickly learns to distribute his weight evenly and to avoid pulling on the snaffle rain. Proper use of the legs develops naturally. If the horse rears or jumps, the rider must learn that safety lies in grabbing the neck straps and bending forward and not in pulling back on the snaffle reins.

Martingales are also used when riding in open country, but are unhooked upon the return, and are never employed within the stable compound. The martingale, when used with loose snaffle reins, develops an easy, natural arch of the back, something like a gently arched bridge. In time the curve is fortified by the stomach and back muscles and so reinforced that a rider can sit comfortably on an elastic, vibrant base. An experienced instructor must carefully supervise the use of the martingale. The martingale is not used to force the horse but only to aid it in assuming comfortably and easily a certain posture. By using the martingale a measured, balanced gait is developed in a short time. Horse and rider complement each other and they begin to be a team.

The physical condition of the horses did not deteriorate during training, as is often the case when horses are being broken, but on the contrary they generally improved.

Teaching the riders and horses to gallop did not cause any difficulties. On the whole the horses were easy to manage

by this time, had soft, elastic backs, and their rear legs swung forward without dragging. A certain rythm of movement had been acquired and they quickly learned to work in formations. The horses appeared to be contented, which gave the riders a feeling of safety and satisfaction.

By this time the lower part of the horses' necks did not bulge, nor did the horses protest the use of the reins, nor did they run. They did not run away when they were hitched to a wagon. The lessons in driving are much easier to continue if any excited, restless horse is first allowed to move about freely for a few minutes.

It is of prime importance that the rider becomes a master of the art and that he rides often with the reins in one hand only.

The horses soon learn to jump, being held at first on a line within an enclosure. When the weather is very hot the horses are kept in the pastures over night. In one instance the commanding general made his inspection out of doors after four weeks of training and it proved very satisfactory. One group of men and horses was trained completely in the open country and was never in a ring. This group was composed of horses from Warthegau and was considered one of our best groups. Only infantrymen were trained with these horses.

The thirty artillery officers who took the course were very stiff and clumsy at first. By questioning them about their earlier training in riding, it was learned that the officers had been taught the so-called military form. In this method of riding the feet are held high in a cramped fashion and turned inward, and the arms are pressed stiffly against their bodies. When addressed it was difficult for them to turn their heads. Teaching them to use tapping as means to guide their horses was a difficult task. However, in about eight days they achieved a more relaxed style of riding.

When the instructors were asked whether they would use a different method of instruction another time, they declared that, if free to make a decision, they would continue to use the system which I have described even if under more favorable circumstances. In spite of a rather difficult physical installation, training had never been easier. All were very satisfied. The rapport between instructors and students proved excellent and the students showed great interest. When time and conditions permitted, the riders rode without stirrups, and the instructors attempted to improve good sitting posture by demonstrating the correct form. Proper form always had to wait until the riders had become relaxed.

Our basic training principle was to inculcate in the rider a desire to ride and a love for his horse, and in the horse to develop a calm temperament and the habit of obedience to his rider.

# APPENDIX J

## THE ARMY HORSE

(From a German translation of the original Russian text)

## APPENDIX J

This book presents to the reader the fundamental uses of horses for military purposes, with an emphasis on the special qualities of the various breeds. It also deals with problems of organizing a high level administration for horse breeding and the army remount services within the Soviet Union and other countries. It was prepared primarily for officers of the Red Army, for use as an instruction manual in army veterinary schools, and for leading horse breeders.

# PART ONE

# THE ARMY HORSE AND ITS SIGNIFICANCE IN NATIONAL DEFENSE

## CHAPTER 1

## THE HORSE IN THE NATIONAL DEFENSE AND IN THE NATIONAL ECONOMY

Since ancient times great numbers of horses have been used as instruments of war, either in combat, in hauling supplies, or in messenger service. In the course of history and the accompanying changes in the art of war, the role and significance of horses in military service also changed. Originally horses were used exclusively as mounts or draft animals. Even in ancient times, nations who engaged in animal husbandry, for instance the Scythians, were compelled to take to the saddle in order to control their pastures and their large herds. Riding gear was easier to make than wagons.

Many historians are of the opinion that the light chariot was used to transport a heavily armed warrior and that its use antedates the riding horse. The chariot in time also became an instrument of war. However that may be, it is certain that the first use of horses for military purposes was to bring the warrior and his weapons to the battlefield as quickly as possible and with the least possible effort. It

is inmaterial whether a warrior first came on a horse or in a vehicle.

In time cavalry developed its own shock power when used in large, compact formations. The striking power was due not only to the hand weapons which the riders wielded but also to the impact of the horses. Cavalry, supported by infantry, temporarily became the most important branch of any armed force. Horse breeding usually received a new impetus and new breeds developed whenever a victorious army occupied a country rich in horses of good quality. In such a way the Flemish breed was created, and the South Ukranian horses acquired their characteristic qualities as riding horses.

However, gunpowder and firearms profoundly affected the organization and employment of cavalry as well as the demands made on all military horses. During the first half of the nineteenth century and increasingly thereafter, massed cavalry no longer satisfied the operational requirements of the changing battlefield. New weapons, new battle techniques, and the very extensive use of rail and motor transportation created new systems of military tactics. During the imperialist war of 1914-18 the new conditions very negatively affected the commitment of massed cavalry. During the

World War,[3] cavalry never had a chance to prove its real worth, although this war was waged by armies which had large cavalry forces.

At the end of 1917 the Russian armies had about 2,766,000 horses, and 404,000 horses were used by auxiliary organizations. At the beginning of the World War, Germany had 3,810,000 horses, of which 876,000 were employed by the army. Of the latter number, 727,000 horses were with combat units and 159,000 were located in the zone of interior. New German units organized during the war required about one million horses. In April 1915 the number of horses in the German Army, including captured horses, totalled 1,270,000.

During the first months of the war the remount services of all the belligerents functioned relatively well. Subsequently great difficulties were encountered everywhere, and these became more serious with every passing year.

In the first four years of the war, Germany requisitioned for its army over one million horses, which was almost one-fourth of the total number of horses in Germany. The great losses, including discharges for injuries or other physical inadequacies, and the requirements of new units so increased the demand for horses that horse-drawn artillery and infantry trains were forced to cut their teams from six to four horses and supply trains were cut to two horses per vehicle. During

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[3] Since the original text was written before World War II, the author's references to "World War" are to World War I. (Ed)

the war 2,500,000 horses were employed by the German Army at one time or another, which was 66 percent of the total horse population of Germany.

The peacetime budget of 1914 allowed the French Army to use 175,000 horses and mules, but during the first five months of the war the number was increased by 780,000 horses purchased in America. Between 1915 and 1918 the number of horses in the French Army averaged 925,000, but at the time of the Armistice there remained only 740,000 horses and mules. During the war the French Army lost 1,140,000 or 60.6 percent of its total horse population. However, this very high loss was due to improper employment and the general shortage of fodder.

At the beginning of the war the British Army had only 25,000 horses, but this number quickly increased to 1,300,000 horses and mules. British losses totalled 529,000 or 40 percent.

The Austrian Army had 800,000 horses, and of this number Austrian statistical reports indicate that 250,000 became casualties by July 1918. Austrian cavalry losses during the four years of the war were 160 percent of the authorized peacetime strength. Most of the losses were sustained at the beginning of the war. In autumn 1914 the Austrian cavalry lost 45 percent of its horses.

The American Army during its two years of war in France lost 28 percent of its 243,500 animals. The Italian Army which had an authorized strength of 48,000 horses during the war had only 37,000 horses in 1917. In 1913 Belgium had 26,000 horses, but only 9,795 of these were used in the Belgian Army.

The number and quality of horses available to the belligerents in the World War considerably influenced the tactical and operational decisions of the military leaders. And it should be clear from the above figures that even in a war of position horses played an important part.

The tables which follow indicate the horse population in the major countries of Europe, Asia, and America in 1933, 1935, and 1936.

TOTAL NUMBER OF HORSES IN CAPITALIST COUNTRIES (in thousands)

| Country | 1935 | 1936 | 1933 per sq km | 1933 per 100 persons |
|---|---|---|---|---|
| Poland | 2702 | - | 10.1 | 12.1 |
| Germany (without army horses) | 3389.9 | 3407.1 | 7.2 | 5.1 |
| France | 2810 | 2774 | 5.3 | 6.9 |
| Belgium (farm horses only) | 231.4 | - | - | - |
| England | 1120.4 | - | - | - |
| Italy (without army horses) | - | 816.3 | 3.0 | 2.3 |
| Austria (1934) | 461 | - | - | - |
| Hungary | 806.6 | - | 9.1 | 9.6 |
| Czechoslovakia | 695 | - | 5.0 | 4.7 |
| Rumania | 2166.6 | - | 6.9 | 11.0 |
| Yugoslavia | 1208.8 | - | - | - |
| Finland | 360.6 | - | 0.9 | 10.2 |
| Norway | 182.6 | 185.5 | 0.6 | 6.3 |

| Country | 1935 | 1936 | 1933 per sq km | 1933 per 100 persons |
|---|---|---|---|---|
| Sweden | 611.2 | - | - | - |
| Denmark (farm horses only) | 502.6 | 536 | - | - |
| Estonia | 217.8 | 215.9 | 4.4 | 18.6 |
| Latvia | 384.4 | 388.8 | 5.6 | 19.0 |
| Lithuania | 558.1 | 558.3 | 10.6 | 24.2 |
| Greece | 361.4 | - | - | - |
| Turkey | 600.6 | - | .7 | 3.8 |
| Iran (1934) | 400.6 | - | - | - |
| Albania | 67.2 | - | - | - |
| China | 3874 | 4080 | .4 | 1.1 |
| Japan (1932) | 1541 | - | - | - |
| Manchukuo (1924) | 1831.2 | - | - | - |
| Outer Mongolia | 1638 | - | - | - |
| Korea | 52.6 | - | - | - |
| British India | 1717.2 | - | - | - |
| U.S.A. (farm census) | 11635 | 11527 | 1.6 | 9.8 |
| Cuba | 757.8 | - | 6.4 | 21.8 |
| Canada | 2931.3 | 2918.5 | .3 | 29.4 |
| Mexico (1926) | 1035.8 | - | .5 | 7.3 |
| Argentine (1930) | 9858.1 | - | 3.5 | 83.5 |
| Brazil | 6131.7 | - | - | - |
| Uruguay (1930) | 622.9 | - | 3.3 | 31.6 |

OTHER ANIMALS IN CAPITALIST COUNTRIES (in thousands)

| Country | Mules | | Donkeys | | Camels | |
|---|---|---|---|---|---|---|
| | 1932 | 1933 | 1932 | 1933 | 1932 | 1933 |
| France | 135 | 131 | 228 | - | - | - |
| Spain | 1461 | - | 1164 | - | - | - |
| Italy | 456 | - | 905 | - | - | - |
| Greece | 161 | 169 | 964 | 374 | - | - |
| Yugoslavia | 16 | 17 | 115 | 117 | - | - |
| U.S.A. | 5034 | 4931 | 48 | - | - | - |
| Mexico | 751 | - | - | - | - | - |
| Brazil | - | 2790 | - | - | - | - |
| Argentine | 1039 | - | - | - | - | - |
| Iran | - | - | 1198 | - | - | - |
| Colombia | 453 | - | - | - | - | - |
| China | 5000 | - | 16831 | - | - | - |
| Manchukuo | 904 | 850 | - | - | - | - |

| Country | Mules | | Donkeys | | Camels | |
|---|---|---|---|---|---|---|
| | 1932 | 1933 | 1932 | 1933 | 1932 | 1933 |
| India | 75 | - | 1881 | - | 947 | - |
| Turkey | 40 | 44 | 908 | 909 | 86 | 85 |
| Iraq | - | - | - | - | 53 | 51 |
| Algeria | 175 | 177 | 332 | 332 | 169 | 170 |
| Palestine | - | - | - | - | 32 | - |
| French Morocco | 108 | 115 | 611 | 677 | 132 | 145 |
| Tunisia | 51 | 52 | - | - | 169 | 179 |
| Egypt | - | - | 795 | 953 | 156 | 154 |
| South Africa | 141 | - | 741 | (1930)- | - | - |
| British Somaliland | - | - | - | - | 1500 | 1500 |
| Ireland | 175 | - | - | - | - | - |
| Bulgaria | 185 | (1926) - | - | - | - | - |
| Brazil | 2790 | - | - | - | - | - |
| British Sudan | - | - | - | - | 400 | 400 |

In the Western hemisphere the United States holds the leading position numerically in horses, with Argentina in second place. In Asia, China is first, and in Europe, not including Soviet Russia, Poland occupies the first place, with Germany second. On the basis of density of stocks, European countries come first. Denmark, Lithuania, and Poland lead with more than ten horses per square kilometer. As to the relation between the number of horses per hundred pupulation, the countries of the Western Hemisphere are unquestionably in the lead; Argentina, Uruguay, Canada, and Cuba have eighty horses per hundred people. Australia is next with twenty-seven horses per hundred people. In Europe the Baltic states of Lithuania, Latvia, and Estonia are clearly in the lead, averaging more than twenty horses per hundred people.

Comparing the 1930 statistical figures of the various countries with those of 1913 we find that the changes in the total number of horses in the world are as follows:

| Continents | 1913 | 1928 | 1930 | 1930 |
|---|---|---|---|---|
| | | | % | in thousands |
| Europe (without Soviet Russia) | 23,213 | 23,545 | 22.4 | 22,698 |
| North and Central America | 26,133 | 20,224 | 18.2 | 17,931 |
| South America | 18,162 | 19,620 | 18 | 18,162 |
| Asia (with the USSR) | 10,308 | 10,911 | 5.5 | 4.914 |
| Africa | 1,639 | 2,070 | 2.1 | 1,692 |
| Australia | 2,968 | 2,295 | 2.2 | 2,976 |

Figures for 1935 clearly show that the sum total of all European horses, including the European portion of the USSR, amount to fifty percent of the world total, and more than one third of the total number of horses in the entire continent of America.

In some countries there is a reduction of horses, or perhaps it is a stabilization in rural areas and reduction in the towns. The decrease in the number of horses, which is due to the increase in motorization in the country, and the shift of the population into the towns, is paralleled by changes in the aims of the horse breeders. The breeders have also been affected by the changes demanded by army administrative agencies. These agencies tend at present to emphasize breeding of horses for agricultural purposes within their own countries, so horses may be available as an army reserve of supply. More stress is

laid on strength and hardiness than on speed, a direct consequence of army motorization.

As the above table shows clearly enough, the present level of horse breeding is generally about the same as before the war. The data of recent years, however, show unmistakable signs of reduction in the total number of horses in Europe, a fact closely allied to the overall economic crisis in the capitalistic countries. This reduction is characteristic of the more highly industrialized countries of Europe and America. The United States and Great Britain, the most highly industrialized capitalist countries, show the greatest and most regular annual reduction.

## CHAPTER 2

## THE ARMY HORSE IN MODERN WAR

The World War robbed the farms of Europe and of countries overseas of a very great number of horses. Roughly speaking, 10,000,000 horses were employed by the military of the belligerents between 1914 and 1918.

The cavalry and other mounted units of the warring nations, although supplied with the very best riding horses, did not by any means meet the expectations placed on them. Because of serious deficiencies in organization, in equipment, in tactical preparation, and in operational use, cavalry was not able to cope with the tasks which were assigned it. This, however, only proves how little the armies of the bourgeois states knew about the art of war and shows the inadequacy and basic incapacity of the overwhelming majority of cavalry commanders of the nations participating in the imperialist war.

Even during the war of maneuver at the beginning of the World War, the German, French, English and also the Russian cavalry made a very poor showing, and their fighting yielded modest or pitiful results. There were only a few instances in which cavalry elements distinguished themselves, and then

generally in local sectors only when enemy forces were advancing to establish first contacts. During the position warfare which followed, cavalry forces could not adapt themselves to the new battle conditions. Whole cavalry divisions were dismounted and firmly entrenched, their horses abandoned somewhere far in the rear. The cavalrymen were decimated by enemy artillery just as were the men of any infantry division. The cavalry of all the European armies and on all the fronts became so entangled with the barbed wire and fortifications of position warfare that in the end they yielded their place and role in the war to armored vehicles and tanks.

In this inglorious manner cavalry was withdrawn from the battlefields of the imperialist war, and grave doubts arose in the minds of military experts and writers as to the value in large-scale, modern wars of this once proud arm. (We are not here concerned with cavalry raiding parties in colonial warfare, conditioned by very special terrain conditions and other circumstances, nor, for similar reasons, with the cavalry actions in such conflicts as the Graeco-Turkish War of 1922-3.)

The hypnotic effect of the war of position exercised a decisive influence on the development of cavalry in the postwar period. Completely conflicting and contradictory views prevailed in Western Europe down to recent times on the

possibilities of cavalry's future employment. French post-war doctrine, for instance, reduced materially the possible sphere of cavalry employment. From being the leading exponent of a very active and far-reaching employment of strategic cavalry, the French went to the opposite extreme. It was decided that a combat action could not be carried out by mounted cavalry. English and American post-war theorists admitted that cavalry was still capable of acting independently in tactical situations and able to conduct large scale operations in sparsely inhabited regions with few roads.

The development of the internal combustion engine was not without influence upon the reorganization of armies in the years after the war, and many bourgeois military experts went so far as to believe that "living forces"--here reference is primarily to the cavalry mounts--could be greatly reduced. It is known that Fuller and other bourgeois theorists on mechanized warfare represent the view that a fundamental reorganization of the whole structure of the army is absolutely necessary. These theorists even insist that the present mass armies be replaced by smaller, completely motorized and mechanized armies, capable of being complemented through the addition of politically reliable personnel.

But this idea of a totally mechanized instrument of war met with much serious objection even in bourgeois circles; the horse found its defenders. Present students and specialists in the field maintain, in contrast to the representatives of the idea of total motorization, that as of today the internal combustion engine is by no means able completely to replace the horse. They point to a whole series of weaknesses inherent in motorized forces, such as their dependence on roads, in contrast to cavalry which are capable of moving through every kind of country and terrain. The critics further defend the view that motorized divisions will not be in a position to take full advantage of their mobility and speed and that in modern armies the cavalry should not consist of poorly mounted infantrymen but rather of sharpshooting cavalrymen. Of course, the modern use of airplanes and the tactics of armored forces will often make the use of roads impossible to cavalry, but its movement across country will not be seriously impeded. Therefore, it is important that the cavalryman should be able to overcome the most difficult terrain conditions, such as being able to traverse either alone or in a large force any water obstacle while at the same time remaining ever ready for combat. Only a rider mounted on an excellent army horse can accomplish these tasks.

Colonel Brook, an Englishman, analyzing the results of the special maneuvers of 1927 and arguing against the opponents of cavalry, asserted:

> For regions poor in roads technical science has not yet been able to invent anything better than a good war horse. Statements which attempt to prove the futility of cavalry in a mechanized army and the end of all horseback riding in any armed force are amateurish and thoughtless assertions made by people who are incapable of following their own analysis of future tactics to their logical conclusions.

We do not entirely share this view. Modern tactics have made it possible to make extensive use of armored vehicles with cross-country mobility, so that the absence of roads is not in itself an unsurmountable obstacle to the movement of mechanized forces. But Colonel Brook is basically right; in modern warfare the horse still does not lose its combat significance. Colonel Brook proposes a whole series of new cavalry training exercises. He emphasized the importance of an adequate peacetime training program for both the rider and his mount, by utilizing uneven, difficult terrain, long marches as much as fifty kilometers, and movement and combat at night.

Poland also pays close attention to the question of the cavalry's role in modern war. Polish military writers maintain that cavalry still has many advantages over motorized troops. There is especially no comparison between the ratio

of attition of cavalry and of motorized troops. The Poles believe that cavalry is best suited to slip through a breach in the enemy's front and thus be better able to attack quickly the exposed flanks and pin down the enemy. Horses are not held back by any terrain obstacles except swamps. While their speed is not very great, it is an average and sustained one; and it should not be forgotten that in an emergency horses can continue for some time without food or rest.

Brandt, former Inspector of Cavalry in the German Reichswehr expressed this view on the subject:

> Motorized forces are far more dependent on a certain and regular supply of indispensable motor fuel than cavalry forces are dependent on forage supplies. For short periods of time a horse can get along on reduced rations and yet remain employable, whereas a motor vehicle will not budge from the spot without fuel.

With reference to the functions of independent, motorized and mechanized forces, a Polish author asked the question: "How will the well-planned and far-reaching objectives of a mechanized division be attained if, for instance, the fuel supply column for some reason or another cannot make contact with the division in accordance with instructions?" The writer goes on to show how and why such failures are frequent, and concludes, "Better a horse without oats than a motor without gas."

We, of course, disagree with this point of view. In our opinion the answer to the problem is that a horse must have his oats and the motor must have its fuel. Our industry is geared to and our military science directed toward the accomplishment of this objective. We cited the opinions expressed in previous paragraphs only to emphasize the truth that horses, with their great reserve powers of endurance, have by no means become superfluous on the battlefields of modern warfare. Many bourgeois theorists still talk of mechanized and mounted forces as if these were alternatives, forgetting that one can only speak of complementary forces, of cooperation on the battlefield, of a distribution of duties and assignments in a joint operation. Motorized troops, mechanized troops, mechanized forces, and cavalry in particular, are assigned very important and decisive roles in a break-through. The common objective of this combined new force is to exploit the breakthrough made by the infantry by swift strokes aimed at the enemy's flanks and attain the deepest possible p netration of the enemy's position. In all the important armies mounted troops are in the process of being reorganized and equipped with the newest weapons. They are by no means being liquidated.

The urge to increase mobility and combat strength led to the motorization of certain cavalry elements, resulted in the

speeding up of cavalry movements and marches. The normal daily march for motorized troops is about 150 kilometers, whereas a day's march for a cavalry regiment is no more than fifty to fifty-five kilometers. If the cavalry trains and columns are mechanized, the rider's combat load can be reduced to a maximum of twenty-five pounds.

The motorization of every kind of column, however, must be carried out with due regard to the terrain conditions of the prospective battlefields, and primary consideration must be given to road conditions. These problems occupied the minds of German military writers at the time the German Army was being expanded. The question was, should all the trains of divisions and major units be motorized, or should a portion of them--of necessity or choice--remain horse-drawn. On this subject a number of considerations were voiced. Although in any future war motorized trains will have to bring in the major portion of all supplies, it will not always be possible to employ them. The movement of trucks may become extremely limited in very rugged terrain, such as mountainous country or areas with few or no roads. It is also maintained that the total motorization of supply trains in Germany is in any case out of the question because of the shortage of native fuel and oil resources.

The World War led to an enormous increase in mechanical transportation of one kind or another. The number of trucks used grew into thousands. The Englishman, Liddel Hart, the well-known champion of mechanized forces, writing on the war of the future, declared with some bitterness that the force of tradition was so great that modern armies went so far as to keep antiquated artillery pieces, that horses were still being used with motor vehicles, and that vehicles without armor were combined with tanks.

Only a short time ago Italy's criminal war against Ethiopia showed that horses and other draft animals could still be of the greatest importance. The mountains and deep raviness posed supply and communication problems for the Italian troops, and motor vehicles employed in Ethiopia had an extremely large number of breakdowns. Owing to the very poor condition of the roads, the stony ground and fine dust particles which penetrated motor parts, and damages of all kinds, vehicles became useless within a short time. The need for replacements was correspondingly great.

Of the 7,500 trucks which the Italians had at the beginning of the war, 2,000 were soon lost. The ammunition for the front-line troops and the small 65-mm infantry guns had to be transported on pack animals. During the war the Italians transported the major part of all supplies on pack animals

The Italian Army began the war with approximately 2,000 mules, 10,000 camels, and over 10,000 horses, but by early February the number of horses and mules had been increased to 87,000.

The rates of march established by army regulations for the German and French military forces are shown in the following tables:

| German Army | Kilometers per hour | Average Daily March in Kilometers |
|---|---|---|
| Infantry division | 4 | 25-40 |
| Cavalry division | 7-8 | 40-60 |
| Mechanized unit | 20 | 150-200 |
| Motorized infantry | 30 | 250-300 |

| French Army | Kilometers per hour Day | Night | Average Daily March in Kilom. | Forc. March in Kilom. |
|---|---|---|---|---|
| Infantry | 4 | 3 | 25 | 40 |
| Cavalry | 8 | 6 | 53 | 100 |
| Horse-drawn artillery | 7-8 | 6 | 35 | 100 |
| Field Artillery | 5-7 | 6 | 20-30 | 40 |
| Machine gun units on vehicles | 20 | - | 80 | 150 |
| Machine gun units on cross country vehicles | 22 | 15 | 90 | 150 |
| Motorized artillery | 10 | 10 | 75 | 90 |
| Cyclists | 8-12 | 10 | 45 | 100 |
| Personnel carriers | 20-22 | - | 80-90 | 150 |

Speed of Cavalry Compared with Speed of Motorized Units

| Maximum speed per hour | Average speed per hour | Endurance | Terrain |
|---|---|---|---|
| Cavalry | | | |
| Best types 20-30 km | 8-10 km for a few days; 80-100 km per day | 10-12 hrs per day for 4 to 5 days | Everywhere except in swamps |
| Meachnized forces | | | |
| 60-70 km | Cross country 10-15 km; on roads 25-30 km; daily performance 100-150 km | 8-10 hrs per day for 2 to 3 days | Wheeled vehicles: roads and limited areas without roads Cross country combat vehicles, armored cars and tanks: everywhere except in swamps and thick woods. |

The above data show that modern cavalry is capable of great mobility; but it is not intended that cavalry compete with motorized forces in speed. Competition does not play any role in these calculations.

Although the military authorities of the capitalist countries created a cavalry which was well organized in every respect and which took full advantage of modern technical developments, Germany takes the most realistic view of the problem. Colonel Lebel writes that "rapidly moving masses of cavalry will learn to play their part in any future war," that "the days of cavalry

are by no means numbered," and cavalry "only needs to adapt itself and its equipment to the demands of modern warfare." Writing on the same subject Colonel Faber du Feaur says that "the basic task of a rational organization is to produce a close collaboration of horse and motor on the battlefield. Success in war may depend upon it."

It should also be pointed out that along with the reduction in the number of German cavalry divisions Germany proceeded to organize and establish a special national socialist cavalry corps. It is a completely militarized fascist organization. The Germans intend to use their cavalry chiefly on the eastern front.

## CHAPTER 3

## RUSSIAN CAVALRY IN A FUTURE WAR

The ideas of total mechanization and of small professional armies have developed from a middle class mentality and that of its official representatives. Recognizing the growth of the revolutionary movement in their own countries these bourgeois officials no longer trust a people's army, so they dream of an organization more submissive to their will: a relatively small number of chosen men organized into fascist armies.

Fuller's hope, however, the elimination of men and other living forces in future wars, remains pure fantasy. But no less false are the views of the representatives of bourgeois military science, who, rejecting the horse as a useful instrument in modern war, consider the cavalry a completely obsolete arm, or at best of very limited value. A few foreign military writers find that the only remaining significance of cavalry rests with the great tactical mobility of its horses, through which, given proper training, cavalry can in an emergency operate in small units. They also recognize the maneuverability of mounted cavalry in any kind of terrain, as well as its advantage in being able to bring its fire power close to the enemy without serious losses of personnel.

Such a concept of the part cavalry has to play in modern warfare does not by any means correspond to the combat assigned Soviet cavalry. As the experiences of the Russian civil war have shown, the Red cavalry is not only highly capable of approaching its enemies; it can also deal smashing blows right from the horses' backs.

Comrade Budenny in his work, The Breeding of Horses in Soviet Russia, (State Agricultural Publishing Company, 1932), speaks of the tasks of Soviet cavalry in modern war:

> In any future war the tactical situation will require cavalry to have fire power, maneuverability, and shock power, or in other words great mobility and the ability to combine rapidly for a swift movement of mounted cavalry making full use of its weapons and other technical aids. Cavalry requires a particularly close knit organization and highly trained personnel. It must, moreover, make use of the support of motor vehicles, through which it attains a greater capacity and power for effecting a breakthrough and the ability to operate on a very wide front. By its very nature the horse gives this arm its great mobility which is next to that of the motorized forces.

The great development in artillery and other weapons, the air forces, the armored forces, and the chemical warfare units have only complicated cavalry tactics; they have by no means lessened the significance of cavalry as an arm. By its nature cavalry is destined to be a strategic weapon. To this end it has now found mighty allies in tactical air support, air transportation and mechanized forces.

In earlier was the cavalry moved about a great deal but fought comparatively little. Now crowded tactical concentrations on modern battlefields set a limit to any such riding and compel cavalry to come to grips with the enemy.

In mountainous regions and in the uninhabited regions of the eastern theater of war, cavalry acquires a very special significance. There cavalry must and will play the most important operational role, with the assistance of the airplane and other modern technical instruments of war. In wild and mountainous country the air force, in cooperation with other arms and especially with mounted cavalry, will tie the various separated operations into a unified whole. The cavalry will attack the enemy, from its advanced guards to the reserves deep in the rear, and will permit a coordinated attack on a broad front against enemy forces distributed in depth.

The difference between the massed cavalry operations so brilliantly executed in former days and the present use of cavalry consists chiefly in the fact that modern cavalry attacks need to be far more carefully prepared and that the operations are carried out in cooperation with the air force and motorized elements. The commitment of cavalry is determined by its fire power, its shock power, and its capability for surprise. Cavalry has not only survived, but has not

been revived and can be used more effectively than ever if skillfully led. In modern war cavalry has acquired a new and special significance. Indeed it fits well into the characteristic nature of modern war: great manouverability and mobility. The mission of the Soviet cavalry and internal structure and organization are basically different from what they are in bourgeois countries. The cavalry as a part of the Red Army is the sword and shield of the proletarian dictatorship.

The significance of the Red cavalry in the Red Army was noted clearly and sharply on the twentieth anniversary of the Red Army when Comrade Voroshilov, Marshal of the Soviet Union and People's Commissar of Defense wrote:

> We represent a completely different point of view. It is self-evident that in any future war the conditions under which cavalry will be committed will be totally different from what they used to be. The proud, old concept of "Queen of the Battlefield" no longer quite fits the cavalry of modern times. There can be no doubt of this, particularly in the case of western countries. But we are firmly convinced that our heroic cavalry will show and prove that in the future it remains what it was in the past, will remain a victorious Red cavalry. It has been completely reorganized to conform to present day battle conditions. It is not without protection against air or tank attacks, and is, moreover, so organized that, either in combination with other arms or alone, it can cope with the most difficult battle assignments. Comrades, our frontiers are inconceivably long and immeasurable and the Soviet Union has many enemies. Thus the Red cavalry and its heroic fighters and leaders have occasion enough to let their deeds reveal their skill and to prove that the Red cavalry has remained a victorious weapon to destroy its enemies, capable of dealing with any important task on all fronts in any war.

# PART TWO

# ARMY REMOUNTS AND ARMY REQUIREMENTS

## CHAPTER 4

## THE CAVALRY HORSE AND ITS EMPLOYMENT

To the rider a cavalry horse is only a medium for getting some place, but the quality of a horse is not determined by its mobility alone. The possibility of using cavalry in a massed formation for decisively defeating an enemy gives us the right to consider the cavalry horse as a powerful fighting weapon. Mounted fighters move quickly to positions which are under fire, overcome obstacles on the way, throw the enemy into confusion through the onrush and impact of the horse itself, and finally pursue the enemy until he has been completely crushed. Such fighting takes place heavy demands on the cavalry horse. In the first place cavalry horses must be equal to the rapid movements characteristic of cavalry engagements. They must also be capable of long, sustained marches through the battle area, either behind or ahead of the front and along the open flanks of the enemy. Under the rider's skillful guidance, the horse must be able to control all its movements at every gait, maintain its balance, distribute its weight and react correctly to the rider's aids.

The qualities which a cavalry horse should have include:

1. A capacity for long, fast marches; endurance under a given load at an adequate speed.

2. Adaptability to changes in fodder and climate.

3. Legs, muscles, lungs, and heart capable of great endurance and exertion.

4. In a riding horse, ease and elasticity at various gaits, galloping and jumping ability, manageableness and responsiveness to aids and directions.

Cavalry horses are first of all evaluated as to:

1. Internal physical qualities such as lungs and heart.

2. Movements.

3. External physical qualities; body structure.

4. Live weight, carrying capacity and strength.

A horse should have an energetic temperament to conform with its disposition, but it should not be too spirited or violent. Its movements should be free and easy, and the horse should be manageable. While maintaining correct breathing it should be able to pass quickly from one gait to another. A rider should be able to feel the gait of the horse beneath him.

Height is the most important factor in judging the outward appearance of a horse. A low stature produces an unfavorable balance between the weight of the rider and equipment and the weight of the horse.

A cavalry horse needs not only mobility but also strength, which is determined by the speed the horse can develop under the weight of the rider. Excessive height is generally a sign of a lack of endurance. The most desirable height for a cavalry horse is sixty-two to sixty-five inches. Height, of course, must correspond to weight and bone structure. If a horse weighs around 900 or 1000 pounds, the front shank should not be less than seven to seven and a half inches in circumference. Such a horse must be able to carry a load of 230 to 265 pounds, which is the approximate weight of a rider, saddle and combat equipment. The body length of a cavalry horse should never be more than its height to the top of the shoulder joint, preferably less, for the longer the horse, the less capable it is of galloping. This relative shortness, however, should not be at the expense of the shoulders or the croup but of the back. A horse with a good profile has a head with sharply defined features and a neck which is slightly concave and tapering. The hollows above the shoulder blades should be rather pronounced and the shoulders themselves well developed and long. The back should be short and

straight; the haunches broad, short, and curved; the croup long but ending fairly steeply. The chest and body circumferences immediately below the shoulders are directly related to the capacity for development of the horse's respiratory system; they must correspond. The belly must not sag, and it should not be too lean and slender.

In the various gaits it is the legs and the muscles which are important. There must be a correctly located shoulder joint with well developed muscles, sinewy, flat, medium-long front shaks, and slanting fetlocks. The hind legs should have long shanks, powerfully developed hocks, and fetlocks should be somewhat shorter and straighter than those of the front legs. The croup of a cavalry horse should be medium large, and the haunches should be well spread so as to insure firm footing and to prevent one leg from striking against the other.

The French like to refer to cavalry as a "delicate service arm", and cavalry horses do indeed require very careful handling. But when intelligently used, horses are capable of very great exertions. If taxed too heavily, exhaustion is first revealed by accelerated breathing.

According to a study made by Mr. Bonie the relation between the normal breath count and the gait is as follows:

BREATH COUNTS PER MINUTE

| Activity | Horse and rider combat equipped, without pack | Horse and rider with full field equipment | | |
|---|---|---|---|---|
| | | Level terrain | Ascending | Descending |
| At rest | 8-12 average 10 | - | - | - |
| Normal walk | 16-18 average 18 | 20-23 without pack | 39 | 28 |
| No great acceleration during longer marches. | | | | |
| Fast walk | 44 42 at end of first km. 46 at end of second km. 51 at end of third km. | 44 without pack 14 more than in column 1. | 39[1] 74 | 28[1] 56 |
| During longer marches at a fast trot the breath count averages 65 per minute. | | | | |
| Gallop | 55 at end of first km. 72-84 at end of second km. | 74 at end of first km. | - | - |
| Fast gallop | 58 up to 300 meters, 62-73 up to 1000 meters | - | - | - |

Based on the above data, Mr. Danilovsky drew up the following chart to show the relation between breathing and the various gaits of a horse.

| Gait | Rate in relation to speed and distance | Rate differential per minute in movement and at rest (10 breaths per minute at rest) | Theoretical Ratio rate of breathing in relation to speed minus rate of breathing at rest |
|---|---|---|---|

[1] The figures in the German translation are obviously an error. The figures of the original Russian text are not available. (Ed.)

| | | | | |
|---|---|---|---|---|
| Walk | 10 | 10 | 10 | 1 |
| Trot | 4 | 41 | 25 | 1.64 |
| Gallop | 3 | 74 | 33 | 2.24 |

The horse's speed is measured by the distance covered per minute according to the gait used. One might, therefore, assume that the rate of breathing per minute would be in proportion to the rate of speed. In reality, however, the breathing rate is greater than the relative increase in speed, as the table shows.

This indicates that with each increase in speed the effort of a horse is greater per minute than the distance covered, and it becomes evident that with each increase in speed a horse must use up more energy for the same distance. The results of Danilovsky's investigations show that the average energy expended by a horse in moving its own body and load on a good road is 1.7 times greater when trotting and 2.2 times greater in galloping than when walking. When racing, galloping, trotting, and walking, the ratio of the energy expended is 3 : 2.2 : 1.7 : 1.

Under difficult road conditions the expenditure of energy increases at such a rate, as was shown by Mr. Bonie's figures, that the increase is about equal to that of a faster gait on a good, level road. A horse galloping a distance of 2.5 kilometers per hour cross-country expends the same energy as a horse galloping 3.5 kilometers on a hard, good road.

The work capacity of horses is measured in kilogram-meters (Kgm)[2] and depends on the magnitude of the effort and the distance to be overcome. The work rate of horses is the relation between work and time; that is, the rate is determined by the number of movements per second. A fully loaded cavalry horse quickens its normal breathing rate after covering 1.4 kilometers in two minutes. Its reserve in muscular strength, however, is such that after recovering its normal, quiet breathing it can immediately resume a gallop.

On this basis a horse's work capacity can be considered as its maximum performance for two minutes of continuous galloping, which in this case is equal to 700 meters per minute, or the maximum speed attainable. According to date given by Bonie, a horse can gallop two minutes without losing control of its breathing and cover a distance of 3.4 kilometers. However, as is well known, a horse can trot without loss of breath for an hour or more, proving that trotting requires relatively less effort.

Bonie also calculates that when a horse weighing 450 kilograms and carrying 100 kilograms and traveling 500 meters per minute the output of energy per meter equals 0.033 kilogram-meters when walking, 1.7 times greater energy when

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[2] Nearly equal to 7½ foot pounds.

trotting, and 2.2 times as much when galloping. When trotting the output of energy per minute per kilogram of weight equals 1.7 times 0.033 or 0.0561 kilogram-meters; when galloping the energy output is 2.2 times 0.033 or 0.0726 kilogram-meters. According to Bonie a horse's work performance per minute can be calculated as follows:

Galloping: 2.2 times 333[3] times 550 kilograms equals 13,431 kilogram-meters.

Trotting: 1.7 times 200[4] times 550 kilograms equals 6,233 kilogram-meters.[5]

Experience shows that a horse's daily output of work, when it can be quantitatively estimated, corresponds very closely to the horse's weight. Only in the case of smaller animals does the relative output increase.

Using the symbol H for the horse's weight in kilograms, the corresponding work output per minute, indicated by W, can be calculated by multiplying the above figures by $\frac{H}{450}$ in which 450 kilograms is the average weight of a horse. The work output for not more than two minutes is expressed as W equals 45 H; for not more than 12 minutes W equals 30 H; and for an extended period of work W equals 14 H.

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[3] One thousand meters in three minutes or 333 meters per minute.

[4] Twelve kilometers per hour or 200 meters per minute.

[5] In both equations an error is made. In order to get approximately the answers which are indicated, the additional factor of 0.033 must be used in each equation

The conditions under which a given rate of work is expected of a horse are immaterial: the effect in regards to breathing remains the same. For instance, if a horse when walking has to carry such a load that its work output per minute is 45 M, its rate of breathing after two minutes will rise precisely as it would during a fast gallop. According to pre-war data, collected at the officers cavalry school, a mounted horse at full gallop can cover a distance up to seven kilometers without getting out of breath. It will develop a work output equal to 45 M in from eight to ten minutes, which is the rate of gallop of 1.4 kilometers in three minutes, that is to say, a work output equal to 30 M, or from 8.4 to 11.2 kilometers in twenty minutes. A well-trained horse whose rate of gallop is 1.4 kilometers per two minutes will develop the same work output while covering from eight to ten kilometers, and at a speed of 1.4 kilometers per three minutes it will take up to twenty-one kilometers. It follows that breathing already limits the work output in the course of a minute, and breathing depends on the tempo of the work.

Because a horse has a great reserve of strength, there are days when the output exceeds the energy produced. The horse may lose weight, but it will be able to do its work. On the other hand, any increase in work tempo has an immediate

effect on the horse's breathing. The strain on the lungs continues to increase until the shortness of breath is such that the horse must stop or it will collapse from exhaustion.

The capacity of a mounted horse to develop maximum effort is directly related at every gait to the horse's reserve energy and its ability to utilize it--which in turn depends on its training and work habits.

The reserve strength of a cavalry horse consists of two basic elements, namely increased and decreased energy. Increased energy consists of the chemical elements capable of being converted into mechanical work. Decreased energy depends on the horse's state of training or on its ability to make the most effective use of its energy reserves. Energy in the form of carbohydrates, fats, and proteins is for the most part used by the muscles and is measured in calories. In maintainin life, an organism, whether at rest or at work, uses chemical energy, and the availability of this energy, says modern physiology, is determined by the adequacy of the oxygen supply. Oxygen is necessary to all living beings in varying degrees and determines the amount of caloric heat which is produced by burning the basic organic foods of carbohydrates, fats and proteins. The Heppert-Zuntz method is used to calculate the amount of the oxygen needed.

The work of the cavalry horse at every speed consists of carrying its own weight plus the burden on its back. In order to measure this work, it is necessary to know the distance covered by a horse and the rates of speed, the nature of the road, the weight of the horse and its load. To ascertain the exact speed at which the horse moved is very important, since it determines actual performance and permits an evaluation of the energy spent. The final computation is based on the average speed which is determined by chronometrical data gathered during several days.

The weight of the horse, its load, the exact distance covered, and the rate make it possible to calculate the horse's expenditure of energy. According to Kellner the amount of energy expended in carrying one kilogram is as follows:

1. For a horse weighing 500 kilograms: when walking the horse expends 0.298 large calories per kilogram; when trotting the expenditure of energy is 0.564 large calories per kilogram per kilometer.

2. For a horse weighing 400 kilograms: when walking the horse expends 0.376 large calories per kilogram per kilometer; when trotting the expenditure of energy is 0.564 large calories per kilogram per kilometer.

A large calory, used as a common measure of energy, is equal to the amount of heat required to raise one kilogram of water one degree centigrade.

There is, therefore, a close connection between a horse's weight and the expenditure of energy. A horse weighing 450 to 500 kilograms will use more energy in maintaining its own correspondingly larger body, but the caloric heat needed for each kilogram of weight is equal to that needed by a small horse. The difference in the amount of energy used per kilogram of external weight or load is explained by the varying relation of the load to the horse's weight. With small horses this relation is very nearly one to three; for large horses the ration is one to four. A horse of lesser weight will carry a smaller load, but in relation to its weight it can carry a larger load.

A cavalry horse not only walks and trots but it also gallops, sometimes at a fast gallop. According to Pirogov the expenditure of energy in accelerating from a walk to a gallop of sixteen kilometers per hour increases as follows: when the rate of speed is accelerated from a normal walk to a speed of 6.7 kilometers per hour the increase in energy is 70 percent; when the rate of speed is accelerated from a normal walk to a speed of 11.7 kilometers per hour the increase of energy expended is 122 percent. In rough terrain the expenditure of energy is increased by the length and steepness of the ascents; descents, however, require less energy than normal. Cavalry horses do not operate under

constant conditions. The horses are affected not only by the type of activity but also by their own weight.

Standard tables permit a fairly accurate evaluation of the work performed by a horse during a prolonged march. These tables are based on a regulated rate of speed and a daily march of fifty kilometers. In the western part of the Soviet Union, where the average gradient is 3 percent, the energy expended by horses is considerably greater than on the level steppes.

At the present time the following sequence of gaits is recommended for cavalry marches: ten minutes walking followed by fifteen minutes trotting, as prescribed by regulations. The rate will be ten kilometers per hour, and fifty kilometers can be covered in six hours, allowing a ten minute rest every hour.

Foreign armies have in recent times considerably increased their regulation speeds, particularly for marches of fifteen to twenty kilometers. The time allowed per kilometer is as follows:

| | Walk | Trot | Gallop |
|---|---|---|---|
| Germany | 10 min | 4 min 10 sec | 2 min |
| France | 9 min 5 sec | 4 min 10 sec | 2 min 16 sec |
| Great Britain | 10 min | 4 min | 2 min 30 sec |
| U.S.A. | 10 min | 4 min | 2 min 30 sec |
| Japan | 10 min | 4 min 20 sec | 2 min 10 sec |
| Italy | 10 min | 5 min | 2 min 51 sec |

## CHAPTER 5

## THE ARTILLERY HORSE AND ITS EMPLOYMENT

The horse is the principal means of transportation for horse artillery units. Every tactical situation in modern war calls for the constant support of cavalry by its horse artillery.

The most urgent combat task of horse artillery is the fire preparation for a cavalry attack, followed by a rapid change of position to the flank, pinning the enemy down by surprise fire and securing the successes obtained by the cavalry charge. To enable the artillery to fulfill its task, the artillery horse must be capable of the tremendous effort of hauling the field pieces with great speed and great strength in very difficult, rugged terrain.

Since every horse must be capable of pulling 600 pounds or more, the animals of the horse artillery must possess greater stamina than the cavalry horses generally. Given the same physical and muscular development, a horse's strength depends on its weight. A massive riding horse which has great physical strength and energy is most suitable for the horse artillery.

To qualify, a horse should be 151 to 154 centimeters in height, have a broad chest, a sturdy and somewhat massive physical structure, strong and well-spaced legs, and free and easy movements. These visible qualities are possessed by half-blooded English horses. To a degree the Russian Trotter, both when purebred and when crossed with other breeds, has the same qualities. For artillery service in Europe selected types of riding horses are also used: a half-breed of English origin, the Hunter, the Anglo-Norman, and the old type Oldenburg.

The light field artillery horse can be a little more massive than the one described above, for it uses the more rapid gaits only when moving into or changing positions in combat. This type of horse, however, must still be capable of moving at a fast pace across country.

The work load of an artillery horse is from 250 to 450 kilograms, depending on the weight of the field piece and the position of the horse in the team.

A light field artillery horse should be 154 centimeters to 162 centimeters in height, have a massive body structure with a broad chest, rather high and muscular withers, well-developed shoulders, a strong croup which does not slant, and firm and well-spaced legs. The diameter of the front shanks should not be less than nineteen centimeters in circumference.

The type of horse suitable for infantry cannon must have a well-developed physical structure with muscles to match, a deep, broad chest, a straight back, a broad, well-rounded loin section, a long and perhaps even slanting croup, firm front legs and well-spaced hind legs, and straight pasterns. The height of the horse should be between 154 and 160 centimeters.

The work of an artillery horse is much more varied than that of a cavalry horse. In addition to considering the speed, the various gaits, the condition of the road, the weight of the horse and its load, the draft capacity of the horse must be evaluated. Draft capacity is the horsepower developed by a horse pulling a load while hitched and is determined by the grade and surface of the road.

The performance record of the horse can be measured in kilogram-meters and is obtained by multiplying the distance covered by the draft capacity or horsepower in kilograms. The expenditure of energy to overcome gradients is just as inescapable as is the expenditure of energy to overcome the horse's weight and wind resistance.

Draft capacity is measured with a dynamometer. The dynamometer is mounted on the muff of the limber shaft. A rope passes through one end of the dynamometer to the axle of

the limber, and the other rope end is attached to the traces of the team hitched to the limber. In this case the entire weight of the gun and limber, which is pulled by the first team, registers on the dynamometer. A rope, drawn through the dynamometer handles, holds the apparatus in place while the limber is moving. To determine the draft capacity of each pair of horses in a multiple team, the dynamometer is mounted or attached between the horses and between the singletrees. The dynamometer registers the pull of the forward team separately. The draft capacity of a single horse in a multiple team is accomplished by attaching the dynamometer to the traces of the horse being tested and to the trace hooks of the hindmost horse in the team.

Experiments conducted with a 75-mm field piece, model 1902, produced a set of figures designated either objective or subjective, which regularly resulted from the joint effort of horses in multiple teams. The figure recorded by the collective pull of the team is called the objective effort. In this case it was the effort of six horses hauling the gun. The subjective effort is the total effort of each individual horse. In multiple teams the objective effort is always proportionally less than the subjective. On a percentage basis the subjective effort is 18.6 percent less than the total pull

of each pair of horses in a six-horse team.

Any peak performance of a team is reduced by the imperfections of individual members, since some of the horses are inadequately trained to work as a team, or by faulty harness or equipment. The draft capacity of a multiple team never equals the collective horsepower of the individual horses. The inevitable loss of effective energy which is entailed by an acceleration of pace or poor road conditions can be reduced by smoother team work. Data collected by Danilovsky indicates that horses in a two-horse team do not pull against one another and that their joint draft effort can be considered as a standard norm. But with each additional horse or pair of horses the normal draft capacity of each individual drops in the following proportions:

With three horses the ratio is 8.5 to 9.
With four horses the ratio is 8 to 9.
With six horses the ratio is 7 to 9.
With eight horses the ratio is 6 to 9.

This would mean that a horse weighing 450 kilograms and having a draft capacity of 73.6 kilogram-meters would have when hitched in a four-horse team the product of 73.6 times 8/9 or 65.4 kilogram-meters.

In a multiple artillery team the lead team pulls 35 percent of the load, the swing team pulls 25 percent, and the wheel team pulls 40 percent. Within each team the saddle horse does 57.1 percent of the total effort, the wheel team pulls 42 to 47.2 kilogram-meters, the swing team pulls

29.5 kilogram-meters, and the lead team pulls 41.3 kilogram-meters for a total of 118 kilogram-meters.

On a proportionate basis per team and per horse the total draft effort of 118 kilogram-meters, starting with the wheel saddle horse and team, is: 26.95, 20.25, 16.85, 12.65, 23.58, and 17.72. The total draft effort of a six-horse team on a percentage basis is:

| | Wheel Team | Swing Team | Lead Team |
|---|---|---|---|
| Saddle horse | 22.8 | 14.3 | 20 |
| Team mate | 17.2 | 10.7 | 15 |

The above figures are based on the objective effort; the subjective pull or effort of the individual horses is distributed as follows:

| | Wheel Team | Swing Team | Lead Team |
|---|---|---|---|
| Saddle horse | 20.27 | 12.72 | 17.79 |
| Team mate | 15.29 | 9.53 | 13.31 |

The objective draft capacity of the whole team is 24.7 percent less than the subjective effort of each horse measured separately and added together. Variations in draft capacity are directly related to the coefficient of resistance offered by the road surface.

On a smooth, level road the draft power of a team is determined by the following formula: P=fxQ; f is the resistance coefficient, Q is the weight of the limber and artillery

piece, and P is the draft power actually required. To determine the draft power required to ascend a seven percent grade, this formula is used: P-$P_1$ plus $P_2$; $P_1$ is the draft power required on a level road, and $P_2$ is Q times sine a, the equivalent to the extra effort required. For grades of more than seven percent the formula is: P-$P_2$ plus $P_3$; in which $P_3$, the effort required to overcome the resistance coefficient, is f (Q times cos a); and $P_2$ is the extra draft power required as in the first example. The braking power is calculated in kilogram-meters according to these formulas. When the required draft power is greater than the basic draft power applied, an additional braking power must be applied.[1] If the draft power being exerted is smaller as on a downgrade, the limber goes downhill of its own accord. In other words, when $P_1$ is less than $P_2$, the remainder equals the braking power; when $P_1$ is greater than $P_2$, the remainder is equal to the draft power required:

Calculations yield the following results:

Soviet Central Asia: $P_1$ equals 70 kilogram-meters and $P_2$ equals 204 kilogram-meters, the braking power is 204 minus 70 or 134 kilogram-meters.

Trans-Caucasia: $P_1$ equals 74 kilogram-meters and $P_2$ equals 204 kilogram-meters, the braking power is 204 minus 74 or 130 kilogram-meters.

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[1] Meaning of German translation is obscure. (Ed.)

## DYNAMOGRAM OF DRAFT POWER

### Coefficients of Resistance Offered by Different Type Roads and Surfaces in Various Parts of the Soviet Union*

| | Coefficient of Resistance | | | | Average Draft Power | | | | Maximum Draft Power | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | South Russia | Central Asia | Trans-Caucasia | Moscow Area | South Russia | Central Asia | Trans-Caucasia | Moscow Area | South Russia | Central Asia | Trans-Caucasia | Moscow Area |
| Main road | 0.051 | 0.025 | - | 0.035 | 98 | 31 | - | 74.5 | 178 | 85 | - | 42.9 |
| Hard dirt road | 0.043 | 0.027 | 0,062 | - | 82 | 33 | 74 | - | 144.5 | 186 | 187 | - |
| Soft dirt road | 0.078 | 0.059 | 0.122 | - | 149 | 72 | 146 | - | 277 | 250 | 255 | - |
| Heavy (wet) road | 0.110 | 0.123 | 0.221 | 0.115 | 210 | 149 | 265 | 215.3 | 300 | 410 | 547 | 298 |
| Dry trail | - | - | - | 0.067 | - | - | - | 125.5 | - | - | 218 | - |

*The German translation seems to be deficient and the significance of the table is not completely clear. (Ed.)

South Russia: $P_1$ equals 149 kilogram-meters and $P_2$ equals 168 kilogram-meters, the braking power is 168 minus 149 or 19 kilogram-meters.

The required additional braking power is distributed among the horses in proportion to the draft power which can be exerted by each team of horses. The distribution is as follows:

| | | |
|---|---|---|
| Soviet Central Asia: | saddle horse | 76.4 kilogram-meters |
| | team mate | 67.6 kilogram-meters |
| Trans-Caucasia: | saddle horse | 74.9 kilogram-meters |
| | team mate | 55.1 kilogram-meters |
| South Russia: | saddle horse | 11 kilogram-meters |
| | team mate | 8 kilogram-meters |

By multiplying the draft power expended by the distance covered the productive capacity of the horse is obtained.

The total productive exertion of the wheel horses in an artillery team is almost twice as great as that of the swing team and one and a half time as great as that of the lead team. The greatest individual performance is by the wheel saddle horse. If 500 kilograms is taken as the weight of the rear pair of horses and 450 kilograms is the weight of each of the other two pairs, the draft capacity is about one eighth or one seventh of the weight of a horse (sic).

The work performance of an artillery horse may also be measured in units of horsepower, one horsepower being 75 kilogram-meters. During a march which lasted three hours and thirty-three minutes and covered a distance of 24,417 meters, the rates of speed were: walking, 1.57 meters per second; trotting, 3.04 meters per second; galloping, 6.6 meters per second. The exertions of the horses measured in horsepower are estimated and distributed as follows:

| Teams | Walking | Trotting | Average |
|---|---|---|---|
| Lead team | 0.6 | 1.17 | 0.72 |
| Swing team | 0.53 | 0.66 | 0.40 |
| Wheel team | 0.7 | 0.36 | 0.83 |

During another experimental march a team, pulling an artillery piece and limber weighing 1952 kilograms, covered fifty kilometers in twenty-four hours, although the actual traveling time was eight hours; the horses walked 35 kilometers of the total distance, trotted 10 kilometers, and galloped five kilometers. Of the fifty kilometers, ten kilometers were on solid road, thirty on dry ground and ten on a heavy dirt road. The work performed by the team in kilogram meters was as follows:

| | wheel team | swing team | lead team |
|---|---|---|---|
| Saddle horse | 3,000,000 | 2,837,000 | 2,153,000 |
| Team mate | 2,959,000 | 2,574,000 | 1,890,000 |

Although saddled artillery horses must exert just about as much energy as a heavy work horse, they are in appearance more like a compact cavalry mount. Heavy draft horses, such as those with the heavy artillery, must consume more fodder if they are to be worked to capacity. These horses require for each kilogram of live weight per kilometer on country roads 0.366 large calories when walking and 0.527 large calories when trotting. To move each kilogram of its draft load each horse requires 0.358 large calories per kilometer on country roads and 0.265 large calories per kilometer on paved roads. On a twenty-five kilometer march, fifteen kilometers walking and ten kilometers trotting, the number of calories required per horse is: for its own weight when walking: 0.366 times 450 times 15 or 2470 large calories; for its own weight when trotting: 0.527 times 450 times 10 or 2371 large calories; a total of 4841 large calories consumed in the twenty-five kilometers. The caloric requirement for a horse weighing 500 kilograms when walking and trotting and when pulling a load a distance of twenty-five kilometers is 0.358 times 500 times 25 or 4475 large calories. On the basis of these figures the daily caloric requirement of an artillery horse amounts to 20,431 large calories. This is precisely the calory content of the reenforced daily summer ration of an artillery horse which contains exactly 20,432 large calories.

In outward appearance the draft horses used by the Soviet cavalry resemble its mounts. All Tatchanka horses belong to this type of draft horse. The original Tatchanka was an open four-wheeled passenger vehicle. During the Russian civil war this vehicle was converted into a machine-gun carrier. In sentimental deference to "Red tradition" this type of vehicle was kept by the cavalry for this purpose. The daily requirement for the Tatchanka horse, whose weight is about 400 kilograms, averages 8,000 large calories. The expenditure of energy and corresponding horsepower effort, according to dynamometric measurements made with a model 1926 Tatchanka, is as follows:

THE WORK OF A CART HORSE HARNESSED TO A TATCHANKA MACHINE-GUN CARRIER

| Good main road | Dry dirt road | Rough road |
|---|---|---|
| Average effort | | |
| 65.2 kilograms | 106 kilograms | 148 kilograms |
| Average coefficient of resistance | | |
| 0.063 | 0.1 | 0.145 |

According to Professor Pirogoff a harness horse weighing about 400 kilograms expends:

On rough roads, between 2,000,000 and 2,225,000 kilogram-meters;[2]

On dry dirt roads, up to 1,500,000 kilogram-meters;

On good roads about 800,000 kilogram-meters.

The draft effort of a Tatchanka horse, according to dynamomentric calculations is as follows:

| | Coefficient of resistance | Average draft effort | Maximum draft effort |
|---|---|---|---|
| First class road | 0.024 | 26.5 | 45.9 |
| Second class road | 0.036 | 39.44 | 61.2 |
| Dirt road | 0.057 | 62.9 | 136.8 |

According to A.Wuest the capacity for work of a horse during an eight hour day may be recorded as follows

| Live weight in kilograms | Draft power in kilograms | Daily performance in million kilogram-meters, less own-weight effort[2] |
|---|---|---|
| 300 | 45 | 1.44 |
| 400 | 56 | 1.80 |
| 500 | 67 | 2.16 |
| 600 | 78 | 2.52 |
| 700 | 89 | 2.88 |

In the course of its eight hour workday the horse covers thirty-two kilometers. At four kilometers an hour and a live weight of 500 kilograms plus twenty kilograms of harness, the energy required per kilometer will equal 148 large calories. Allowing thirty-five percent for productive work, these figures show a consumption of 51.8 large calories

[2] The energy used to move its own weight forward. The addition of this energy would naturally increase the record of a horse's daily performance.

(on the basis of 0.2042 small calories per kilogram of weight). This caloric intake insures a work performance of 22,000 kilogram-meters per kilometer of road covered. The effort of moving its own weight a distance of thirty-two kilometers is nearly 700,000 kilogram-meters.

Figured in this way the following work performance table for horses in other classes is obtained.

WORK PERFORMANCE FOR HORSES

| Horse's weight in kilograms | Daily performance in million kilogram meters | Daily performance moving own weight in thousand kilogram-meters | Total daily work in million kilogram-meters |
|---|---|---|---|
| 300 | 1.44 | 400 | 1.84 |
| 400 | 1.80 | 527 | 2.32 |
| 500 | 2.16 | 700 | 2.86 |
| 600 | 2.52 | 810 | 3.33 |
| 700 | 2.88 | 944 | 3.82 |

The above figures are for maximum daily performance.

Work capacity can be approximately determined by converting the energy output into starch unit equivalents. It is generally assumed for this purpose that one gram of carbohydrates in the grain ration contains an average of 3.96 large

calories of usable energy which will produce 533 kilogram-meters of energy. According to Professor Kellner, for each one thousand kilograms of actual horse weight, which includes the energy necessary to move the animal's own weight, the following carbohydrate equivalents are required:

| | |
|---|---|
| For heavy work | 15.0 kilograms |
| For medium work | 11.6 kilograms |
| For light work | 9.2 kilograms |

## CHAPTER 6

## THE PACK HORSE AND ITS EMPLOYMENT

The demands made on an artillery pack horse depend on the conditions of its employment: carrying a load in rugged mountain terrain, moving on narrow mountain paths and through trackless and sandy deserts, and, when hitched to vehicles, simultaneously hauling a gun while carrying a rider, perhaps even over mountainous terrain. Only a special type horse can meet these requirements. A French Army regulation emphasizes this point: "Only specially selected horses can be considered for these duties."

In war, mountain artillery generally moves on wheels during most of its advance. It reinforces the infantry and the cavalry, and it is often called upon to carry out its combat assignments at an accelerated pace. A foreign military writer, on the strength of his observations of Russian pack artillery in action on the Caucasian front during the World War, wrote as follows: "One cannot deny that these batteries have a number of advantages, particularly their greater tactical mobility in comparison with batteries hauled on limbers." And yet a well-founded objection might be made to such a conclusion: pack animals loaded with gun parts and other equipment become very tired and continuously develop back sores

from the combined pressure and friction of their packs. Under the weight of the packsaddle these horses are not very steadfast, nor can they cover any great distance at a trot, let alone at a gallop. A chief problem seems to consist in how to vary the speed of pack animals while carrying loads. Until now no formula has been worked out to determine the relationship between the live weight of these horses and the weight of the loads which they might be expected to carry.

In the old Imperial Russian Army the mountain artillery did not receive the special kind of horses it needed. This was also true of light horse artillery. During the Russo-Japanese War all newly organized artillery units were supplied with the Siberian horses common to that region, the Minusinsk, Transbaikal, and Narm breeds. During the imperialist war all possible kinds of native horses were employed in the mountain artillery batteries: the Vyatka, the Bashkir, the Kalmyk, the Kabardinian, and many more.

A most important problem relative to the mountain artillery horses is that of determining the maximum load which may be carried without impairing the ability of the animal to attain certain rates of speed. Earlier indications that horses were inferior to donkeys in the relationship of carrying capacity to live weight were confirmed by practical experiments conducted in mountainous country. A horse

could carry one-third of its own weight, a donkey two-thirds, and a mule one-half.

The height of an artillery horse, measured from the ground to the withers, greatly affects the weight of the load it can carry and the ability of the animal to maintain its balance. In other words, the height of the pack artillery horse must be considered in relation to the weight and shape of its load or the size of its rider. The gun parts and equipment, which are carried on the packsaddle, are often irregular in shape, although some items are carried more conveniently than others. Neither the weight nor the transportability of the front section of a gun carriage or a tube can be compared to the wheels or ammunition boxes. Four men are required to lift the gun carriage to a certain height. The average height of an artilleryman is sixty-six inches. According to information furnished by the weight lifting section of the Peoples Institute for Physical Culture, a load corresponding to one-third or one-half a man's weight can most easily be lifted to a height of sixty-two inches, which corresponds to the height of the chest or shoulders of the average artilleryman. To load the various parts of a field piece onto a packsaddle, the men must raise it an additional four inches. Therefore the packsaddle must not be higher than sixty-two inches from the ground. Since three to

four inches must be allowed for the height of the packsaddle itself, a pack animal should not be more than fifty-eight or fifty-nine inches tall.

Bearing in mind that the weight of the horse's load should not exceed one-third of the animal's own weight, the above figures indicate that the weight of the horse must be not less than 330 to 510 kilograms or an average of about 400 kilograms. An animal for mountain or pack artillery must be sturdy and heavy boned, not more than fifty-nine inches tall and weighing about 400 kilograms. It is absolutely necessary that the pack animal should also be able to serve as a riding horse. In outward appearance an artillery pack horse must be well-developed, have a strong, broad, oval-shaped chest, a broad well rounded croup, an adequately broad and deep-barrelled body, a muscular neck, not too prominent withers, a broad and straight back, a broad yet short loin section, sinewy, well-spaced legs and well-developed front shanks and joints.

The back line including the loin section and croup must be strong and well built. A horse with a high neck and prominent withers will always suffer from the pressure of the packsaddle. The legs should be short, since this lowers the center of gravity and increases the stability of pack animals and since the height from the ground to the withers must be

moderate. The lower neck between the withers and the back should be flat to prevent sores from developing from the chafing of the packsaddle or load. The back should be neither concave nor convex, but straight. A horse with a long back, long legs and a narrow chest cannot be used as a pack animal. The head should be large and heavy, since a pack horse uses its head as a counterweight when climbing. Since the ideal pack horse uses a short, tripping step, horses with a long, free stride cannot be used as pack animals. A long stride causes the load to sway.

The hoofs of pack animals must be correct in shape and composition. Flat hoofs with thin soles or hoofs which are imperfect in structure or composition are unsuitable. Large hoofs are a handicap since they cannot find a good foothold in stony, mountainous terrain.

The selection of proper horses for pack animals is a difficult task. Experience has shown that the work horses which were obtained for this purpose in the Tambov and Voronezh areas were, because of their excessive height and angular physical structure, poorly suited for operations in mountainous country. As soon as they started climbing, they became breathless and nearly suffocated.

Because of their frugality and hardiness, their strength and physical characteristics, the Haflings and Nunules are the

best suited of the Western European horses for mountain work. The Haflings are bred on a high mountain plateau north of Bolzano, between Sarno and the upper Adige Valley in South Tyrol. In recent times they have also been bred in Styria, Moravia and in Lower Austria. In 1931 Hafling stud farms were started in the Bavarian Alps, where the most typical Haflings are now being bred. Of all horses this animal is best suited as a pack animal. It is medium large, well muscled, and generally not over fifty-six inches tall. It has short, well spaced legs, a deep chest, rather taut, modest-sized withers, a broad, strong loin section and a sloping bow-legged rear. Its hoofs are adequately strong.

While the Haflings are ideally suited for carrying loads in mountainous country they are also quite successful when harnessed to carts. Their particular value is due to their firm, well-spaced steps, their frugality, capacity, endurance, and their general adaptability to the most rugged terrain.

The Carpathian Huzules, which are bred in Galicia and Bukovina, are small and sturdy and have great endurance for mountain work.

The native horse of the South Bavarian Alps, the so-called Noric, also serves as a remount in German mountain brigades. Its special physical characteristics include a well-developed muscle structure, a short body of low stature,

and strong hoofs. It strongly resembles the Hafling, particularly its quiet nature, toughness, and frugality. The Noric is not found in large numbers in Germany and must be imported. In recent times experiments have aimed at using the East Prussian horse for mountain troops. This horse, considered by many as a descendant of the Esthonian Klipper, has faults which prevent it from being fully employed in mountainous country; it is too temperamental, its hoofs are flat and too brittle and its stride is not suited to mountain work. These defects limit the possible use of the East Prussian as a remount for mountain troops.

A small Bosnian horse which, like the Huzule, is bred in the Carpathians, is reported to possess qualities which make it an excellent horse as a mountain pack animal. It is said that this horse gave good service during the imperialist war.

Compared with Western Europe the Soviet Union has a far greater number of types of horses suitable as pack or riding horses with mountain troops.

The training exercises of mountain horses must be carried out under the same conditions and the same environment as exist in war. Every bit of fat must be trimmed off through unceasing work, for only those animals that have sinewy bodies used to hard work, strong muscles and controlled breathing can fulfill combat tasks. Mountain exercises must be conducted during all

seasons of the year, by night and day, in every kind of weather with full loads and at every gait the terrain permits. Walking is the usual gait for an artillery horse in the mountains, since there is little occasion or possibility for trotting. During training the gallop is omitted completely, since it adversely affects the development of a quiet and steady pace.

Young horses must be very gradually accustomed to climbing mountain slopes. During the first days of training the ascents should not exceed a height of 200 meters. A horse which is in the mountains for the first time tires very quickly, tries to go much too fast, and in so doing gets out of breath very soon and foams at the mouth. After a time a horse-just as man himself for that matter-develops the gait and pace which are suited to mountain climbing. This slow walk, which saves energy, is acquired and mastered after long training of both man and beast.

The horses are trained to carry loads of different weights and shapes. The weight of the load is always expressed as a ratio of the horse's own weight. The percentage ranges from 30 to 50 percent, depending on the weight of the individual horse. Although the regulations of many foreign armies speak of sixty to eighty kilograms as the utility load for mountain horses, the normal load carried in daily field practice is much greater. According to the published reports of German specialists

the loads carried by animals of the machine-gun units of cavalry regiments, considering seventy kilograms as the average weight of the riders are from 130.4 to 154.9 kilograms, indicates that the load amounts to almost fifty percent of the animal's weight.

Valuable information was obtained by a special mountain expedition. The pack animals of this expedition weighed from 390 to 420 kilograms and carried loads varying between seventy and 170 kilograms. The march program of the expedition included marching of the first three days, rest on the fourth day and exercises on the fifth day. Although the daily march did not average more than sixteen kilometers, nearly all horses suffered back injuries, which emphasized the necessity of exercising greater care and consideration of the loads, the type of saddles, and effects of the load upon the animal's back. Experience showed that a packload should never exceed thirty percent of the horse's weight and that the dead weight carried by a horse should never amount to more than the normal weight of a rider with his weapons and full combat equipment. On the basis of the information acquired, the total load of a horse weighing 420 kilograms may be divided as follows:

| | | | |
|---|---|---|---|
| 1. | Weight of saddlebag and contents | 21.955 | kilograms |
| 2. | Weight of the rider | 63 | kilograms |
| 3. | Weight of equipment | 17.218 | kilograms |
| 4. | Weight of the saddle | 24.1 | kilograms |
| | Total weight | 126.273 | kilograms |

A health horse weighing 420 kilograms should be able, under normal conditions, to carry without ill effects 126 kilograms or approximately thirty percent its own weight. Under special marching conditions the load must be correspondingly modified. In a forced march the load of a cavalry horse must not exceed twenty percent of its own weight.

The rate of march in the mountains depends, of course, on the type of terrain crossed. On gradients of five to ten percent and three to five kilometers long, which are very common, one and a half to two kilometers per hour is considered a normal rate when walking. Artillery regulations, under similar circumstances, prescribe one to two kilometers per hour.

RATE OF MARCH IN RELATION TO STEEPNESS OF THE GRADE:

| Steepness of grade in degrees | Average ascent in kilometers per hour | Average descent in kilometers per hour |
|---|---|---|
| From 5 to 10 | 3 | 4 |
| From 10 to 15 | 2.5 | 3 to 3.5 |
| From 15 to 20 | 2 | 2.5 to 2.75 |
| From 20 to 25 | 1.5 | 2 to 2.5 |
| From 25 to 30 | 1 | 1.5 to 2 |

In rugged mountainous terrain the average rates of speed also depend on the nature of the terrain and the condition of the roads, and they may fluctuate between one and four kilometers per hour.

## CHAPTER 7

### THE MULE AND ITS EMPLOYMENT

The mule is a mongrel, the product of a mare and a jackass. The advantages which mules have over horses are several, since mules are far better able to endure heat, are less dependent on particular kinds of fodder, work with greater calm--which is particularly important on the battlefield--are less susceptible to lameness, and are least incapacitated by age. The working capacity of a mule is twenty to twenty-five percent greater than that of a horse of the same size. A mule is rarely affected by saddle sores, since its hide is tougher than that of a horse, but it is particularly susceptible to the chafing effect of a packsaddle.

The longer stride of the horse causes its load to sway. When confronted with an arduous assignment, the horse will show less endurance and less resistance. The horse is inclined to climb mountains too fast and requires frequent rests. When a horse has fallen behind during a long climb, it will make a sudden effort to catch up and get so out of breath that it has to stop altogether.

A mule lives longer, forty years on an average, and is less susceptible to contagious diseases, such as Siberian

ulcers. It also appears to be less affected by babesiasis. In appearance the mule has a large head, small, tapering withers, a narrow, pointed croup, a deep cylindrical chest, and hard, well-set hoofs.

Carefully bred mules are noted for their size and their rapid gait. Some can travel at an ambling gait twelve to eighteen kilometers an hour and are capable of maintaining this pace for fifty to sixty kilometers, and because of their peculiarly elastic gait without tiring their rider.

The breeding of mules in France and North Africa is far more productive and profitable than horse breeding. The costs of the latter are almost double the costs of the former. Mares which have been bred with jackasses require special care and attention during their gestation period. The young can be put to work when only eighteen months old.

In Europe and North Africa the most widely distributed mule breeds are the Poitou and the Algier. The Poitou are especially considered excellent pack mules. Their average height is between sixty-two and sixty-four inches. Their ears are flatter than those of the Algier, their backs straight, their chests broad. The best qualities of this class of mules are inherited through the mother, a poitou horse. Horses of this breed are large and bony and have good movements, strong muscles, and broad, flat hoofs which are a special characteristic of the Poitou. The Algier mules are bred from Berber

mares. The head is more slender, the ears are short, the chest well developed, and the croup is short and narrow.

The best known donkeys are the Catalonian, the Poitou, the Andalusian, the Maltese, and the Italian. The first two, particularly the Poitou, are among the most popular breeds of donkeys. The North African donkeys are derived from two basic classes, the one large, the other small; both are noted for great strength. The small donkeys, although not as well suited for mule breeding, possess remarkable stamina. A donkey of this class, thirty-two inches tall, can carry a load of more than sixty kilograms and on occasion even the added weight of its driver. During the war, these little animals were used for transportation in the trenches, because of their quiet nature and adroitness.

The toughness of donkeys has been confirmed by a series of experiments. On a level country road a donkey weighing 250 kilograms pulled a load of 985 kilograms without difficulty. A donkey weighing 215 kilograms hauled a load of 882 kilograms, or more than four times its own weight. In load carrying tests a donkey of 215 kilograms carried a pack of 275 kilograms, a load considerably greater than its own weight. These animals are fast; even when loaded they can travel eight kilometers an hour.

To meet the requirements of an army remount, a mule should be six to eight years old, sixty inches in height, have a chest measurement of sixty-seven inches and front shanks eight inches in circumference. Mule breeding in France is supervised by the Agricultural Society of Sévres. This agency shipped a number of young animals to southern France and to Spain. The remount commission in Hautresanie buys eighty to one hundred mature mules each year. In Spain mules are raised in the provinces of New Castille, Estremadura and Andalusia.

In China and Manchuria mules are very important as draft, riding and pack animals. They are commonly used in the mountainous provinces of northern and western China. The Chinese Army uses mules to haul its artillery and machine guns, and for its pack trains and for light mountain artillery. Chinese and Mongolian horses are unsuited for this purpose because they are too small.

The best Chinese mules are bred in West China, in the Province of Shan-Dun, and very good ones are bred in Tsaochan and the neighboring frontier areas of Henan.[1] Their average height is sixty-two inches, their bone structure is adequate, and their chests are broad and deep. A good mule, like the

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[1] The names of certain of these provinces have been incorrectly transliterated and their proper location can no longer be determined.

Mongolian horse, can travel 100 or 120 kilometers a day carrying a load of 200 pounds without any trouble. In Tudimyoa,[2] a western province of China; there is an annual mule fair. The military administration makes large purchases at this time. Until the beginning of the imperialist war of 1914-1918, the Germans and English also purchased mules there for their colonies.

The Soviet Union engages in mule breeding in Central Asia and in the Caucasus region. Several types of Buchara and imported Persian donkeys are bred. In Central Asia the Buchara, Karshinian, Hamadanian, as well as the valuable descendants of Indian and Egyptian donkeys bred in this area are of great importance.

Animals not less than four years old are used in breeding donkeys. Mules and donkeys used in mountains and stony regions must be shod. The Americans and French use a broad, almost circular shoe. Mules are best shod with a light cavalry shoe taking no more than four or five short nails.

American breeders even employ half-bred mares for mule breeding. Large mules for use as artillery teams must be bred from large mares. First to be considered for this purpose are the

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[2] See footnote on preceding page.

half-bred mares which are the product of crossing ordinary farm horses with purebred or nearly purebred stallions or with the strong Russian trotter stallion. The only acceptable other choice is the employment of the strongest and largest mares from local stock. For mule breeding it is even possible to use mares which have some external physical defect, such as a sagging back, poor legs and hoofs, or even mares which wheeze. However, mares with a poor bone structure or narrow chest should not be used, since these are defects apt to be accentuated in the hybrid offspring.

For use as a pack animal a mule should have a powerful, straight or slightly concave back, a short but firm loin section, and a sloping croup and haunches. Close-spaced front legs, a cow-like posture and bow-leggedness greatly favor the work of mules in the mountains, when they are used as pack animals. Mules very seldom have trouble with the tendons in their legs. A low neck, where the mane forms a straight black line between the withers and the base of the head, permits free movement of the head, even when the mule is carrying a bulky load such as gun parts. A free and unhindered movement of the head is often important in maintaining balance when carrying a heavy load. A great advantage is also derived from an oval-shaped chest, which, in combination with a straight back, guarantees strong and firm support for a heavy load.

The legs of mules favor short steps which serve as a safeguard against staggering and facilitate mountain climbing. To make up for its short steps mules generally walk at a correspondingly more rapid pace. This is why horses, used as pack animals in the mountains, are usually slower than mules, unless they have learned to use the short but faster step. The mule's shorter step also prevents the pack load from swaying.

Of particular value are mules which have strong, concave hoofs which keep the fetlocks from striking together. This feature, in conjunction with strong leg tendons, makes the mule an indispensable animal for mountain work. In an American Army experiment made with a mule-drawn machine-gun train, the rear hoofs of the mules were left unshod. In a march of twenty-five miles over hilly terrain, not a single animal dropped out.

Mules mature very slowly, and do not attain full stature until they are between five and six years old. The same is true for donkeys. However, mules remain fit for work until they are forty-five years old.

Mules should be trained from the beginning to work in pairs, since they will otherwise get so used to working alone that it subsequently becomes very difficult to get the two animals to cooperate in gait and rate. They are apt to kick

one another. A pair of mules trained together as a working team will later perform splendidly together. The teamwork of trained mules is much superior to that of horses, and unlike horses, they will pull evenly together. Once used to each other they work well together in a pack train and follow each other at a steady, even pace. On narrow mountain paths they can lead a column unaccompanied by the driver and not disturb in any way the marching order. In passing dangerous spots in the mountains, mules, again in contrast to horses, will advance with great caution and skill, taking advantage of every possible foothold.

Their behavior in battle is particularly praiseworthy. They are not at all afraid of the sounds of combat and do not, like horses, rear frightened and anxious when a shell bursts nearby. Like donkeys, mules have tough mouths and an extraordinary strong neck so that a curb bit should always be used when riding them. Foreign army regulations mention a figure of eighty to ninety kilograms as the pay load of a mule.

A German writer gives the following table of weights for the particularly heavy loads of mountain troops which include the weight of packsaddle or carrying frame:

| Load | Kilograms |
|---|---|
| Front section of gun carriage | 154 |
| Rear section of gun carriage | 147.3 |
| Gun carriage frame | 148.8 |
| Gun tube | 155.7 |
| Shield | 153.6 |
| Engineer equipment | 108 |
| Mortar tube | 125.7 |
| Mortar base plate | 131 |
| Vertical sighting equipment (mortar) | 111 |
| Mortar crate | 112 |
| Mortar crate | 128 |
| Mortar crate | 147 |

As these figures show the loads carried by the mules are rather heavy. Their weight along with the saddle totals almost 150 kilograms, which is just about the maximum weight which can be carried by a mule. In this connection it may be pointed out that the numerous experiments of foreign armies made with all possible pack animals always favored mules.

While mules literally carried the brunt of the burden in the colonies during the World War, they also found important employment in the European theatre of war. During that war 209,618 mules were shipped to England--206,729 from Canada and the United States, and 2,889 from Spain. Mules have been used for military purposes for a very long time, particularly in colonial expeditions. It has been said by travelers from Africa that mules gave the French their colonies. They are used there for every kind of work, including the evacuation of the wounded.

As has been pointed out earlier, the demand for pack animals during the Italo-Ethiopian War of 1935, particularly for mules, was tremendous. Since 1867 little change is to be noted in this respect. At that time, during the campaign of General Nabit, one counted on four mules per five soldiers, and from sixty to eighty kilograms of pack load per mule. Taking into consideration the fact that during both the Anglo-Ethiopian War as well as during the Italo-Ethiopian wars the loss of pack animals from one cause or another was extremely high, it becomes clear that the importance of mule breeding and employment of mules has not diminished. This statement applies particularly to mountainous border regions.

Considering the vast size of the Soviet Union and its greatly varied climate and topography, it is absolutely essential to carry out a large-scale program of mule breeding, with emphasis on a type which has the height and strength to serve as pack animals with mountain cavalry, mountain machine-gun battalions and mountain artillery.

The stock of mules available in the Soviet Union, compared with that in foreign countries, is quite insignificant. This is natural enough, considering that in the days when Russia was divided into large private estates with a backward agriculture, nothing whatever was done in the field of mule breeding or the raising of purebred donkeys. Consequently, the

breeding of mules presents a new problem for collective farming in the proletarian Soviet Union. There are enough mares available in Russia for the breeding of mules as pack animals. In the mountains there are various breeds of mountain horses, raised in the mountains and acclimated to mountain service. The Tukhinian, the Kasakh, the Kirghiz and the Lokaian have broad straight backs, strong hoofs and wiry physiques. Until recently Soviet mule breeding was concentrated in a few places, such as stud farm 68 in Uzbekistan, stud farm 97 in Kazakhstan, stud farm 71 in Azerbaijan, and stud farm 92 in the North Caucasus. The People's Commissariat for Agriculture in Soviet Russia has taken measures to establish special organizations for the breeding of Soviet mules. Intensive breeding methods will be adopted.

The hinny, a cross between a stallion and an ass, possesses good qualities as a pack animal. Large numbers of hinnies are found in the Turkish Army, and during the World War the Army of the Caucasus also made large-scale use of these animals. They carried a very large portion of the pack train freight. The hinny is smaller than the mule, and its carrying capacity is less, generally about eighty or eighty-five kilograms.

Other animals used for carrying loads are the camel and the buffalo.[3] Although these animals can carry a considerably greater load than horses and mules, up to 200 kilograms, their employment remains very limited. Camels are very sensitive to cold and humidity; they are altogether unusable in the mountains in rainy weather, since they are constantly slipping and falling. Buffalos on the other hand are too slow and have the bad habit of wanting to roll in every body of water they encounter on the way.

[3] Water buffalo?

# PART THREE

## ARMY REMOUNTS AND THEIR BREEDING

## CHAPTER 8

### ARMY REMOUNT BREEDS AND METHODS OF IMPROVING THEM

Since the basic qualities of cavalry horses were described above we shall now concern ourselves exclusively with breeds and types of riding horses.

The English Thoroughbred[1] is first in speed and performance and admittedly irreplaceable. The Arabian is also famous for its extraordinary strength and endurance, particularly in mountains and deserts. But these two horses are very expensive and not well suited for military service in the Soviet Union.

At present the military remounts of the Soviet Union are bred from local, specialized or non-specialized types of riding horses improved by an admixture of English Thoroughbred or, less often, Arab blood, and from original native stock bred on selective principles but without foreign blood. The improvement of Russian riding stock may be obtained either by increasing the English or Arab blood through use of the desirable

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[1] The term Thoroughbred is used to designate the breed known by that name and not as a designation of purebred. (Ed.)

stallions, or by improving quality by the selective breeding of choice Soviet horses.

Many other breeds of horses cannot entirely meet the requirements of an army horse, even though they might have some excellent qualities, such as being easy to feed or to take care of. Small horses of impure breed are unable to develop the speed necessary to gallop cross-country under enemy fire. Nor does their short height permit them to overcome obstacles quickly enough, let alone jump over fences or similar high barriers.

The measures taken by the pre-revolutionary Russian government in raising military remounts did not, of course, meet the army's demands during the war, and the shortage very adversely affected the outcome of the war. The improvement of farm horses also continued in an unsystematic manner. The stud owners did not show the least consideration for the needs and interests of the army. A mixture of all possible breeds could be found in their stables: Russian Trotters, English Clydesdales, French Percherons, and Belgian Ardennes. The First All-Russian Congress of Horsebreeders in 1910 failed to emphasize the desirability for the improvement of farm horses; no concrete objective was established, no standard type of farm horse was agreed upon. The result was indiscriminate breeding without system and without plan.

In old Russia even the stud farms carried on their breeding program without a plan.

Today in the Soviet Union a very favorable ground for horse breeding exists in the Ukraine and North Caucasus area, where some of the old stock of half bloods remain.

The breeding of the Russian Trotter as a riding horse is still very limited, since many specialists were of the opinion that the Trotter could not pass on its fast trotting qualities, so important to cavalry horses, to its cross bred progeny. But systematic investigation in the Soviet Union has shown that it is possible to use some types of Trotters, descendants of the Lessok and the Mezenate, as a breeding stock for the improvement of riding horses. The horses obtained from such cross-breeding showed a particular capacity for exceptionally rapid galloping. Even in old Russia a large percentage of horses of light Trotter stock has been placed at the disposal of the cavalry. When a fast and sustained gallop became obligatory for all horses of the Russian cavalry, however, the remount commission no longer purchased horses with Russian Trotter blood.

In those days only certain types of horses were made available to the remount commission because some cavalry regiments were traditionally mounted only on greys, blacks, or some special type of color. But to find these colors in the

stud farms of the Don region or the steppes south of that river was very difficult. On the other hand it was much easier to find these colors among the Trotters.

Several cavalry maneuvers revealed that the Russian Trotters lacked a long, free stride and failed to develop a regular rythm of breathing during a rapid gallop. It was noted by many observers that the Trotters were unable to cover four or five kilometers at continuous gallop. For this reason the improvement of many breeds for ridability is recommended, chiefly by the introduction of more purebred and half-blooded stock, which will benefit growth, strength, and energy and result in a greater capacity for an all-round performance. Such crossbreeding should produce a very excellent horse suitable both as an army remount and a farm horse. It would be either a strong and wiry type or a very light half-blood.

In the present endurance contest type of fighting far from the home bases, a horse is required which combines physical structure and quality of breed; a horse which combines a capacity for endurance and a powerful physical structure. The half-blood must be considered as the basis for the army's remounts.

The half-blood combines all the good qualities of the full-blood. It is the most energetic, the most steady, the most understanding of horses; also, the lightest jumper, the

the quickest to learn, and altogether the best all-round horse for army purposes. The half-blood as an army remount is distinguished for its speed, the influence of the English Thoroughbred, and for its sturdy physical structure, the influence of the native breeds.

By crossing the fleet-footed Thoroughbred with our original, long-bodied native breeds, the so-called Metis is obtained, which is tough, speedy, easy to feed and take care of. A pureblood stallion bred to a sturdy mare generally produces a deep-chested offspring with large legs and strong ankle joints. Yet the proper relation of the legs to the body remains, and this horse possesses an extraordinary capacity for light, rapid running and jumping. The Hunter in England is bred to obtain the same objectives. Half-blooded hunting horses also serve as remounts in the English Army.

The half-bred riding horse is only one of a number of satisfactory breeds which can be chosen from the colossal wealth of horses in the Soviet Union to serve the Red Army and to supply it with horses. Breeders of army remounts in the Soviet Union are already improving such basic breeds as:

1. English Thoroughbreds of proved origin which are entered in the Russian or a foreign Thoroughbred stud book or the product of registered parents.

2. Arabian purebreds also of proved origin.

3. Streletz Arabians either bred at the former Streletz stud farm of a direct descendant of one.

4. Don horses, which have been bred and branded at a Don stud farm or other breeding establishment of the Don River area.

5. Kabardinians and Karachaev horses, providing they are branded and are more than three-quarters riding horse by blood and descent.

6. Black Sea horses and their offspring, providing they are branded and are three-quarters riding horse by blood and descent.

7. Trakehnians, provided they carry that brand (stag antlers) on the thigh, or that they have less than one-quarter foreign blood.

8. East Prussians, providing they are branded on the left thigh or on the neck; their progeny, providing these have more than three-quarters native riding-horse blood in them.

9. Hungarian horses of proved origin or bearing the brand of the most important lines of the Hungarian half-bloods (the first letter of one of the following names: Nonius, Hidran, Furioso, Nordstar); or providing they have more than three-quarters riding-horse blood.

10. Achal-Tekinians and Iomudians.

11. Karabairians and Lokaiskians.

These breeds are the most important for breeding army remounts, but the principal large-scale improvers of army riding horses are those horses which have been produced by the following crosses:

| Breeds Crossed | | Product |
|---|---|---|
| English Thoroughbred | English 3/4 blood and higher | English 7/8 blood and higher |
| English Thoroughbred | English half-bred | English half-bred, 3/4 blood |
| Arab purebred | Arab 3/4 blood and higher, or Streletz | Arab 7/8 blood and higher |
| Arab purebred | Arab half-bred and Streletz half-bred | Arab half-bred or 3/4 blood |
| Arab purebred | Any other breed of riding horse | Arab half-bred |
| Streletz | Any other breed of riding horse | Streletz half-bred |
| English purebred | Arab purebred | Anglo-Arab purebred |
| English purebred | Arab 3/4 blood | Anglo-Arab 7/8 blood, and vice-versa Arab purebred English 3/4 blood |
| English Thoroughbred | Arab or Streletz half-bred | Anglo-Arab half-bred, 3/4 blood and the same in reverse combination |
| English Thoroughbred | Don or Anglo-Don | Anglo-Don, not more than English 3/4 blood |

| cont'd | Breeds Crossed | Product |
|---|---|---|
| English Thoroughbred | Black Sea, East-Prussian, Kabardinian, and other riding types | English half-bred |
| Don horses | Black Sea, Kabardinian, Karachaev, Kirghiz | Don-Black Sea, Don-Kabardinian Don-Karachaev, Don-Kirghiz |

Providing evidence of origin and pedigree is available, the same conditions apply to the Trakehnian, the Kabardinian and Karachaev horses and the Orlov-Trotter and Orlov-American.

Apart from these principal types of riding horses, a large number of local and unspecialized classes of horses are widely employed in the Soviet Army, such as the northern classes of Mongolians. The improved types of native horses include, among others, the Mongolian, the Siberian, the Kirghiz, the Minusinsk, the Amur, the Transbaikal, the Kalmyk, and the Bashkir.

## CHAPTER 9

### SPECIAL PURPOSE BREEDS AND THEIR IMPROVEMENT

Before describing the various special purpose breeds of horses which are of decisive importance, not only for service in the cavalry but also for horse breeding generally, it should be mentioned that their special value as army remounts are divided into three groups:

Group I. The full-bloods, particularly Arab and English purebreds, which are of great importance in the breeding of horses generally and for the breeding of riding horses specifically.

Group II. Local breeds of horses which have been improved for riding purposes, including horses from the North Caucasus region, such as the Don and Kabardinian, and from Soviet Central Asia, such as the Tekinian.

Group III. Non-specialized native types; these are very widely distributed and constitute the principal breeding stock for military remounts. Horses from Kazakhstan and Siberia are the chief representatives of this group.

The Russian Trotter belongs to a pedigreed stock and is an important source of light artillery horses. The Arab, which toward the end of the sixth century gained a reputation as a horse of great military possibilities, served as principal

breeding stock for improving all the best known European horses, from the English purebred to the Russian Orlov-Trotter.

The best known contemporary expert on Arab horses, Karl Bauvan, distinguishes various types of Arabs on the basis of their origin. Variations among these types are so great that horses of different Arab origin may di fer more from one another than from horses of totally different breeds. Arab horses can be divided into three types: the Kokheilyan and the very closely related Khamdani; the Munika or, as it is often referred to in Russian literature, the Manega; and the Saglavi.

The Kokheilyan type is the oldest. It is characterized by its medium size and strong body structure and bones. The head and the neck are short, and the chest is relatively large. The closely related Khamdani is known for the additional characteristic of getting fat when not kept working hard.

In contrast, the Munika or Manega type is very different. It is taller, has a long head and neck, a narrow chest, and a rather tautly-drawn back with a soft loin section, in short, the prototype of the riding horse.

In physical appearance, the Saglavi is a very fine looking horse. In Europe at the beginning of the nineteenth century,

the demand was for an Arab which combined perfectly the ideal characteristics of this type, a show horse: a racy grey, with a handsome tail curving well out over the buttocks, and a broad forehead. The Russian and foreign breeders paid particular attention to these characteristics and insisted on them when importing either mares or stallions from Arabia. In this manner the European Arab was created, and it was eventually accepted as the model of good Arab form.

The steeplechase, which is so keenly promoted in England, was a test which called for extraordinary exertions of speed and daring. To meet the demand, English breeders paid particular attention to speed.

In this manner the Anglo-Arab Thoroughbred did not develop into a parade horse but into a race horse. The best known ancestor of this cross was the Darley-Arabian, and Arabian Manega type of ancient lineage. Many experts believe that the first Arabs were brought to England from Central Asia and that they belonged to the Turkmenian race.

Horses raised the hot, waterless deserts of Arabia, trained, and broken to saddle by Bedouins are admirably suited for cavalry horses. Living only on the booty obtained from raiding parties, the Arabs laid stress on the riding and fighting qualities of strength, endurance, daring, adaptability, lithesomeness, and adroitness in leaping over obstacles and depressions. These qualities gave the Arab horse

its importance as a mount; an importance which has continued to the present time.

The external characteristics of the European Arabs include a compactness and firmness of body, a light head with the thin lines of a straight or slightly concave profile, a medium-long neck, a cylindrical rump, a straight or slightly concave back, a straight croup, a detached and rather high tail joint, medium long legs, excellent joints, and small but very firm hoofs.

The average measurements of the Arab are as follows: height at the withers is fifty-nine inches, the slanting length is fifty-eight inches, the chest is seventy-two inches in circumference, and the front shank is seven and a half inches. The only external fault of the Arab is its small size and, compared with the English Thoroughbred, its inadequate speed.

This principal type of Arab does not fulfill present day expectations of a cavalry horse, for the Arab, as the horse of the desert, is not accustomed to a heavy rider. Apart from this, as has been said earlier, the raising of half-bred Arabs involves a serious problem, since it is extremely difficult to find pureblood Arabs. In France the Arab is nevertheless widely distributed, particularly the half-bred Anglo-Arab. Indeed, France even uses this type of horse to supplement its light cavalry mounts.

The experiences of the imperialist war, particularly in the colonies, proved the great endurance of the Arab. It does not tire easily and is not difficult to feed. It is significant that in Cavalry Corps Bordet on the French front, during the Battle of the Marne in 1914, only those cavalry regiments which were mounted on Berber Arabs were ready for action after a long forced march.

As an example of the performance capacity of this breed of horses the result of a ride made by an English cavalry officer, Captain Hoarn, might be mentioned. As reported by Christian Wried in his book, Biological Experiments Regarding Horse Breeds and Breeding,[1] Hoarn set out to cover 644 kilometers in five days on the Arab stallion, Jimmy the Jumper. He reached his objective three hours and five minutes ahead of schedule. The last 129 kilometers were covered in nineteen hours fifty-five minutes. This is indeed eloquent proof of the endurance of Arab horses.

Since modern combat requires the utmost mobility of all mounted forces, the employment of Arab half-bloods, particularly the Anglo-Arabs, as cavalry horses is an inescapable necessity.

It becomes clear in the Soviet Union the Arab must be used to improve the quality of native steppe stock. The

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[1] Versuche der biologischen Rassenforschung der Pferde und die Fragen der Pferdezucht.

environment and the natural habitat of the Russian breeds are closer to the Arabs' dry climate and environment than to the climate and environment of English horses. And this is precisely why the Arab is such an excellent stock to improve our own horses.

In Western Europe, particularly in Spain and Southern France, but also in Hungary and Poland, the breeding of Arabs receives special attention.

In pre-revolutionary Russia there were a few stud farms where purebred Arabs and Anglo-Arabs were raised. The Don type horse is of an early Arab origin. The private stud farms of Sangushko and of Shcherbatov raised Arabs and paid particular attention to that breed. Today, in the Soviet Union, Arabs are bred exclusively at the military stud farm at Terek with Arabs purchased and imported from France and England. The Streletz stud which survived the civil war of 1918-1921 was also brought to Terek from the Ukrainian Socialist Soviet Republic. The Arab can also improve the blood lines of the native Kabardinians, Karachaevo, Lokaiskians, and Kazakhs, all of which are raised in the warm climate of a high plateau. In this manner it may be possible to breed very valuable riding horses from the small-sized native stock by combining the northern and southern types.

The English Thoroughbred, as a distinct breed, was produced in England at the end of the seventeenth century and became the fastest breed of horses in the world. This English riding horse is the result of centuries of selective breeding and crossing to increase speed and performance. The English Thoroughbred is racially pure, constant and stable in its hereditary qualities of strength and speed. It was always the victor over all other breeds in contests and examinations covering such qualifications. It is therefore natural that wherever the desire was to produce horses of high quality, with emphasis on speed--as in the case of army horses-- the English Thoroughbred was resorted to as breeding stock.

The Thoroughbred's capacity and inclination to run, and to run fast, began to be cultivated and developed in the Middle Ages. Later on, English horse racing, as the touchstone of quality, became classic all over the world. Among these are the Derby, which offers the highest honors for three year old stallions or mares running a distance of 2440.67 meters, the Saint Leger, and the 2000 Guineas, also for three year old stallions and mares, running distances of 2940 and 1609.31 meters respectively. The 1000 Guineas and the OKS are for three year old studs only, for distances of 1609.31 and 2440.67 meters respectively.

Although the English did succeed, stimulated by the popularity of horse racing in the eighteenth century, in finally producing the incomparable English Thoroughbred, horse racing was an end in itself for English aristocracy. In general, the main incentive was a thirst for financial gain and fame. Because of these characteristics inherent in every bourgeois society, the English attached no significance to the physical structure of the horses' bodies. Among the English, horses took part in races regardless of their physical appearance. The use of the English Thoroughbred exclusively for sport produced a special concept of the horse in England, a concept which is based on horse racing but not on riding.

RECORDS OF ENGLISH THOROUGHBREDS

| World record | Pre-war records in Russia | Post-revolutionary records in the U.S.S.R. |
|---|---|---|
| 1000 m:55 and 3/5 sec | 1067 m:63½ sec (Ika, two year old) | 1200 m:75 sec (Subsidia and Beskarnuy) |
| 1600 m:1 min 33 and 2/5 sec | 1600 m:1 min 38 2/5 sec (Godny, three year old) | 1600 m:1 min 39 sec (Terek II) |
| 2400 m:2 min 27 and 2/5 sec | 2139 m:2 min 14 and 2/5 sec (Inak three year old) | 2400 m:2 min 31 sec (Beskarnuy) |
| 3200 m:3 min 19 sec | 2440 m:2 min 35 sec (Fasan) 3200 m:3 min 27 sec (Demosphen) | |

Racing tests carried out on Soviet state race tracks for English Thoroughbreds show the qualities of each horse. The main purpose of the races is the selection of the very best horses for subsequent use as breeding stock on the stud farms. The best horses from the army stud farms and the People's Commissariat for Agriculture are determined by the winners in certain major races: the Kalinin Prize (two years olds-1600 meters), the Grand Prize of the Soviet Union (formerly the Derby, three year olds--2400 meters), and the Prize of the U.S.S.R. (four years old and older--3200 meters). As a rule the best stallions up to four years old and mares up to three years old are tested, but occasionally representatives of older age classes appear at the tracks.

The following table shows the running time of horses from Soviet stud farms.

| Year | Name | Distance | Time minutes:seconds | Stallion and dam |
|---|---|---|---|---|
| 1924 | Terror | 2440 | 2:40 | Terror I and Diana |
| 1925 | Dago | 2440 | 2:46 | Don Juan and Gamina |
| 1926 | Terek | 2400 | 2:47 | Tagor and Garconier |
| 1927 | Hetman Ney | 2400 | 2:34 | Herzog and Napoli |
| 1928 | Subsidia | 2400 | 2:33 | Sirokko and Sula |
| 1929 | Budynok | 2400 | 2:32 | Brimston and Saint Macho-sa |
| 1930 | Karta | 2400 | 2:33 | Tagor and Kafara |
| 1931 | Bunshuk | 2400 | 2:39 | Brimston and Formosa |
| 1932 | Gitara | 2400 | 2:37 | Tagor and Glorvina |
| 1933 | Sprut | 2400 | 2:37 | Temruek and Sorrento |
| 1934 | Evolution | 2400 | 2:34 | Junak and Etoile |
| 1935 | Geroinya | 2400 | 2:45 | Brimston and Grust |
| 1937 | Sektor | 2400 | 2:32.5 | Beskarny and Gamsa |
| 1938 | Dagar | 2400 | 2:34.7 | Granit and Dariko |

The average time for one kilometer, when first class horses participate, is one minute. According to foreign data the world record for the kilometer is fifty-three seconds.

The scale index of the English Thoroughbred, which is the relationship between the diagonal length and the height of the withers is 99.6. The index of body width, which is the relationship between the chest measurement and the diagonal length, is 112.4. These figures apply specifically to the slender body type such as that of the English Thoroughbred.

Although there are several types of English Thoroughbreds, the physical appearance of all of them is much the same: an attractive, clean-cut head with a broad forehead, large eyes, dilating nostrils, wide cheeks, a long muscular, generally straight neck. The withers are high and sharply outlined, the shoulders are sloping, the chest is nearly always deep and broad with a long rib section. Very often the ribs are flat. The back is short and straight and the small of the back is high. The croup is long and often sloping. The base of the tail is low, and the hind legs are wiry. The shoulder blades are long and muscular, and the front legs have broad shanks, short brushes and long fetlocks. The thighs are well developed and the buttocks long and broad. The hocks are broad, firm, pronounced, often straight and the pasterns

are broad. The weak points of the English Thoroughbred are its narrow hoofs, flat ribs, growths on the hocks and front knees, and bent front knees and legs.

The standard measurements for Thoroughbreds are: height, sixty-three to sixty-four inches; breadth of chest, sixty-eight to seventy-six inches; front shanks, seven and a half to eight inches; weight, 498 to 510 kilograms. Because of its disposition to pass on such important qualities as speed, wiriness, and endurance, the English Thoroughbred is not only ideally suited for breeding cavalry horses, but in England and other European countries it has also been used in breeding working horses.

The English Thoroughbred and the half bloods derived from it are the best animals as mounts and supplementary horses for cavalry. Military literature is full of highly favorable reports, some of which were made by eye witnesses in various campaigns.

Russian cavalry officers who took part in the Russo-Japanese War, and who, during the Manchurian campaign, were mounted on Thoroughbreds, reported that even when they moved at a walk the Cossacks, mounted on their native horses, were unable to keep up, even at a trot. Although the Cossacks made fun of the Thoroughbreds' thin legs, they were invariably left behind.

Long distance marches and tests surprisingly confirmed that even in endurance the Thoroughbreds surpassed all other horses. In the days of Czar Nicholas I the English Thoroughbred stallion, Charger, in a competitive test between St. Petersburg and Tzarskoye-Selo, covered the distance and return, about seventy-six kilometers, in less time than the best Don horse, Leonid. In 1914, just before the outbreak of the war, the well bred Deluen, 7/8 Thoroughbred, covered 1280 kilometers in twelve days, without daytime rests.

Some very superior English Thoroughbred stallions played an important part in the breeding of further Thoroughbreds and half-breds in old Russia. Names such as Metah (1748), Gerold (1758), and Eclipse (1764) are celebrated in the history of horse breeding. Today there is not a single Thoroughbred that does not have some blood from one of these ancestors. In the planned economy of the Soviet Union the English Thoroughbred is used to improve riding horses and is exerting a decisive influence on the development of army horses. Crossed with any kind of non-specialized native horse the English Thoroughbred not only improves growth, weight, and speed, but also passes on a capacity for rapid development and, most important of all, ridability.

The Thoroughbred lines which are most wide-spread in the stud farms of the Soviet Union are the Saint-Simon, the Ben-Dor

the Gempton, the Iconomic, and the Barcayldine. The very best Soviet breeding stallions belonging to one or another of these lines include Tagor, Herzog, Crab, Bagdadi, Granit II, Sirokko, and Poluss. These stallions produced brilliant descendants who displayed great speed and first class Thoroughbred qualities.

The Orlov-Rastopchinian riding horse is a Russian variety of Anglo-Arab, but finer in outward appearance than for instance the French Anglo-Arab. It is a horse of very elegant form and is not physically inferior to English Thoroughbreds.

As an independent type, the Orlov-Rastopchinian has existed since the nineties of the last century. Only a few purebred animals remain in the Soviet Union, and they are kept as breeding stock at the Derkulsky stud farm. They include Osherelok, born in 1913, Interess, born in 1923, Obraschik, born in 1911 and Braslet, born in 1932.

Considered as riding horses the breed has the following weak points: too narrow a chest, relatively low withers, poorly developed muscles in shoulders and thighs, and tardy maturity. The standard measurements of this horse are: height, sixty-three inches; chest, sixty-eight inches; shanks, eight and a half inches. The weak points of this breed are fully compensated by such qualities as: strong buttocks; sinewy, powerful, correctly spaced legs; great fertility; and non-susceptibility to contagious diseases. They are also adaptable

to climate and are easy to feed and care for. Horses of this type are quickly broken to the saddle, both for ordinary riding and for exhibition purposes. They are easily trained for jumping, and they are suitable for every kind of terrain. They are of average speed but have good movement. Their average rate of gallop for one kilometer is 1.12 minutes. They are lively, long-lived, have an excellent record for work and maintain their fertility to an advanced age. It is an ideal horse for a commanding officer. The Orlov-Rastopchinian stud improves the Kirghiz and Bashkir breeds without faults and the offspring can be crossed with English Thoroughbreds.

The Novo-Alexandrovsk horses are not very numerous. They were bred in Russia during the previous century at the stud farm of that name. Orlov-Trotter mares, Orlov-Rastopchinians, and big English Thoroughbred stallions were used to create this new breed. The cross was a large horse, slightly shorter in length, with a deep barrel supported by very good legs. It inherited speed from its English ancestor, and its free trotting ability and beautiful, parade appearance from the Orlov-Rastopchinians.

The Novo-Alexandrovsk is considerably more massive than the English Thoroughbred. Leg defects, common to English horses, are rare. It acquired a better bone structure and

stronger muscles, but without losing its special qualities as a riding horse. The horse is very easily broken to the saddle and has a long stride. It is a good breeder and easy to feed and care for. The objective in the breeding of this horse was to produce a large, long-legged horse of great endurance, fast, strong, and capable of good performance when under a heavy saddle as well as when harnessed to a light vehicle. The measurements of the Novo-Alexandrovsk mare Sirene were: height, sixty-four inches; chest, eighty inches, shanks, eight inches. The stallions have played an important part in the production of certain variations which now constitute the basic stock of the state owned stud farm at Kirov.

The Novo-Alexandrovsk, because of its speed and bone structure, could well be used to improve either riding horses generally or a fast riding horse for the heavy rider or a draft horse for mobile machine guns and horse-drawn field artillery.

The Streletz is one of the oldest half-bred lines of Anglo-Arab breed in the Soviet Union. The horse is characterized by the graceful form common to Arab horses generally, having perfectly symetrical limbs and body structure, a sharp-featured head with large eyes and a broad forehead, a neck with a fine, sweeping curve, a straight croup, and a beautifully

curving tail. Its hair is fine, its skin elastic and its muscles prominent. The legs are strong and very sinewy, the fetlocks and hoofs are small. The horn of the hoof is firm and tough.

The highly bred Ukrainian horses are among the best riding horses in the Soviet Union. They were bred from the local steppe horses, a breed which in the eighteenth century supplied excellent horses for the cavalry of the Saporoshsk Cossacks and later filled the ranks of the Czarist cavalry.

According to Professor Kuleshov the Ukrainian horse originated from a combination of Strelets, Anglo-Norman, and Mecklenburg breeds. At the beginning of the twentieth century this combination received a considerable reinforcement of English blood. The Czarist Government, which recognized at a very early date the great military significance of the best Ukrainian horses, organized a series of stud farms as an independent source of supply in the southern and southwestern Ukraine. There were in pre-revolutionary times a large number of small privately owned stud farms where horses of different breeds were raised and offered for sale to the remount commission. Many well-to-do farmers were engaged in horse breeding.

The military remount commission determined, in accordance with their needs and preferences, the kinds of horses which

should be bred. The military purchasing commissions in the days before the World War paid a higher price for horses which had a larger proportion of English blood; the English half-bred was recognized as the best cavalry horse. The Ukrainian riding horse was also in demand for agricultural purposes.

Because of its physical characteristics and temperament, the Ukrainian horse is capable of improving those horses which are bred from English blood lines. The Ukrainian itself may be subdivided into independent secondary groups: the Kirov, the largest and best group; the Valkov; and the Byerlozerkovnaya. The average measurements of Ukrainian stallions of high quality are: height at the withers, sixty-three inches; chest, seventy-one inches; front shanks, seven and a half inches.

The great majority of the horses belonging to the Kirov state stud farm, which are not the result of crossing with purer bloods, are nothing more than small steppe horses, the local riding horses. They have a bulky head, a long, goiterous neck, long back, pronounced withers, a short, sloping croup, wiry shanks, and sturdy legs. A large number of horses from this almost one hundred year old mixture could serve as an excellent breeding stock for crossing with English Thoroughbreds. At present all this stud stock is indiscriminately mixed with the working horses on the Kolkhoz.[2]

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[2] Since the reference is to a state operated farm Kolkhoz should probably read sovkhoz. (Ed.)

The main districts in which pedigreed stock is raised are in the administrative sphere of the state operated stud farm at Kirov. The best horses are from Xmelye, Dobro-Byelitchev, Novo-Brod, Novo Ukraine, Vyshnye-Vyshkovsky, Tishkovsky and Pyervomaiski. The stud farm at Kirov, organized in 1935, was stocked with horses from the first six of these districts.

The Russian Trotter occupies a special position in the improvement of remount horses for horse-drawn artillery. The Russian Trotter is known all over the world as a highly bred horse of mixed blood. It was bred as a result of the demand from imperialist Russia's big landowners, who were very fond of the Trotter as a carriage horse. The Ryssak or Trotter is now the main blood line used by large collective breeding establishments.

The Trotter as a separate strain emerged in Russia 150 years ago from crosses which involved several riding and carriage horse breeds such as Arab stallions and Danish and Dutch mares. Later the new breed was consolidated and fixed as a separate type.

The Russian Trotter shows divergencies toward two different characteristics, one of which is inherited from the original, local breeds, and the other from the Dutch line. When the

physical characteristics of the first predominate the horses are generally small and wiry with graceful lines; when the characteristics of the second predominate the offspring are larger and more massive with coarse and shaggy fetlocks. In physical appearance the Russian Trotter averages sixty-four inches in height, has a rather coarse head and a narrow, often pike-shaped neck of medium length, sometimes with a swam-like curve. The withers are of medium height and length; the back is long and for the most part soft, and the loin section, although short and powerful, is often sloping; the legs are long, especially the front shanks, the pasterns are short with average hoofs; the chest is not very deep, but the shoulders are sloping and strong.

The average measurements in centimeters of the Orlov-Trotter are:

| | Mares | Stallions |
|---|---|---|
| Height at the withers | 158 | 158 |
| Chest (circumference) | 181 | 177.5 |
| Front shanks (circumference) | 19.7 | 20.2 |
| Weight in kilograms | 472 | 477 |

The Trotter is slow in attaining maturity, which is reached at four years of age at the earliest, more often at six years, depending on the strain. The Trotter has the capacity to develop considerable speed. Ulov, a Trotter, surpassed the pre-war record, held by Krepysh, of 1600 meters in 2.085

minutes and set a new trotting record for the Soviet Union by trotting the 1600 meter course in 2.036 minutes.

Because of the Trotter's long stride and very high trotting capacity, it is now used to improve the carriage horse for use in Soviet agriculture. The strongest of its offspring also serve as breeding stock for the special remounts of the light cavalry.

Before the Imperialist War a large number of Russian Trotters from the former administrative district of Voronezh were exported to Germany and Austria, where they are reported to have been used to produce half-breds as remounts and carriage horses.

In some parts of the Soviet Union the Russo-American Trotter is used. This specialized trotter of very rapid gait is also used as breeding stock to improve light farm horses and horses used in the army transport services. Its progeny can also be used as riding horses. In selecting these horses particular attention is paid to secure those which have the correct, natural gaits. When tested on a race track at Hamburg, the Russo-American Trotter, Petushok, from the state stud farm at Smolensk established a new European record by defeating the American Trotter, Protector, when it covered the 1600 meters in two minutes three-tenths seconds.

## CHAPTER 10

## RIDING HORSES FROM THE NORTHERN CAUCASUS AND CENTRAL ASIA

Among the riding horses of the Soviet Union the two North Caucasian breeds, the Don and the Kabardinian, and two from Central Asia, the Tekinian and the Karabairian, comprise a group from which the Soviet Army of Workers and Peasants obtains the majority of its remounts. Even in pre-revolutionary times the horses bred in the North Caucasus were important as army remounts. The particularly favorable climatic and topographic conditions, such as existed on the vast, fertile steppes of the southern region, contributed to the development of splendid riding horses. These horses have kept their excellent qualities as riding animals to the present time and are the reserve source of supply for the Soviet cavalry.

The Don, also referred to as the improved Trans-Don, was developed from the original Old Don stock. It was the distinctive, general utility horse of the steppes and inherited all the good qualities of its ancestors, the Mongol-Kirghis or Kalmyk breeds. These animals were famous for their strength, endurance, hardiness, and ability; qualities which were particularly valuable to the warlike Cossacks. The continuous raiding and fighting of the Don Cossacks, who served as border

guards in the south against neighboring Mongolians, Tartars and Turks, greatly influenced the development of their horses. During the eighteenth century the addition of Turkish, Mongolian and even Persian blood improved the quality of the Don horse.

The first stud farm on the Don River was established in 1770 by the Cossack Ataman, General Platov, later the hero of the war against Napoleon, with the best available Arab, Persian and Turkish breeds. These horses, booty from the campaigns against the Turks and the Persians, contributed a great deal to the improvement of the Old Don horses. The Don horse, enriched by the heritage of the Arab, the Kabardinian and Persian breeds, was finally ennobled by the blood line of the English Thoroughbred, which was first imported into the Don region by Platov. Since then the Don horse shows the unmistakable influences of the Strelitz, the Anglo-Arab and the Orlov-Rastopchinian.

The growth of capitalism at the end of the nineteenth century forced some of the noble and privileged Cossacks from their occupation as horse breeders, and a number of farmer breeders, such as Pokopaev, Suprunov, Korolkov, Pishvanov, received government support on the condition that they make certain annual deliveries to the cavalry remount commission.

Each of them had to deliver each year not less than fifteen horses which met all government specifications. These horse breeders raised numerous herds of horses consisting exclusively of Don horses on extensive pasture lands leased from the government.

In order to meet the requirements for army remounts, the breeders of the Don had to cultivate certain physical characteristics in their horses: height, a fine small head on a short neck, a straight back, a deep chest and firm legs. Breeders utilized English Thoroughbreds and half-breds, Anglo-Arabs, and Orlov-Rastopchinians, which they acquired either from the former state stud farm at Byelovodsk or from a great number of private stud farms, Persians, Karabanians, and other local breeds.

Because of the stringent requirements of military administration at the beginning of the nineteenth century, the influence of the English Thoroughbreds upon the Don horses was so great that even before the beginning of the Imperialist War of 1914-1918 the Don was considered the best army horse. This fact received public recognition at the All-Russian Horse Show held in Moscow in 1910 and at Kiev in 1913, in both of which the Don horse was recognized as the horse best suited for cavalry. It won high praise not only from Russian horse breeders but also from foreign representatives. It

should also be remembered that a few years before the war a large number of Don horses were exported for the replenishment of the German and Austrian Armies.

It has already been mentioned that Don horses were a supplementary source to the cavalry of the old Russian Army. Some 4000 mature horses were delivered annually, which was about half the annual requirement of the cavalry remount service.

In outward appearance the Don horse has a medium large head, a wiry straight neck, a straight back, long, rounded ribs, a straight croup rounding off at the end, short legs, short perpendicular pasterns, flat knee joints, knees which are often bent slightly inward (calf knees), hindquarters which are somewhat bowlegged when viewed from the rear with the hocks coming together. Don horses, almost without exception, are chestnut colored.

The value of the Don consists in its unique toughness and sturdiness, its strong bone structure, uniformity of type and its capacity for passing on its special characteristics to its offspring. For this latter reason the Don horse is of great importance as a stock to improve the mixed breeds of the Russian steppes.

Until quite recently the breeding of the Don horses in the Soviet Union was unsystematic, and the Don horse was regarded

solely as raw material for breeding with pedigreed horses. This erroneous view was corrected in 1930, and a plan for improving the breed itself on lines of selective breeding was established, but not without cross breeding with English Thoroughbreds. However, the addition of Thoroughbred blood was resorted to in very limited measure and only for the purpose of improving the courser strains which had lost some of the necessary characteristics of a saddle horse, or lacked grace of movement, an elastic gallop or speed, or strains which did not tend to inherit the qualities of Don stallions. Cross breeding with Arabs renewed the tendency to pass on to offspring the Arab's excellent qualities as riding horses, their perfectly ideal movements, and their unique hardiness.

The Don horses have given sufficient proof of their speed in the hippodrome at Rostov. The Don possesses everything that could be asked in a cavalry horse. Two year old Don entries ran the 1600 meter distance at an average speed of 2.02 minutes and the fastest time was 1.51 minutes. At Moscow the three year olds ran the 1600 meters in 2.073 minutes and the record time was again 1.51 minutes. The superiority of the English Thoroughbred in speed is not questioned, but the Don's stride is long and correct, its trot is smooth and fluent, its gallop is free and unrestrained. At the present time special attention is being paid to increasing its speed.

The high value of the Don as a cavalry horse was demonstrated practically in several wars and campaigns. Shaposhnikov in his book, The Cavalry, credited the Don horse with brilliant performances in all marches and major movements during the Imperialist War.

Even in the Napoleonic wars the Cossack horses, which are the Old Don horses, were praised by many writers of military history. Denisen said that the Cossack cavalry was tireless and that no European cavalry could compare with it; that although the horses were small, they were fast, hardy and easy to feed. As to the Cossacks' rate of march, Denisen said there was no other force in Europe to compete with their 7.5 kilometers per hour.

During the Caucasus campaigns the cavalry, mounted on Old Don horses, gave proof of a mobility which could not have been equalled by any cavalry in the world. A Russian cavalryman, who had taken part in the Boer War, observed that the few horses from the Russian steppes which the English had purchased proved to be the best cavalry horses for use in that kind of country, and that in both endurance and frugality they were far superior to any of the other foreign horses present. All of which clearly shows that the Don is the best army horse when raised under the difficult living conditions of the Don steppes. Shortly before the Imperialist War, the number of Don stud horses was estimated to total 60,000 head.

At the present time the Don breed is concentrated on the Marshal Budeny stud farm in the North Caucasus, at the horse breeding kolkhozes of that region, at the Narynsk stud farm in the Kirghiz Republic and at a horse breeding sovkhoz in the Stalingrad district called The Steppe Horse Farm.

In the economic planning of the Soviet Union the improved Don horse has been recognized as a proper source of army remounts. In 1934 a state stud book for pedigreed Don horses was introduced. Don horses are improved by selective inbreeding without recourse to horses of any other breed.

The Anglo-Don was created to increase the speed and riding qualities of Don horses. The Anglo-Don is shorter in length, taller in height, and racier than the full-blooded Don; the Anglo-Don has fewer flaws, but does not flourish on the steppes. The influence of the Thoroughbred line gives the Anglo-Don greater speed. In 1928 the two year old Sulamif ran the kilometer in 1.05 minutes. The Anglo-Don has always done extremely well in the Soviet cavalry. It is irreplaceable not only as a saddle horse but also as an artillery horse harnessed to field guns.

The Kabardinian horse is one of the most valuable native mountain horses in the North Caucasus region. The Kabardinian originated from a crossing of Kalmyk and Nogayan mares and Turkish, Persian, Karabachian and Arab. The stallions were

for the most part brought from Arabia and Persia by the Kabardinian mountain people returning from holy pilgrimages to Mecca. These warlike Mohammedans and other mountain people, in the days prior to the conquest of the North Caucasus by the Russian troops of Czar Nicholas I, lived on the plunder obtained by raiding parties who crossed the Kalmyk and Nogayan steppes, the Kuban, Stavropol, and Astrakhan districts.

They also brought back mares as booty and crossed them with Persian and Arab stallions. During the long period of isolated breeding influenced by climate and natural selection, the Kabardinian emerged as a new type. During the past sixty or seventy years the Kabardinians were for the most part inbred, and it was only a few years before the Revolution that attempts were made to improve the Kabardinian by adding Arab and English blood.

In size the Kabardinian is the most important of all the Caucasian mountain horses. Its physical characteristics include a wiry head with a frequently convex nose line, a straight, muscular neck, prominent withers, a straight, broad, strong back, a good loin section, a well-proportioned, almost perpendicular croup, muscular and sinewy legs; the hind legs come close together at the hocks but are otherwise rather bow-shaped; the hoofs are exceptionally strong. The Karbardinian horses are never shod, not even for traveling on slippery ice.

In spite of its low neck the Kabardinian horse is well balanced and easy to control. This is due to the position of the head, the faultless nape, and the broad lower jaws in its standard type mouth. In color it is generally a uniform brown and very rarely black or grey. The Kabardinian does not attain full maturity until it is between five and six years old.

The average measurements in centimeters of Kabardinian mares are:

| | Herd type | Riding type from stud farm N 34 | Karachaev type |
|---|---|---|---|
| Height of withers | 144-145 | 146.08 | 144 |
| Chest, circumference | 168-170 | 175.38 | 174.5 |
| Front shanks, circumference | 17.8 | 18.05 | 18.1 |

The physical structure of the Kabardinian horse is characterized by the following indexes:

| | | |
|---|---|---|
| Size index | $\frac{\text{Body length}}{\text{Height of withers}}$ | 102.02 |
| Bone index | $\frac{\text{Front shanks}}{\text{Height of withers}}$ | 12.5 |

The suitability of the Kabardinian as an army remount is indicated by its fast gait on mountain roads and trails. When using this gait, which alternates between an amble and a walk, they can travel as fast as ten kilometers an hour.

The Kabardinian, however, is a poor trotter and is completely incapable of galloping. It has a fairly fast stride.

though it is by no means as fast as the Don. Speed is not expected of a horse accustomed to and destined for use in the mountains, yet in 1901 a Kabardinian mare ran the 1056 meter distance in 1.24 minutes.

The demand for Kabardinians is just as great now as it was before the war. Apart from its strong physical structure the horse has a very special asset in its legs, and can literally cling to every projecting rock in the mountains. Because it has great endurance, is easy to feed and is very adaptable, it is considered one of the very best mountain riding horses.

The experimental use of the Kabardinian during the Crimean and later wars as an artillery horse proved that this horse, and particularly its mountain cousin the Karachaev, were extremely well suited for work as pack animals.[1]

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[1] The German translation of the Russian text ends at this point; the original is not available. (Ed.)

# APPENDIX K

## DIRECTIVES FOR SERVICE WITH HORSES USED DURING THE RUSSIAN CAMPAIGN

I. DUTIES OF TRAINING OFFICERS IN THE FIELD

1. OKH[1] Order of 26 November 1941. Training for Service with Horses.

a. The heavy horse casualties sustained in the Eastern Campaign through causes having nothing to do with enemy action, such as overexertion, ignorance of a horse's capacity, and inadequate care, make it necessary to take special measures to preserve our valuable supply of horses.

In order to maintain the mobility of our forces it is the duty of all officers to have an appropriate understanding of service with horses so as to insure that horses be given proper care.

b. To assist the division and regimental commanders in this important task it will be necessary to have recourse to:

(1) Officers who will be responsible for a uniform and adequate training of the men and horses assigned to the mounted and horse-drawn services and for the proper use of the horses; Officers are to be assigned to every infantry division and every regiment or independent battalion. The officers selected should be enthusiastic horsemen. While they may still carry on their other duties, their new and

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1 German Army High Command

special task will be to report to the responsible commanding officer on the state of training in riding and driving, and to give personal advice to the organizations concerned. Wherever possible they should be put in charge of the training courses.

(2) The veterinary officer assigned to the division or regiment, who should be consulted on all matters concerning the care and health of the horses, and who should give advice regarding their proper utilization and replacement.

c. The training of the officers who are to be responsible for the horses should be initiated by the staff officers "F" of the OKH[2] as soon as the situation permits. They should initiate courses for officers of the division, and these in turn will initiate courses for the officers who in the regiments or battalions will be responsible for the service with horses program.

d. The commanding officers of field units are responsible for the state and condition of the horses.

These measures in no way relieve the field commanders, such as company or battery commanders, of their responsibility to preserve their valuable stock of horses.

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[2] Staff officers "F" of the OKH are staff officers for riding and driving in the Army High Command. (Ed.)

2. Instructions of 14 November 1942. From the Commander in Chief of Eighteenth Army[3] to the Training Officers under his Command.

In each division officers should be assigned to see that proper utilization is made of the horses. In order to clarify varying concepts regarding the duties of these officers-hereafter referred to as training officers[4]-the following instructions are issued:

a. the training officer will supervise: instruction in riding and driving; the composition of teams; saddling, hitching, and harnessing; riding equipment, harnesses, and vehicles; and the feeding and care of horses after consultation and agreement with the veterinary officer.

These duties are to be carried out in accordance with the directives of the division commander.

b. While in the field the training officers will carry out their duties by continuously visiting the combat troops and units on the march. On these occasions they will inform unit commanders of any errors being committed. During periods of rest the training officers will inspect stables, and with

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[3] At that time committed south of Leningrad

[4] Pferde-Ausbildungs-Offiziere

the competent officers supervise the care of horses. Whenever possible they will also, in accordance with directives from the division commander, initiate courses on service with horses for the officers and the noncommissioned officers.

c. The training officers will schedule their time so that the chief emphasis will be on training for service with horses.

d. They will inform the unit commanding officers of their observations and suggestions and also report them to the division commander and operations officer.

e. In all matters in which, according to Army Regulation 56/1 section V/2, the veterinary officers have the duty of counselling and assisting the unit commander, the training officers will act in concert with the former.

f. These directives apply to all officers of a regiment or battalion who have been appointed instruction officers.

g. The division commanders must select and appoint the training officers in accordance with current directives, and must provide them with the transportation necessary to permit them to attend to their very important duties.

It is important that from the officers available for such duties, preferably with the rank of captain or major, only those will be appointed who have a genuine enthusiasm for horses, are able to assert their authority, and who, apart

from their regular duties, have sufficient time to render useful service as training officers.

3. Directive Issued by the Eighteenth Army to Division Training Officers on their Duties in the Field.

a. Unannounced visits to field units should only be made when the division commander has issued specific instructions to that effect. Such instructions should be issued through channels and made known to the unit or units concerned. At all other times the units should be informed of the intended visit, preferably through the first staff officer. If the inspecting officer himself announces his intended visit, he should politely explain that he is doing so under specific instructions from the division commander. He may, of course, suggest and obtain concurrence for a visit from the division commander or his operations officer, and then determine the day by discussing the matter with the regiment or battalion concerned, without letting himself be put off too long.

b. When visiting units in bivouac, the division training officer should immediately after announcing his intended visit express his wish to speak with the adjutant, the regimental or battalion training officer, the officer in charge of weapons and equipment, or the ordnance officer, and that he would subsequently like to have a short interview with the commanding officer of the regiment or battalion. It is

also best for him to announce by telephone what units he would like to inspect, whether all or a few, and, if necessary, also discuss the means of transportation he will use during his visit.

c. Prior arrangements of this kind are often impossible when visiting units which are in the field. In this event the division training officer should limit his inspection to some or all of the mounted and horse-drawn units, wherever and in whatever condition they may happen to be. In a quiet manner he should then point out and correct the most glaring errors. Afterwards he may find it necessary to advise briefly the subordinate unit commanders and submit a report to the higher commander.

d. If the occasion arises, one day before leaving for active service, the division training officer should inquire of the division ordnance officer the requirements of his units in standard army equipment, or when he expects the requirements to be met, or what equipment he no longer expects to receive. He should also ask for a brief inventory statement from the maintenance sergeant.

e. If necessary, the training officer should bring along copies of a questionnaire[5] for use at meetings.

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[5] See page 589

f. At the beginning of his visits with the regiments or battalions, the training officer may use these questionnaires as a basis for short talks to the troops.

g. He should visit mounted or horse-drawn units of regiments or battalions to check on the training for service with horses. (See paragraph 1 of the Service Regulation for Training Officers with the Eighteenth Army, dated 14 November, 1942). During an inspection the regimental training officer, the unit commander, and ordnance sergeant of the unit concerned, should be present.

h. If necessary, the division training officer should terminate his visit by a conference with the regimental or battalion commander, in which he will report his observations and make recommendations.

i. If the regimental or battalion veterinary officer is not present during the inspection of the stables, he should be called on at the end of the inspection.

j. On his return to the division the training officer may make a brief verbal or written report to the operations officer and division commander.

k. The manner in which these visits are conducted should in themselves serve to train the regiment and the battalion training officers.

l. The inspecting officer should adopt a quiet and friendly tone whether writing or conversing.

Sample questionnaires for use in meetings

When was meeting held? Who was present?

Regarding the employment of horses in the army:

1. What is the percentage of horses recuperating in rear areas?

2. At what distances?

3. What is the percentage of draft or pack horses actually with the troops and at work daily?

4. What number of horses or pack animals are cared for by one man?

5. How many auxiliary volunteers or prisoners of war are engaged in taking care of horses compared to the number of Germans employed?

6. How many horses and caretakers are supervised by one noncommissioned officer?

7. What percentage of horses are sheltered in stables or barns, and what percentage in bunkers?

8. What type of buildings are being erected by the troops?

9. Are the troops, in regard to horses, mobile and ready? (How many horses are exhausted or sick? Replacements needed?)

10. Are fodder supplies arriving regularly?

1. How have requisitions been made and acted upon recently?

2. What are the principal deficiencies?

3. What has recently been received for taking care of equipment?

4. How has it been distributed and in what condition is equipment now?

5. Where is the equipment kept?

6. Where is the equipment of returned horses stored, and how is it stored?

7. Has the division a store of unused equipment?

8. Have army saddlers been present and what did they accomplish? Relative to this question: Have the available saddlers and stablemen been drafted and instructed? If not, why not? Have army saddlers checked the proper fitting and condition of equipment in the time prescribed? Did they set up workshops? Did they send a report to the army ordnance department, in duplicate?

9. Is there a shortage of sleds, or have enough been delivered, particularly for winter use?

10. To what extent has the conversion of army vehicles to Russian type vehicles and gauge been accomplished?

11. What is the principal deficiency in vehicles?

12. In what condition are the vehicles and sleds?

13. When was axle grease and paint last received?

14. In what condition are the wagon tarpaulins? (Important!)

15. Is the work of the maintenance sergeant and ordnance sergeant being done satisfactorily?

16. What is the status of equipment, particularly of reorganized motorized units (antitank companies, baggage trains)?

17. What is the supply status of leather? Saddle twine? Saddler's equipment?

18. What are the deficiencies in harness rope, halters, and awnings?

19. What is the supply status of equipment for pack animal trains?

20. Are winter mobile units familiar with the use and the hitching of horses to sleds?

Training

1. Who is training officer? Since when? What was his profession in civilian life?

2. What was his training?

3. Did he attend a course of instruction? Where? When?

4. What is his regular duty?

5. Has he an automatic successor for his regular duty?

6. What are his means of transportation?

7. How often does he visit the mounted and horse-drawn units of the regiments or battalions?

8. What support does he get from his superiors? From the personnel officer? From the ordnance officer? From the officers of the units visited? From the veterinarian?

9. What instructions has he received?

10. What proportion of the officers of horse-drawn units have, in his opinion, a proper understanding for service with horses?

11. Has he given courses of instruction? To whom? Where? When?

12. To whom does he report? to the regiment commander? to the adjutant? the operations officer?

13. In his opinion, how well are the unit training officers doing their work?

14. Are they given time for preparation?

15. How well trained in the service with horses are the field units?

16. Are replacement specialists being selected and given short training courses?

17. Has any thought been given to the training of officer-candidates, noncommissioned officers, and enlisted men replacements?

18. Has any thought been given to the training of ordnance sergeants?

19. Is any training being given to auxiliary volunteers, or prisoners of war on taking care of horses?

20. What is the state of training of the pack animal drivers?

21. Are pack animal trains being used?

4. Directive to Division Training Officers for Training During Periods of Rest.

a. Promptly inquire of the operations officer how long the division is to remain there.

b. Promptly ask the operations officer if the division intends to issue instructions for overall training. If so, quickly draw up a short program of instruction for service with horses and request that this program be included in the division's training orders. The short program should aim at obtaining replacements for riders and drivers, officers and officer candidates, noncommissioned officers and noncommissioned officer candidates, and should provide training for the riding and driving instructors and the horses.

c. Quickly draft a plan for a refresher course extending over the expected period of rest for the regiments and independent battalions. If the course is based on the short training program it will only be necessary to extend or reduce the number of days.

d. The short plan for the refresher course should include a list of students and instructors.

(1) Circumstances permitting, the training officers of regiments or independent battalions should receive instruction from the division training officers for three to fourteen days.

(2) Riding and driving instructors should receive instruction from training officers of the division or independent battalions.

(3) Riding and driving instructors in turn should instruct beginners in riding and driving and give lectures based on the short training program.

e. The beginners' course in riding should include: officers who have just been or may be assigned mounted duty. All infantry and artillery officers not yet able to ride; all officer candidates who have not yet received adequate training; noncommissioned officers and noncommissioned officer candidates who have been assigned mounted duty, or who may have been engaged in such duties for only a short time; enlisted men who have been or may be assigned to mounted duty. As a basic principle there should be two trained men available for every mounted assignment.

f. The beginners' course in driving should include all men who have been or may be assigned driving duty.

g. Advanced riders need receive no further training in riding, but should be employed in training riding horses, in columns of two or in troops, walking or trotting, on roads or in cross country. They may be given a few hours of instruction during which bridling, saddling, and the care of equipment and horses is reviewed.

h. Advanced drivers should be given a few review lessons using stationary driving equipment and some review in bridling, harnessing, hitching and the care of equipment, vehicles, and horses. During longer rest periods they may also receive some practical training in driving four horse teams from the driver's seat.

i. Circumstances permitting, riding horses which have not yet been trained to march in columns should be tested by experienced trainers, and given such additional training as they may require.

j. Draft horses which balk at being mounted should be broken to the saddle by the best riders of the unit. (No fancy training! These days we have neither the instructors nor the riders for that.) It will be enough for them to walk when alone accompanied by a quiet, well-broken, and well-mounted horse. To the extent required unbroken horses should be trained to accept being saddled, curbed against rearing, and cured of any bad habit of sticking close to an accompanying horse. While

breaking shying and timid horses, the trainer should keep his composure, patting the animal's neck.

k. Draft horses which do not pull well should receive special training from qualified trainers.

l. Special attention should be paid to the care, repair, and renovating of all equipment, including vehicles.

m. The best possible shelters for horses, equipment, and vehicles must be procured.

n. Vehicles which are not going to be used for some time should be unloaded and thoroughly cleaned and overhauled. The loads should be stored in dry places in separate piles.

o. Inspection should be held once a week or once every fortnight, at which time the horses, properly fitted with bridles, and saddles, and the draft horses, properly harnessed and hitched to their vehicles should be reviewed.

p. Items c to o above, must be briefly included in the plan drafted by the division training officer.

q. All these points should be checked by the division training officer when visiting troops resting in rear areas. On these occasions he should briefly advise the commanding officer and instruct the instructors and personnel.

r. During these visits the training officer himself should look lively in his riding and driving.

5. Directive to Division Training Officers on Inspections Made while Troops are in Bivouac, about to March, on the March, during a Halt, or about to Occupy Quarters.

Visiting a Unit in Bivouac.

a. During a day of rest always visit a unit.

b. Check to see that the horses are well cared for and ready, and that all leather gear and vehicles are kept in good condition. As far as possible insure that the horses are well sheltered against wind and weather and that they are not crowded.

(1) Horses should be kept very clean. In summer they may be washed in lakes, ponds, streams, and rivers. At that time of year it is often better to keep horses outdoors, separating the kickers and biters, and over-greedy horses. They may also be pastured under supervision; precautions are taken against kickers and biters and injuries which may be caused by defective fences. In winter horses should have blankets even in stables when the temperature is below ten degrees centigrade.

(2) Leather gear should be kept thoroughly cleaned with a brush, a damp cloth, and leaves, or, when enough is available, with small bunches of hay or straw. Leather should be lightly oiled or greased after cleaning. In winter the oiling should be done indoors where it is warm,

since the leather must be kept warm long enough for the grease or oil to penetrate. Leather should not be exposed to the hot sun in summer after oiling. Have the army saddlers repair all leather gear. Very seriously damaged parts should be turned in through the authorized channels.

(3) Vehicles should be washed and, when necessary, scraped clean. Repairs should be made by carpenters and blacksmiths. Seriously damaged vehicles should be turned in through division or army channels.

c. It is advisable for the unit commander or his representative to inspect the horses when fully equipped with bridles, saddles, and harness. He should coordinate the inspection with the veterinary officer, for with all the caretaking and inspecting the horses must have a chance to rest and recuperate!

d. The records of the ordnance sergeant should be checked for requisitions, equipment inventories, and lists of vehicle parts and leather gear.

e. When necessary, draft horses should be unhitched and replaced by riding horses with the necessary changes in saddles, bridles, and harnesses. New horses may have to be obtained through veterinary companies. If necessary tractors should be procured, or even oxen or camels! Under no circumstances should any vehicle be left without some means to move it.

f. Exhausted and sick horses should be turned in as soon as possible.

g. Vehicle loads must be checked. If necessary and with the express authorization of the division commander, excess weight should be removed and equalized. (Small field wagon, 600 kilogram; light field wagon, 750 kilograms; heavy field wagon, 1000 kilograms.)

h. Each vehicle should be equipped with two small cribs, one in front and one behind, and when possible a rack containing coarse fodder on the rear; trenching and vehicle equipment, including shaft plates, thongs, lanterns, and nails should be carried. Advise the commanding officer and instruct the noncommissioned officers and men.

Visiting a Unit about to March.

a. When were the marching orders received?

b. At what time were the noncommissioned officers and enlisted men in charge of horses awakened? (Include the forage sergeant or his assistant if the former is in the rear with the main baggage train; include riders and drivers. One hour to one and a half hours should be allowed for getting ready to march.)

c. When were the animals fed? Were they previously watered? (A quarter to one-half hour before feeding!) Who issued the fodder? (The forage sergeant or his substitute?) Who supervised the feeding and watering? (Forage

master, his substitute and section corporal, gun section leader, or senior billet officer?) Did each horse get its full ration? (Keep morning ration small!) Did thin or over-tired horses get more to eat than well-rested and well-fed horses? (Necessary!)

d. Were orders for saddling, harnessing, and hitching issued sufficiently soon? (An adequate time allowance is particularly important in the dark. Minimum requirement is fifteen to twenty minutes.) Did the order reach everyone promptly?

e. The horses should be saddled or harnessed outside their shelters or stables in order to insure an orderly start. (If packsaddles are to be loaded, the saddling should be done by two men. Use caution if there is any danger of air attacks.)

f. Do the vehicles have the emergency ration of fodder (hay, straw, green fodder, roots) and the required cribs and hay rack?

g. Was the route to the assembly area reconnoitered early enough?

h. Did the unit commander have advance information on the march objective and rest periods? Did he obtain advance information on suitable places for stops, bivouacs, and the indoor billeting of men and horses? Did he have to consider contact with the enemy.

i. It is advisable for the division training officer to be accompanied by the unit commander or responsible officer while supervising saddling and harnessing, or while letting the column pass in front of him on its way to the assembly area.

j. This occasion should be utilized for advising the commanding officer and for instructing the noncommissioned officers and men.

Visiting a Unit on the March.

a. While under way:

(1) Head gear (curb chain neither too long nor too short), saddles (saddle girth loose, position of saddle rug), stirrup (not too low), driver in the saddle with rider's hand baggage on off horse, seating and bridle control of riders, seating and bridle control of drivers (no sleeping!), harness (bellyband, breast collar, girth-if used-stopping-rings with lines properly drawn through them, buckling of traces to the girth-if used-correct leading of off horses when driving from the saddle-not too close!).

(2) Overloaded vehicles, dragging brakes, worn brake blocks.

(3) Riding horses and pack animals not too heavily loaded, equal distribution of loads (pressure, chafing).

(4) Picking the best side of the road to be traveled on.

(5) Gait (trotting and galloping only when urgently necessary, particularly in the case of cold bloods), rate of speed (front horses not too large as their speed is apt to be faster; nor should horses with a free stride head the column). Maximum speed should not be asked, except in pursuit, particularly not when the unit is marching independently of other units, free to set its own pace, generally two to five kilometers per hour).

(6) Leading of riding horses and horses of multiple teams (with off horse) when climbing, descending steeply, or where the road is otherwise difficult. Only the driver should remain seated in the vehicle or field kitchen; an exception is made for the wounded and the sick, especially those with foot injuries. The latter may be used as assistant drivers, after receiving specific instructions.

(7) The unit, troop, and section leaders should not ride or walk disinterestedly at the head or rear of the column, but should see to it that good order is maintained.

(8) When intervals in the column have been ordered, these should be maintained in order to prevent continuous stopping and starting.

(9) Auxiliary hauling, pushing, and braking crews should be on hand to unload a vehicle when stuck: free the wheels, provide extra traction if necessary also extra horses, make emergency repairs, and brake with poles when no brakes are provided.

b. During short rests:

(1) Is distance which remains to be covered known?

(2) Was the distance covered satisfactorily divided?

(3) Always dismount at once; check bridles, saddles, harnesses, traces, vehicles, and horseshoes (fasten loose shoes, replace lost shoes cold: loose nails cause cuts, unshod hoofs splinter,loose shoes may be detected by shaking, and loose nails by passing the hand around the edge). For resaddling packsaddles two men should work together.

(4) Whenever possible, water and feed the horses (dry or green fodder, allow grazing along the roadside, even if it is only a mouthful; the hotter it is, the more water).

(5) When necessary, use pastern caps for protection when cuts have been sustained around the fetlocks.

c. Road discipline:

(1) While on the march, move along one side of the road only.

(2) Men should always be posted ahead to direct traffic through villages, across railway tracks, and where the road narrows. With the possibility of air attacks in mind, villages and tracks should not be traversed until through passage is assured. The danger point should then be quickly left behind to make room for others who may follow.

(3) No overtaking, even of a halted column, without the concurrence of the commanding officer of the overtaken unit. Troops on foot should be passed slowly to avoid raising dust or splashing mud.

(4) No cutting through other columns on the march.

(5) When marching by night the head and rear end of the columns should show a dimmed light.

(6) Combat forces moving to the front have the right of way over non-combat units.

(7) Ambulances always have the right of way in either direction.

(8) Dead horses and damaged vehicles should be removed from the road by those who first reach the obstacle.

(9) At each halt pull well over to the right (or to the left if marching on the left side of the road).

(10) At each halt set up traffic control points at each end of the column to prevent traffic jams. Establish one-way traffic. No halting on curves, close to road crossings, or near narrow passages.

(11) Resting troops must keep clear of the road; it belongs to traffic. Before halting for a rest, troops should turn into side roads or previously selected locations. Not a single vehicle should be left standing on the road while its occupants are resting.

(12) It is the duty of all officers to take action in case of traffic violations and disturbances.

Visiting a resting unit.

a. Short rest (less than one hour).

(1) Was the place of rest designated by an order? When?

(2) Was a scouting party sent ahead to the bivouac. What preparations did they make?

(3) Was consideration given to shade, or, if in winter protection against the wind? How was the approach to the bivouac.

(4) Were there enough watering places? Were troughs or pails on hand? Was the unit properly divided and assigned to a suitable watering place (fountain, pond, lake, brook, river)?

(5) Were saddle girths and blanket straps loosened? The bits removed? Were freely perspiring horses, especially draft horses, covered with a blanket?

(6) Check brakes to see that they are set; if on a slope, stones or blocks should be used as additional chocks.

(7) Limber shafts should be supported.

(8) Check saddles, head gear, saddle blankets, harnesses, vehicles, and hoofs the same as during short stops. Where necessary bandage legs or pasterns.

(9) Watering: the bit of horses perspiring freely should be left in the mouth. Grass or hay should be spread over the water in the nosebag, pail, or trough. Perspiring horses should not be permitted to drink directly out of a lake or stream unless they are to continue the march immediately afterwards.

(10) As soon as the horses are watered, they should be given hay, straw, grass, green fodder or a small quantity of grain. Horses may also be permitted to graze along the roadside or in a field beside the road. It may be convenient to drive and lead them there.in the first place.

(11) Check all leather gear and vehicles.

(12) Horses must be attended to before the men.

(13) Small arms should not be left leaning against vehicles or hung over the back. Musette bags, canteens, and helmets are articles of equipment for men, not for horses! They may be placed on the horses only if specific permission has been given.

(14) Was enough time given to get ready for departure? See that bridles, saddles, and harnesses are all in proper order; the girths are tight, and saddle rugs smooth and snug at the pommel and cantle.

(15) Did the columns assemble in good order?

(16) When in danger of air attacks the individual components of the columns should not pull up too closely to each other.

b. Long rest (two or more hours), the same as for short rest, and in addition:

(1) Actual length of rest? Distance covered? Determine amount of rest for riders and drivers accordingly, after the horses have been attended to. Care of harnesses and vehicles as needed.

(2) Night bivouacs call for very careful preparations.

(3) Enemy situation permitting, strip horses of saddles and harnesses.

(4) No watering until horses have cooled off. If necessary, use grass or hay on water or leave bit in mouth. When watering let horses drink their fill.

(5) Fodder ration should be generous. (The grain feed ration should be increased in proportion to the length of the rest, feed hay and/or allow grazing.)

(6) When advisable have the fodder prepared ahead of time by an advance crew or local people.

(7) In cold or wet weather always use blankets on horses, securing these properly with straps passing under the belly and around the neck. Horses should be bunched together, stern to the wind, but not too many in a group, in case of an air attack. In inclement weather the horse blankets must not be used by drivers or riders.

(8) Departure should be announced in good time. If departure is by night, special care must be exercised in saddling, harnessing, and hitching.

(9) Route of departure particularly if followed at night, must be reconnoitered well in advance.

(10) At every rest stop, care in lighting lanterns and in smoking must be exercised to eliminate the danger of fire.

Visiting a Unit about to Occupy Quarters.

a. Taking up quarters:

(1) Was a quartering officer and billeting detail sent out ahead? (To be done whenever possible, since it gives the column a longer rest period.)

(2) Selection of quarters depends on intended length of stay and the season of the year.

(3) Shelter in stables, houses, sheds, cellars. In bad weather even the worst shelter is preferable to having horses and equipment standing outside. As far as possible, vehicles should also be sheltered in bad weather.

(4) Consider the situation in regard to water, fodder, and protection against wet and cold.

(5) Stables should be as close as possible to the attendants' quarters.

(6) How were the quarters readied? Methodical and correct establishment of horse shelters. (Remove nails and other sharp objects prior to installing the horses. Practical preparations for suitable stabling: partitioning poles or stalls, rings for tying cribs.)

(7) Handy and orderly sheltering of harness and saddles, but not so close that the horses can reach them with their teeth or hoofs. Rapid hitching and saddling must be possible in the dark.

(8) Vehicles must be sheltered or located so that the teams be easily backed into the shafts, even in the dark.

(9) How much time was required for stable duties after entering quarters? (An hour should be required) Horses are checked for injuries, cleaned, hoofs are examined and cleaned, horses are rubbed down when necessary, or, in warm weather, washed outdoors while there is still daylight. Leather gear and vehicles are cleaned and checked. When necessary and possible, drive vehicles through water to remove the dirt and facilitate closer inspection and care. Vehicles should be cleaned by assistant drivers or other men. In artillery units and in infantry howitzer and machine-gun companies the cleaning of vehicles, horses and harnesses should as far as possible be done by privates. The privates should also do the necessary chores when getting ready to leave in the morning and during the rest periods.

(10) Who supervised the stable duties? (Forage sergeant or assistant, section corporal, section leader, chief of section, or ranking senior in the quarters?)

(11) Are there sick or exhausted horses to be exchanged? saddles? harnesses? vehicles?

(12) Danger of fire from lamps and smoking.

b. In bivouac the procedure is as above; note in addition:

(1) The worst quarters are often preferable to open air camping.

(2) Was camp site carefully selected? Was enemy situation considered?

(3) A dry sheltered location facing south or southwest is most favorable. Woods, bushes, or a ravine provide added protection against air attacks. For the same reason, when camping in the open, all crowding must be avoided.

(4) Water should be available near the camp, but if it is not, then the horses should be well watered at the last watering place. Water may be carried along in large barrels; or the horses may be led to a watering place, in which case there may, in summer, be occasion to bathe the horses after letting them drink-as far apart as possible.

(5) Beware of acacias and other poisonous plants.

(6) The horses must be covered, in cold and wet weather in poor shelters in winter, and during a cold rain.

(7) Horses and equipment should not be massed and become an easy bomb target.

(8) Horses should be tied to trees or tightly strung ropes.

(9) Snow shelters may serve for a short time: clear space for five to ten horses, raise three walls 1.7 to 2 meters high, tie horses close together, sterns to windward, tent flap for fourth wall, tie rope taut. Small evergreen branches may serve as litter. Additional snow shelters may be constructed for the stable guards, and, if enemy situation permits, fires may be permitted.

6. Training of Russian Auxiliary Volunteers as Teamsters and Attendants. (Sample directive)

Owing to the frequent employment of Russian auxiliary volunteers as teamsters and attendants the following procedure is recommended for their training:

a. Train the noncommissioned officers as of forage sergeants and section corporals and enlisted men as attendants and drivers in accordance with the Short Training Program for New Units in Riding and Driving, before giving them any responsible duties with horses. (One section corporal per thirty horses; one German soldier per ten auxiliary volunteers.)

b. As far as possible volunteers chosen as stablemen and teamsters should have had previous experience with horses in the Russian army or on a farm.

c. (1) Those assigned duties as drivers should as far as possible have had experience in that capacity in the Russian army or on a farm. Training, which will proceed in

conjunction with daily work duties, will be supervised by trained German noncommissioned officers and enlisted men. They will instruct by using striking examples of the right and wrong way in bridling, harnessing, hitching, caring for equipment, and driving.

(2) Those assigned as drivers from the saddle should be volunteers with previous experience in the Russian army or on a farm in driving from the saddle. These should receive further training by the same procedure as in (1) above. Extra training may be given in drill exercises in the use of aids for turning and in driving in difficult terrain in accordance with the Short Training Program.

d. Trainers and volunteers should be distributed so as to include Germans with some knowledge of Russian and Russian volunteers with some knowledge of German to serve as interpreters. Language review lesson for the volunteers may be used to point out their duties.

e. Some supervision should be given this training by the division, regimental, or independent battalion training officers when riding or driving through their districts.

f. Volunteers who have received training as stablemen or drivers should be kept on the same jobs and their efficiency improved by on-the-job training.

g. It is recommended that this order be reproduced by divisions and every unit concerned receive a copy.

1. Bridling and Saddling.

General: Instruction with an incorrectly saddled and a correctly saddled horse. Saddles and bits of various sizes and a headstall should be used in the demonstrations. (If the stock of model 22 bridles has been exhausted, variations of experimental model 43 will be issued for riding horses, mountain riding horses, and pack animals.)

a. Bridling.

Briefly identify the parts of a bridle set:

| WRONG! | RIGHT! |
|---|---|
| Headpiece too short | Correct fitting of headstall, snug around the head (too tight a headpiece will chafe the ears); have headpiece lengthened by the saddler; |
| Throatlatch too tight | Must be able to insert breadth of hand between throat and latch; |
| Reversed headstalls | Curb bit brace should be in front; |
| Noseband too tight, not correctly buckled | Must be able to insert two fingers between nasal bone and noseband; the noseband must pass through the loop made for that purpose on the headstall; |

| WRONG! | RIGHT! |
| --- | --- |
| Snaffle bit too high or too low. | Snaffle bit must rest against the corners of the mouth; |
| Curb bit too steep or dropping. | Curb bit should be level with the chin. |

Note: It is important for the curb chain to be properly hooked, and S-shaped attaching hooks must not be pulled out of shape. The curb and snaffle bits must be of the same size (sizes 1 to 4); bits now only in the following sizes: curb bit, size 2 (leaves mid-section of the tongue free); snaffle bit, size 2; double-ring snaffle bit, size 3, for riding horses, without chain or gag; double-ring snaffle bit, sizes 3 and 5, with chain and gag; watering bit, size 2. Fasten snaffle properly, strap on left, and buckle on right side; on curb bit reins left rein is the longer.

All horses in a multiple team are driven with a double-ring snaffle bit and with the driving halters.

Equipping riding horses with double-ring snaffle bits: In all new or reorganized units only 15 percent of the authorized number of riding horses are to be equipped with the complete headgear and bridle set with curb or snaffle bits, and 85 percent with bridle set 22 or 43 and a pair of snaffle reins. Bridle sets 22 and 43 have double-ring snaffle bits without chain or gag.

b. Saddling:

Brief enumeration of the parts of a saddle

| WRONG: | RIGHT: |
| --- | --- |
| Saddle fitted with the saddle blanket on. | All army and packsaddles, including pack frames for single teams, are fitted without the saddle blanket. |
| Saddle too broad or too narrow. | The panels of the saddle should fit evenly over the ribs and reach to the shoulder blades; between the withers and the pommel there should be a space of four fingers; the inside upper edges of the saddle should not pinch the horses' back nor press against the withers. The choice of saddle depends on the build of the horse to be fitted: high, narrow, and wedge-shaped withers require a No. 1 saddle; the rounder and broader the withers, the higher the saddle number required; numbers run from 1 to 5. |
| Horse, while being fitted for a saddle, is resting or standing on uneven ground. | Horse must stand evenly balanced on all fours on level and firm ground, neck and head in normal position, hind legs straight. |
| Deep point often too far back. | Deep point should be in the middle of the saddle between the third and fourth eyelet holes of the panels. |

Size numbers are stamped on both sides the pommel, on the cantle, and on the underside of the saddle seat. A saddle girth, sizes 0 to 4 must be selected to fit the saddle, while the stirrup strap, sizes 1 to 3, is selected to fit the rider. When the present supply of plaited girths is used up, only the cord girths will be supplied. Stirrup straps, which used to be supplied in three lengths, 133, 138 and 143 centimeters, are now being manufactured in only one length, 138 centimeters.

The saddle cloth is generally used six-fold, though with young horses, and with all one horse teams, it is generally used nine-fold. It may also be used eight-fold in front in order to raise the saddle (as when it is too wide).

After the saddle has been secured over the saddle cloth, the latter is raised against the pommel and cantle to permit the passage of air between the saddle and the horse's back. The field army is often supplied a saddle blanket in lieu of a saddle cloth which can be folded only four times.

When saddle bags are attached either in front or behind the saddle, care should be taken that these rest on the saddle cloth. The saddle horse in multiple teams should receive the largest saddle cloths available. The prong of the saddlebag buckle should always point to the rear.

The saddlebag may be replaced by a combat rucksack. About 5 percent of the saddlebags issued are used without authorization

by messengers and scouts. Saddlebags are to be considered an item of equipment belonging to the horse or pack animal and not to the man.

2. Bridling for Driving from the Box, Fitting the Harness, and Hitching the Team.

General: Instruction is conducted with a horse properly harnessed, and with a horse improperly harnessed. With a double team show the principal errors made in hitching up. Have cross-lines available.

In the future only the lightweight breast harness with lightweight halters will be issued, except for double teams with mountain troops, which are to be equipped only with breast harness model 25.

a. Bridling for driving from the box.

Identify the parts of driving halters. For all horses to be driven from the box or saddle, only the driving halters with double-ring snaffle bits with chain and gag will be issued, sizes 3 and 5.

In fastening the double-ring gag snaffle bit, attach the free rings of the bit to the cheek pieces and the gag and chain to the driving halter.

Tight or loose fastening will need to be explained. Double-ring gag snaffle bits are only supplied in two sizes, 3 and 5.

Double-ring snaffle bit with chain and gag. Chain should be shortened four to three links, otherwise the bit will be too low or the noseband too high.

b. Adjusting the harness:

The proper and final adjustments of a harness can only be made when a team is pulling. Identification of the parts of the breast harness.

| WRONG! | RIGHT! |
|---|---|
| Breast strap too low and horizontal. | Breast strap's lower edge two fingers above the leg joint; from the leg joint it should form a straight line above the traces to the singletree. |
| Harness collar too wide. | The harness collar is designed to relieve the breast strap from strain when stopping the vehicle and of the lateral motion of the wagon shafts; one should be able to slip the flat of the hand between the neck and the collar. |
| Neck strap not horizontal to the breast strap, slanting to the rear. | The neck strap should lie in the hollow in front of the withers and when taut must be perpendicular to the breast strap. It is generally in t e right place when the neck strap is buckled to the first ring of the breast strap. |

| WRONG! | RIGHT! |
| --- | --- |
| Back pad put on wrong with the buckle prong of the connecting strap pointing forward. | The back pad lies back of the withers with the buckle prong of the connecting strap pointing to the rear; if the back pad is mashed flat it should be raised free of the spine with some cushioning material of fur, felt, or rubber; a saddle cloth or rug shoul not be used, as they are apt to get lost during night marches. |
| Top sheet strap and buckle prongs not perpendicular to breast strap. | Top sheet strap, when taut, must be perpendicular to breast strap, otherwise the back pad will be affected by a pull on the traces. |
| Top sheet strap buckled too high. | Irregular pull results in chafed withers. |
| Girth too broad or too narrow. Crupper too broad at the base of tail or highest point of croup. | The crupper rests with its upper edge a handbreadth away from the highest point of the croup, with possible exception a horse with a very high croup. The saddle girth rests with its upper edge a handbreadth away from the hump of the ischium; it should be strapped with enough play to permit passage of a fist between the girth and the muscles of the upper thigh. The tracer supports are buckled to one of the suspension straps. |

The length of the traces should frequently be checked.

Tracer supports and suspension straps need to be lengthened thirty centimeters for big horses.

Crosslines: In order to check the lines for the prescribed length a control thong is used. The two outer lines must be of same length, but the two inner lines should be twelve centimeters longer. The same relative length between these sets of lines must be maintained with any civilian type or improvised lines which may be used.

c. Hitching:

For driving from the box the horses stand loosely in their traces. Trace chains and lines hang free.

| WRONG! | RIGHT! |
|---|---|
| Breeching chain too short. | Breeching chains must hang free in order that the horses may subsequently throw their full weight into the pull; singletree is about sixty centimeters from the ankle joints. |
| Inner and outer traces hooked at same length, or inner traces even longer than outer traces. | The inside traces should be hooked one or two links shorter; the singletree must hang level or the breast strap will pull slantwise. |
| Traces hooked downward into the singletree. | The hooks at the end of the traces should be hooked upward into the singletree, which makes it easier to unhitch the traces if horses fall. |

| WRONG! | RIGHT! |
| --- | --- |
| Outside and inside lines mistaken for one another in buckling up. | Through lines are on the outside, buckled lines pass over small of back to inside, otherwise horses would have to pull with head turned sideways, which would tire them and cause cuts on their front legs. |

In driving with a limber the extensions remain with the vehicle.

3. Captured Harness.

General: Captured harnesses must not be used for multiple teams. Length and condition of the traces must be frequently checked, as they are generally of rope.

a. French breast harness (two sizes).

Peculiarity: In multiple teams one horse pulls another. The bearing power of the girth is transferred to the breeching chain via the girth strap.

The following changes are recommended:

(1) The girth strap should be sewn to the breast strap.

(2) Breast collar ring should be connected directly to the neck strap.

(3) Fasten back strap to blanket strap to provide a base pad for back strap and blanket strap.

(4) Connecting strap should be buckled only as far back as the back strap.

b. English breast harness. Same peculiarity of transferred pull as in the French breast harness. The steel traces are covered with leather.

c. Czech breast harness. Adjustable chest-ring.

d. Polish breast harness. Many different models; harnesses of lead horses have no chest-ring.

e. Duga harness.[6] Always engage a native driver to handle duga harnesses. Traction is led directly from the collar to the front axle. Harnessing sequence: Put on collar, back pads, girth; join duga to collar and wagon shafts; fasten hames; fasten shaft straps from back pads to shafts, since in the duga the shafts are supported by shaft straps; fasten main or check braces to shafts. Shaft straps and check braces are often nothing more than a strap, rope, or belt which passes from one side of the back pad down to and around the shaft, then under the belly to the other shaft and back to the back pad. Attach the reins and lines. The collar can be enlarged with special wooden wedges.

The lines are carefully passed first under the straps running from the collar to the shafts and then over the two shaft straps. This prevents the horse from throwing its head back

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[6] Duga: arching piece of wood passing over the horse's shoulders from one shaft to the other in Russian type sled or vehicle.

or bolting. Particular attention must be given to the correct spacing of the rings on the shaft sleeves.

Captured saddles must be adjusted and adapted with particular care. As a rule Polish and Czech saddles are only suitable for lightweight horses, but some of them are adjustable. If the saddle girth straps on the latter are attached too far back, the movements of the horse cause the girth and saddle to slip backward. Sometimes the mistake is made of putting the saddle too far forward in an attempt to keep the girth in the normal army saddle position. Most of the saddle sores are caused by the saddle being too far to the rear.

In general the headpiece and throat latch of captured head gear need to be lengthened, and the bits exchanged for German army bits.

4. Light Country Type Harness.

German light farm type harness (now the light breast harness).

The harness is made for horses of small or medium size. This should be borne in mind when requesting or receiving this type of harness. Harness made within the local supply areas of an army group often does not fit horses of all sizes.

When any unit is equipped with collar harness with hames the commanding officer should as soon as possible secure the services of an experienced saddler. The collar is properly

fitted when it lies evenly against the shoulders, and the traces are at right angles to the collar when taut. One should be able to slip an open hand between the lower edge of the collar and the neck of the horse. On horses with abruptly falling or narrow shoulders, it may be necessary to use collar pads under the collar. Pads must also be used when the horse has a large head, since the collar is then apt to be out of proportion to the shoulders. If the collar is too long, a cushion may be fastemd at each end of the collar with two straps made to measure by the saddler. A collar which is slightly too small is less a fault than one which is too large, since the latter causes injuries by rubbing and chafing.

5. Multiple Teams.

In a three-horse team the lead or extra horse is hitched to a singletree or makeshift equivalent attached to the hook at the end of the shaft. The lead horse is driven from the box with a rope line or is led by hand.

For multiple teams of four and six horses breast harness 25 will still be used. The lead and middle teams may in exceptional cases use the lightweight harness.

In many divisions in the east it was ordered that all four-horse teams should be driven from the box, except during combat, in order to spare the horses. Since lines for four-in-hand teams are no longer issued, makeshift lines must be made of suitable leather thongs, rope, or telephone wire.

In four- or six-horse teams the four front suspension straps of the wheel horses may be used as reins, and the four pairs of snaffle reins of the wheel and swing teams may be buckled to the cross lines of the wheel horses.

Light cord, heavy twine or telephone wire may serve as outside lines to the lead or swing teams and on the inside the horses may be joined together with a rope or strap attached to the rings of their bits.

When using makeshift arrangements the lead team in a six-horse team may still be driven from the saddle or it may be driven by the driver of the swing team, with an extra set of lines. The wheel teams may be driven from the box, the swing team from the saddle, and the lead team by the driver of the swing team.

For driving from the box or saddle only driving halters sizes 3 and 5, with snaffle bit, chain, and gag, will be issued. For four- and six-horse teams the following equipment is also issued: one set of tie reins, one set of lead reins to off horse and one whip for each team. The small riding whip and small feed bag will no longer be issued. Four connecting traces and four lazy straps will also be issued for the swing team of a six-horse team.

For swing and lead teams the neck straps, breechings, and the suspension and supporting straps for traces are omitted.

Long straps to support the traces are attached to the crupper, which for large horses, must be lengthened an additional 1.60 to 1.90 centimeters. Saddles for off horses are replaced by special back pads whenever these are available. Saddlebags without covers if not yet turned in, are to be buckled to the off horses' backs.

Errors in four- and six-horse teams:

| WRONG! | RIGHT! |
|---|---|
| Hitched with little or no slack. | Horses must be hitched so that they can exert a straight pull when hauling a heavy load. |
| Saddle cloth not in correct position. | Neck straps must pass over the saddle cloth; horses hitched to limbers and wheel horses generally, must have a larger cloth or blanket. |
| Inner traces shortened for swing and lead team. | Only in the case of the wheel horses are the traces hooked one or two links shorter. |

All multiple teams must be hitched well before starting time and stand in their traces. The driver of the wheel team, holding reins in ready position, gives the starting signal.

c. Eight- and ten-horse teams:

When two or four extra horses are added in front and there is a shortage of traces, an additional set of single-trees will be necessary. These are fastened to the shaft

hook by a hemp or wire rope running between the lead and swing teams. To prevent interference a strap between each pair of horses is attached to the girth ring and the rope passed above the connecting straps.

6. Hitching with Winter Equipment.

Single, tandem, or random[7] teams; also two-horse teams and four-horse teams, as under multiple teams.

On narrow roads, in woods, or in deep snow, sleds should be drawn by single horses or by two or more horses in a single file. When a tandem hitch is used the path made by the runners is not obliterated nor broken up by the horses of succeeding double or multiple teams. The teams which follow do not have to exert themselves as much as the lead team, and are not compelled to trample through snow outside the tracks made by the sleds. When the road is wide and clear of snow it is more practical to hitch the horses again in pairs. In order to meet both situations, all army sleds will hereafter be manufactured for use by single and double teams.

All present army sleds are to be changed for alternate hitching in accordance with Army Bulletin 44, Section 569.

a. Single teams: The most practical harness for a single team is breast harness 25, complete, but without collar

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[7] Random: More than two horses hitched together in single file (Ed.)

and with two shaft straps and one checkbrace. The two front suspension straps may serve as shaft straps, and the two loose buckle straps and the loose bellyband-or, if too short, the back pad belt-may be used for checkbraces.

Field improvisations of the breast harness, belts, ropes, and girths must be used to make shaft straps and checkbraces. The back strap should be fastened to one of the blanket straps, with a pad underneath to prevent sores.

If possible the harness of every horse hitched to a double shaft which should be equipped with a breeching strap. Russian style breechings are adequate, or substitutes can be made from old girths or old belting.

The following hitching sequence is to be observed:

(1) Unbuckle the breeching straps from the breast strap.

(2) Fasten the shafts to the thill straps so that the wagon shafts are level with the breast strap. This will prevent the horse being struck by them in the lateral movements of the shafts. The thill straps are passed once around each pole of the thill and buckled to the rings of the breast collar straps directly in front, if the strap clamps on the shafts are directly under the back pad when the horse is pulling.

(3) Hook the traces.

(4) Move the horse forward till traces are drawn tight.

(5) Hook the breeching straps to shafts.

(6) Buckle the check braces.

b. Tandem: The lead horse is hitched two chain or rope traces of moderate length directly to the singletree. Under no circumstances may the lead horse be hitched to the shafts of the sled or to the breast strap of the horse standing in the thill.

Both horses are driven with the crosslines which are extended to the lead horse. The inside line is buckled to the shaft horse and the outside line goes to the lead horse. If need be, one man can lead the front horse, in which case a horse with a free and easy stride should be chosen for that position.

c. Random: It is entirely practical to drive the middle and lead horses from the saddle. The shaft and middle horse may also be driven as in the tandem team with a rider on the lead horse. If need be, one man can lead the team by walking alongside the front horse.

7. Hitching to Carts.

Breast harness 25, complete but without neck-strap is used. Back pads are replaced by the carrier frame for single

teams. Two thill straps and one main brace are used. The sequence for hitching is the same as for single teams. The carrier frame for single teams has adjustable saddle flaps. The original fitting, prior to actual use, should be made without a saddle blanket.

For use by mountain units, teams may be supplied with packsaddle model 23 and its supporting equipment.

8. Hitching to the Light Country Type Vehicle Model, Pleskau.

When equipped with breast harness 25, complete, plus two thill straps and one main brace, this type of light vehicle is hitched in the same manner and sequence as under 6a above.

The singletree can be omitted if the Duga harness is used; all army harness, and all German or Russian breast harness require hitching to singletrees. Trace extensions must be inserted in order to protect the horses from injuring themselves against the shaft supports. The forward ends of the thills should be tied together either in front of the horse by a piece of rope, or, preferably, wired or chained together behind the horse. This equalizes the tension and prevents the shafts from becoming unhooked on bad roads or in making sharp turns.

In using simple improvised harness, such as the light-weight Russian or German farm type breast harness, the back strap should be fastened to the blanket strap and pass as much as possible over the folded saddle cloth or other padding to keep it from rubbing and injuring the horse's back. The thill straps, or the ropes used to hold up the shafts, are passed through loops or rings sewn into the back strap. A main brace may be improvised out of buckle straps and the loose bellyband or other rope or belting of any kind.

9. Packsaddles.

Army Regulation 375 must be continuously referred to when instructing in the use of packsaddles and frames.

When the supply of bridle 22 is used up the experimental model 43 will be used for riding horses, mountain horses, pack animals and pack horses. Since its introduction the march halter has only been used by units equipped with bridle 22.

a. Packsaddle 23 is issued in two sizes: size 1 for small pack animals and size 2 for larger pack animals.

There are also three different types of packsaddles: No. 1 for a pack animal with a normal back, No. 2 for a pack animal with a slightly concave back, and No. 3 for a pack animal with a sagging back.

The pack load of a mule is determined as 100 kilograms, that of a horse at 80 kilograms, and of a donkey or hinny at 60 kilograms.

b. Improvised packsaddles can be made from saddle model 25 using two rug girths as the main support, using two rugs with attached hooks, and using two pack frames for two shells.

In saddling pack animals with army saddle 25 two either pads or one horse blanket and one army blanket are used; additional protection can be given by using bags filled with straw, hay, or moss. The loads should be firmly strapped together, and the weight divided equally on each side of the saddle.

c. Packsaddle 33. The packsaddle differs from the pack frame; the packsaddle has shorter supporting frames, has iron loops on the saddle panels for securing the two saddle girths, and the sadde panels are adjustable.

10. Improvised Pack Animal Equipment.

Replace neck strap by two loose buckle belts and loose bellyband; replace one cover strap by one suspension strap, replace breast collar by one suspension strap and one trace support strap; a piece of rope will do for a breast ring, a girth for a breast strap and a breeching belt for a back pad.

If a riding horse is to be used as pack animal, modify its gear by replacing the headstall by a throat latch and nose band, the saddle girth by a cover girth, one saddle girth strap by a loose buckle strap and another saddle girth strap

by a trace support strap, and a stirrup strap by a suspension strap. A three-horse team can be improvised from one draft horse with breast harness 25, complete, with crosslines; one riding horse, bridled and saddled; and one captured horse, without bridle and without harness. The riding horse uses the girth of the draft horse as a breast strap, preferably padded; the loose bellyband and two loose buckle straps for a neck strap also padded to prevent sores. The breast strap ends are joined to the stirrup straps. Ropes serve as traces, and suspension straps or stirrup straps are used as a breast collar.

The draft horse and the riding horse are hitched as the wheel team and driven from the box with crosslines or makeshift reins.

The saddle blanket of the riding horse is rolled into a collar for the captured horse and held together by two suspension or tracer straps from the harness of the draft horse. Ropes are tied firmly to the collar to serve as traces. When available, a pad should be placed under the collar on each side, where the ropes are attached, to prevent chafing. A makeshift bridle for the captured horse may be buckled together from the throat latch and noseband of either the draft of the riding horse. A piece of rope may serve for a bit. If a throat latch or noseband is not available, a doubled rope

passed through the mouth of the horse and tied at the top or side of the head, can serve as a bridle.

11. Care of Saddles and Harnesses in Combat.

Every member of the Armed Forces must know that by timely care and repair many accidents may be avoided, and the equipment will always be ready for use.

Before applying oil or grease to any leather equipment all parts should be unbuckled and cleaned. In this condition damaged parts are to discover. In cold weather cleaning and oiling should be done in a warm stable or bunker. Leather gear should never be hung near a hot stove or exposed to strong sunlight in summer.

Cleaning is done with a brush or a damp cloth and luke-warm water. If there is no shortage of hay or straw, wisps of hay, straw or leafy twigs may be used for cleaning. The dubbing or grease, applied after cleaning can be any animal tallow, or rancid butter may be used as a substitute. In cold weather, the oil or grease should be warmed before using. Leather can be oiled or greased even if a little damp, since the oil will penetrate the leather as it dries out. All parts that come into contact with the rider or the horse must not be greased. The use of shoe polish on any leather gear is forbidden. All leather parts must be soft and pliant but firm. The saddle straps, the underside of the seat,

and the leather bottom of the saddle pad are oiled, but the seat itself should not be treated. The saddle girth should be washed only; never use any lime mixture or white oil paint. The inner side of the double breast strap can be oiled.

Traces made of hemp must be hung up to dry thoroughly when wet either in open air or a heated room. Woven wire traces must be oiled regularly to prevent rust. Traces, like stirrup straps, must be the same length.

Soiled saddle pads must be washed in lukewarm water, and after they are dry they must be brushed and beaten. Dirty saddle cloths or blankets must be washed in lukewarm ammonia water, hung to dry without wringing and without folds either in the sun or a dry room. Repairs must be woven and not patched.

Crosslines should be oiled very lightly to prevent warping.

12. Specifications for Army Vehicles.

Emergency brakes.

Drag chain.

(continued on page 639)

## 13. Weight and Dimension of Military, Commercial and Captured Vehicles and Sleds

| Vehicles or sleds | Weight in kg | Capacity in kg | Track width in meters | Tire gauge in mm | Flange in mm | Wheel diameter in cm | Remarks |
|---|---|---|---|---|---|---|---|
| Light field wagon (Hf.[8]1) | 610 | 750 | 1,53 | 55 | 11 | 124,4 | Variations of Hf.1 with or without springs |
| Large farrier wagon Hf.1/13, baggage cart with field forge or weapon carrier Hf.1/.4 | 710 | 1000 | 1,53 | 55 | 11 | 124,4 | |
| | 640 | 750 | 1,53 | 55 | 11 | 124,4 | |
| Heavy field wagon Hf.2 | 800 | 1000 | 1,53 | 70 | 13 | 124,4 | Hf.2, no variations, four-horse teams only |
| Small field wagon Hf.3 | 462 | 600 | 1,125 | 55 | 11 | 110 | Variations 3/12 without springs |
| Field wagon 43 (Hf.6) | | | | | | | |
| Substitute field wagon 40 | 631 | 1000 | 1,51 | 70 | 13 | 110 | |
| Large combat wagon Hf.7/11 | 1040 | 1570 | 1,58 | 156 | Pneumatic tires | | |
| Large field kitchen Hf.13 | front section 330 | 290 | 1,53 | 55 | 11 | 122,4 | Hf.11 earlier construction |
| | rear section 540 | 125 | | | | | Hf.12 earlier construction |

[8]Hf: Army vehicle

| Vehicles or sleds | Weight in kg | Capacity in kg | Track width in meters | Tire gauge in mm | Flange in mm | Wheel diameter in cm | Remarks |
|---|---|---|---|---|---|---|---|
| Small field kitchen Hf.14 | front section 260 | 200 | 1,12 | 55 | 11 | 110 | |
| | rear section 370 | 87 | | | | | |
| Large field wagon (t) | 510 | 1000 | 1,10 | 50 | 10 | front 80 rear 100 | |
| Small field wagon (t) | 430 | 700 | 1,10 | 50 | 10 | front 80 rear 100 | |
| Small field wagon (approx.) | 400 | 750 | 1,28 | 55 | 11 | front 90 rear 110 | |
| Infantry kitchen If.[9]8 | 81,5 | 350 | 0,86 | Pneumatic tires | | | |
| Pleskau I | 220 | 350 700 | 108 | 50 | 10 | front 64 rear 80 | |
| Pleskau II | 240 | 700 | 103 | 50 | 10 | front 66 rear 82 | |
| Sleds: | | | | | | | |
| Hs[9]1 | 135 | 300 | 0,66 | sled runners in two sections | | | |
| Hs 3 | 266 | 500 | 0,66 | | | | |
| Hs 3/1 | 330 | 500 | 0,66 | | | | |
| Hs | 297 | 1000 | 0,69 | | | | |
| Russian farm sleds | various | | | | | | |
| Pleskau Model | 150 | 300 | 0,55 | | | | |

[9]Hs: Army sled

Ms # P-060

16781

Coach boot.

Detachable rear singletree.

Hook (to attach traces) on wagon shaft.

Weight of vehicle: 400 to 600 kilograms
Capacity: 750 kilograms } for double teams.

Maneuverability: reverse turns on normal roads.

Removable shafts, important for loading.

Adequate clearance, about 50 cm from the ground.

Shaft length (harnessing length) is 285 centimeters, which is measured from the middle of the rear singletree to the ring at the fore end of the wagon tongue.

Front set of singletrees are 140 centimeters long.

Rear singletrees are 80 to 85 centimeters long.

Front and rear wheels are the same diameters.

Gauge should be the same for each vehicle in any unit or train.

Suspension chain (to shafts) should be long enough to allow a free pull; Sixty centimeters distance between hooks and singletree.

Shaft support, 80 centimeters long

14. Care of Vehicles in Combat.

Vehicles should be cleaned before every grease job. The axles, the steering and slide gear the limber pin and pin hole, the brakes, the slide rail, and all other points of

friction are greased. Wagon grease is supplied, but if the supply is not received in time, motor oil may be used as a substitute, as may also bacon rind or other waste animal fat, but in such cases the greasing must be done more often.

Vehicles must be washed and scraped clean in order to discover defects; particular care must be taken to check for cracks in the supporting frame, the most important part of any vehicle. Vehicles should never be washed in strong sunlight, as this causes the paint to peel off. Similar damage to the paint ensues when vehicles are wiped with old oil or petroleum.

The axletree clips should be tightened and wheel gauge adjustments made with washers. The tow hook at the end of the shaft should be strengthened whenever necessary. Leather straps on the vehicles should be checked for strength, cleaned, and oiled. Special attention must be paid to the tarpaulins. They should be painted with canvas paint if available or varnished. When not in use the tarpaulins should be carefully folded and hung over a piece of round wood mounted behind the dash board of the vehicle.

15. Emergency Repairs to Vehicles.

For emergency repairs to vehicles a special repair kit is available. It may also be used for repairs to commercial

type vehicles. See Army Regulation 465/5, page 59. The following items taken from the drivers' repair kit should always be kept on hand: ten halter ropes, one axe, one shovel, one set of front singletrees, two shaft repair slats, sixteen slat nails, one length of chain, one wrench or spanner, and some nails and baling wire.

If the joints of a wheel are loose, the spokes may be tightened by inserting wooden wedges between the spokes or by inserting improvised spokes between the hub and the felly. If the spokes are split or damaged, wire can be wrapped around them; if broken splits may be wired around the spoke, or an improvised spoke may be inserted to replace the broken one. If only half a wheel with its spokes and hub remains serviceable, this may be tied in place with rope or wire and used as a drag. If a wheel cannot be used at all, a pole about four and a half yards long and about six inches thick is fastened to the frame of the wagon as a drag in lieu of a rear right wheel. If necessary the wheels can be exchanged. When on the right rear the drag facilitates keeping to the right, making a complete left turn, and, in the event of a breakdown, will prevent the load from spilling into and blocking the street.

Broken or cracked shafts can be held together or strengthened by nailing or tying a suitable number of specially made

slats alongside the damaged shaft. If split lengthwise, strap bandages will suffice. If the broken sections of a shaft cannot be properly fitted and matched together they may be overlapped and held together by slats, or a suitable pole or bar may be wired or strapped to the two ends. When joining broken hollow steel shafts a piece of round wood is inserted into the tubing. Repaired shafts may only be used for steering. If a front set of singletrees is used these must be attached to the main axle by traces.

Split or broken thills are reinforced with splints if necessary and are wrapped with rope. If the damage is between the rear singletree and the front axle the singletree can be attached to the main axle.

A limber pin can be repaired by riveting a round piece of iron to the limber pin plate and clamp. The front and rear sections of a wagon steering plate and guide may be joined with chains, ropes, or wire.

Single acceptable replacements for singletrees, linchpins wagon forks, and other vehicle parts can be made by every driver. A tree trunk fastened between the rear wheels makes an effective brake.

16. Field Duties of the Ordnance Sergeant.

The ordnance sergeant has a number of duties that require his attention both before and during a march.

If the march begins after dark, special care in saddling and harnessing must be exercised; always have two men saddled horses; check the harnessing and the equipment on the vehicles: halters, repair kits, entrenching tools, thick planking for use in mud, sand, and ice. If the ordnance sergeant is also train leader, he must check on reserve caulks; the distribution of lines, ropes, and tethering halters. New saddles and harnesses should not be issued just before a long march, as these are apt to cause sores.

The ordnance sergeant must see that pails have been obtained, that cribs and feed racks have been built, and that grease boxes are full. Each vehicle must carry ropes and traces which men use to pull vehicles up a steep slope, hold them back on the descent, or prevent the wagons from slipping off a slanting, icy road. The brake blocks must be tested. The equipment of a man driving from the saddle must be on the off horse.

While on the march, the ordnance sergeant must use every opportunity to check the horses and correct immediately any gross errors such as shaft support chains too short, engaged brakes, loose saddle girths, saddle pads not correctly placed, crosslines not buckled correctly, breast strap too high or too low, breeching too wide or too narrow, curb chain hooked wrong, traces unevenly hooked. Vehicle loads, particularly

that of the field kitchen must be checked: Hf.1 : 1500 lbs, Hf.2 : 2000 lbs, Hf.3 : 1200 lbs, Hs.1 : 600 lbs, Hs.3 : 1000 lbs, Hs.5 : 2000 lbs. Particular attention must be paid to secure an even distribution of loads carried by riding horses and pack animals.

The ordnance sergeant is concerned with the maintenance of the stipulated intervals on the road.

During short stops the section leaders report what repairs and exchanges of vehicles and harnesses are necessary. The ordnance sergeant personally checks all the teams, has knee and fetlock bandages ready, and supervises resaddling.

During short rests the section leaders again report on repairs and replacements needed. Again a personal check is made of all teams. Repair tools should be ready for immediate use; cartwright, wheelright, and saddler tools and equipment should always be kept in one specific vehicle. Teamsters who are skilled in the handling of these tools should be immediately released for repair work on arriving at the resting place. Only the most urgent and essential repairs should be made, those which would prevent the total loss of harness or vehicles. Special attention is paid to see that water and nose bags, troughs, and pails are available and used.

During a rest stop the saddle and back pad girths should be loosened for watering and feeding, and bits should be removed. If the vehicles are halted on uneven or sloping

ground the brakes should be applied and stones or blocks placed against the wheels. The shaft supports of limber vehicles should be lowered; the shafts on other vehicles can be supported by the singletrees. Weapons and helmets must not be hung on the saddles or harnesses. When getting ready to leave, careful attention is paid to the bridling, saddling, harnessing, and hitching. The ordnance sergeant is the last man to leave the location and makes sure that nothing is left behind.

During long rests the same activities are carried out, but more extensive and permanent repairs are made. After a long period of bad weather, all vehicles and harnesses receive a general overhauling, if the combat situation permits.

On reaching sheltered quarters the ordnance sergeant receives the reports requesting repairs and replacements and personally inspects the animals. The specialists are put to work immediately on repairs, by lamplight if necessary. A suitable working place is provided for them. Since the repairs cannot be delayed, one must always reckon on a change of marching orders, the repair work continues long into the night. The stables, equipment and vehicles should be located as close together as possible so that even in darkness the march sequence can be quickly resumed. Care must be taken, however, not to leave any equipment too close to the horses or

pack animals, where it may be trampled upon. Whenever possible vehicles should be placed under a shelter. Once the quarters have been established, all harnesses and other equipment must be cleaned, in winter there may be ice to remove. In cold and wet weather the worst possible quarters are preferable to leaving the horses outdoors.

The same procedures as described above are carried out in any open-air camp. Tethering lines and clogs are issued. In bad weather all equipment should be stored in tents or put in covered wagons.

During a day of rest the unit commander should order an overhauling of the vehicles and harness gear and conduct an inspection to check on correct bridling, saddling, and harnessing. The repair specialists should correct all damage to vehicles and equipment.

If the unit is to be in rest quarters for a longer period of time, the vehicles should be unloaded and the contents aired and dried and stored near the vehicles. The vehicles should be sheltered. Trees or a shelter made of fir boughs may have to do. Bear in mind the direction from which the prevailing rains come. The ground should be covered with planks or corduroy, since dampness produces hoof rot. The exit should always be kept free. The front end of vehicles with the shafts removed should always face towards the door.

A small workshop must be set up for the repairmen; after each use the tools should be returned to the tool box. The horses properly fitted with bridles, saddles, and harnesses and hitched to the vehicles should be inspected every week or two. All saddling, bridling, and harnessing equipment must be stored nearby in stables or shelters which are dry and ventilated. Curved harness parts must be hung on rounded, wooden forms.

17. Instructions to Trainers for Service with Horses.

General Army Equipment, Army Regulation 476.

Part 1. Vehicles.

Part 2. Pack Animal Equipment.

Part 3. Large and Small Field Kitchens.

Part 4a. Types of Equipment.

Part 4b. Types of Equipment.

Part 5. Technical Equipment.

The Infantry Cart, Service Regulation 193/1.

Sleds and Sled Runners, Service Regulation 72.

Driving Regulations, Army Regulation 455.

Part 1. General Principles for the Training of Drivers.

Part 2. Training Draft Horses.

Part 3. Driving from the Box, including Harnessing and Hitching.

Part 4. Driving from the Saddle.

Part 5. Driving and Instruction Equipment (fitting harness, makeshift repairs to harness and vehicles, equipment and supplies for commercial vehicles).

Riding Regulations, including Riding and Saddling, Army Regulation 12.

Pack Animals, Mountain Horses, Ox Teams, Army Regulation 375.

Gas Protective Equipment for Horses and Mules, Army Regulation 395/14.

Dust Masks for Horses, Army Regulations 11/1 and 2.

Improvised Combat Constructions, Army Regulation 391/1 and 2.

The Army Horse in the Field, Army Regulation 11/1 and 2.

The Preservation and Care of Arms and Equipment in the Field Army, Army Regulation 488/5.

Pocketbook for Winter Warfare.

The Short Training Program is authoratative for use in training for service with horses in a division and serves as a guide for the short course in riding and driving given to newly organized units. For training in riding there are also the Explanations to the Riding Instruction in the Short Training Program with an appendix and the Training of Riding Horses and Holding a Riding Review in the Field. (See numbers 18 and 19 below).

18. Guide to the Short Course for Training New Units in Riding and Driving.[10]

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19. Scheduling the Riding Instruction of the Short Training Program.

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20. Training Riding Horses and Holding Riding Reviews in the Field, with Explanations for the Training in Galloping and Jumping in Accordance with the Short Training Program.

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21. Leaflet on the Care of Horses. Is particularly applicable to care of horses during a long rest period and contains a model plan for stable procedures.

a. Grooming: Horses should be groomed thoroughly at least once a day. The following equipment is required: a curry-bomb for all muscular parts of the body, a horse-brush for the entire body except the pastern joints, a cloth or sponge for the pastern joints and body openings, and a hoof scraper and brush for cleaning hoofs. The scraper is used for cleaning the inner sole, the brush for the outer wall. Except in an emergency all cleaning should be done in the open. Currying and brushing should proceed from front to rear, in long and quiet strokes, avoiding all gouging and hair catching. Brushing should be collected in boxes and not

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[10] Already given in Appendix F, Section III.

tapped out against inside stable walls. Wiping the entire body of the horse with a soft cloth will increase the glossiness of the hair.

b. The care of mane and tail: The forelock, mane, and tail are not to be cleaned with combs or brushes, the hair is combed by hand only. Thick tufts in the mane should be pulled apart. It is well to wipe the tail and mane with a cloth soaked in salt water-a handful of salt to a pail of water.

c. The care of hoofs: Hoofs should be cleaned each morning and after every outing. In dry weather they should be washed and oiled. In more than passing damp weather, the hoofs should be scraped and brushed dry and clean and then oiled. The hairy skin around the crown of the hoof must not be touched by the oil, since the oil may easily cause inflammation of the skin or affect the horny growth. In winter the hoofs should be washed as little as possible, because it tends to make the hoof brittle and crumbly. The outside wall of the hoof must not be scraped with any sharp object such as a knife, wire-brush, or piece of glass.

d. The care of horses after work: The hair of a horse which is wet from perspiration must be smoothed with a coarse brush. In winter the horses should then be blanketed for twenty or thirty minutes and then quickly rubbed down.

It is also good practice to brush them down and smooth the hair with wisps of straw. After strong exertion, if time permits, it is a good idea to lead the horses around until quiet, normal breathing has been restored; this generally prevents the undesirable perspiration which follows exertion.

If overexertion is avoided and the animals walked about slowly after work, horses will generally perspire little or not at all. Horses which become wet from rain or snow must always be thoroughly rubbed down with wisps of straw until they are dry. Horses which have worked themselves into perspiring should in cold weather be covered for as long as they remain standing in the open.

e. Washing: The horses' legs and hoofs should be washed only when they are very dirty and only up to the knees or hocks. The pastern joints should be cleaned and rubbed dry with a cloth or wisp of straw. To wash the entire body is dangerous, as it exposes horses to colds, and weakens the horse through the loss of body heat. Never wash with tap water, but only with water which has stood for some time. In warm weather the water of clear ponds and lakes may be used.

f. Covering the horses: Under normal circumstances covering a horse is forbidden, since the practice tends to soften the animals and make them more susceptible to contagious diseases. On marches the blankets should be spread

over the horses only during the rest periods, particularly in winter or in strong winds.

Model plan for stable procedure (for guidance only).

Early morning duties:

0500-0645 hours: watering

0645-0730 hours:
1. care of litter
2. feeding
3. care

Stable duties subsequent to riding or driving:

one hour
1. care of horses
2. care of litter
3. care of saddles and harnesses

Noon duties:

1115-1200
1. watering
2. care of horses (rub down horses which had perspired after work)
3. care of litter
4. feeding

Evening duties:

1700-1800 hours:
1. watering
2. care of horses (much rubbing down!)
3. care of litter
4. feeding

1930 watering (duty of night guards)

22. Leaflet on the Care of Stables.

The Care of stables includes all measures which promote the health and work capacity of the horses, such as correct ventilation; cleanliness, light, freedom from dampness; and good stalls for the horses. The stables are aired to remove harmful gases, and contagious germs; to eliminate or reduce the humidity of the air in the stable; and to regulate the temperature in the stable. Dry, moderately warm, and well-ventilated stables greatly contribute to the well-being of the horses and their capacity to resist disease. Even in emergency stables it is possible to obtain these essential features. The ventilation of the stable is regulated in such a way that all corners of the stable continuously receive fresh air but that the horses are not exposed to direct, cold drafts. If the stable is too cold, part of the fodder consumed will go toward the raising the body heat and will adversely affect the horses' appearance. If the stable is too warm the horses will get soft and less able to resist diseases. The temperature for stabled horses should be between ten and twelve degrees centigrade.

The walls of emergency shelters which offer too little protection against wind and cold must be insulated with branches; if necessary, snow or horse manure may be packed against the outside walls.

The most important airing of the stable takes place when the horses are at work, and should be done more thoroughly. All windows and doors should be left open until the horses return to the stable. If the airing takes place while the horses are in the stable and there is a strong wind blowing, windows on the leeward side should be opened if there is no wind and the weather is cool and sunny, windows on the sunny side should be opened. Drafts must be strictly avoided. Good ventilation must also be maintained during the night. A stable which is too cool in summer is worse than one which is too warm in winter. The best, most thorough airing is done in the early morning hours.

Good air also depends on the cleanliness of the stable. The timely removal of all animal excretions is of primary importance. Droppings must be removed from the litter as soon as possible. The passage and drain behind the stalls and the feeding cribs should be constantly cleaned. Equally important is a frequent scrubbing of the walls.

Horses, like human beings, need light for their well-being. A dark stable is an unnatural place for horses to live, but an exaggerated or brilliant light is equally out of place. However much bright light may be desirable in order to see to the care of the horses, in the long run it is better if the light is subdued. In bright light horses are more bothered

by flies. At night, in the absence of electric light, lanterns which give off a good light should be available. It is advisedable to keep a lantern inside of a pail burning all night. The light is always handy and does not disturb the horses' rest.

Great caution must be exercised over electrical installations, since horses are so sensitive to electrical current that any contact with an exposed wire may very easily mean instant death.

The litter used for bedding should be soft, warm, springy and dry, restful to hoofs and legs and the entire body. The litter may consist of straw, turf, sawdust, heather, or brush. To prevent injuries any harsh twigs should be broken up. All unnecessary handling and mixing of litter inside the stable should be avoided, so as not to fill the air with dust. The droppings are removed as soon as possible and the litter kept dry. Wet spots-in the middle of the stall in the case of geldings, at the rear of the stall in the case of mares-should be forked out and replaced with a fresh base and dry litter.

Fire-prevention measures must be carefully observed.

23. Leaflet on Feeding and Watering. Includes a model feeding plan.

The capacity of a horse to work depends essentially on what it is fed. Consequently, the first basic principle in the care of horses is to feed them well and give them enough to drink.

A healthy appetite and a good digestive system are indispensable to a good army horse. Poor feeders and poor "converters" are not equal to great and sustained efforts.

Because feeding and performance stand in direct relation to one another, the feeding must correspond to the work to be performed. Every horse cannot be treated alike; its nature, condition, and natural strength must be taken into consideration. The quantity of the food available is not alone decisive.

The feeding schedule should be as regular as possible. The proper kind of fodder is equally important. Spoiled or otherwise unsuitable food can cause sickness and losses, but so can perfectly proper food fed in the wrong way. The regular feeding schedule must be maintained as long as special duties and services do not intervene. Since the stomach of a horse is relatively small and is unable to hold much at a time, it is well to divide the daily ration into four or five feedings. The largest feeding should be given at the

beginning of the longest rest period, usually in the evening. Horses should not be worked until two hours after each feeding. Before putting fresh fodder in a crib remnants of the previous meal should be removed.

All fodder must be in first class condition, and stored in a dry and well-aired place. Baled hay which is a year old should be opened and loosened up immediately upon receipt, otherwise it is very apt to get mouldy and produce colic. The daily mixture of oats and barley should be divided so that the horses receive one quarter of the ration in the morning, one quarter at noon, and the rest in the evening. Chopped straw, two to four centimeters long, should be mixed liberally with the grain to compel the horses to chew the oats and barley properly.

Cleaning should not be done in the stable while the horses are eating and all should be quiet at that time. The horses must not be tied too slackly, or a horse may eat out of a neighbor's crib and it will not get enough to eat. Any supplementary ration should be fed well in advance of any greater exertion.

Every loss of appetite or refusal to eat is a sign of illness, and the veterinarian should be called at once. Sharply protruding teeth are often the source of the trouble and these the veterinarian will file down.

In pasturing and green feeding it should be noted that meadows, either wet or dry, are always good for pasturing horses; that cut grass must be fed fresh only; and that acacia (locust) bark and leaves are very poisonous.

Water is indispensable to horses. Their bodies consist largely of water and they are constantly giving off water through urine and excrements, through the exhalations of lungs, and through the skin. This water must be replaced.

Watering is as important as feeding. Thirst very quickly reduces the work capacity of a horse. The intake of water depends on weather, the season of the year, and the amount of exertion. Watering should always precede feeding.

Drinking water must be colorless, odorless, and perfectly clear. Its temperature should be between nine and twelve degrees centigrade. Normally it is sufficient to water the horses three times a day, but in hot weather horses should be watered as often as possible.

Overheated horses returning to their stable should not be watered until they have been thoroughly dried and until their heart beat and breathing rate is back to normal. On the march overheated horses may be watered, providing they immediately resume the march. Excessively rapid drinking must be discouraged by throwing a handful of hay or grass on the water or by leaving the bit in the mouth. On the march

the horses must be offered water to drink as often as possible, even though they may not drink much. Tap water has a fairly even temperature throughout the year and is good for horses.

Whenever a stop is made every individual rider and driver should try to still the thirst and hunger of his horses, since he cannot always be sure of his next opportunity. A delay may result in empty stomachs and a consequent loss in performance. Even the small quantities of food or water offered the horses on such occasions are of value. A few handfuls of grass may yield surprising results.

In order to get full value out of the fodder, the largest issue should be made at the beginning of the rest period which is planned to be the longest. It is particularly important to see to it that the horses get the hay and straw so necessary to their digestion.

At the beginning of each longer rest period, several of which are to be scheduled for each day of march, the horses should be unharnessed and unsaddled before feeding if the situation permits. If this is not possible the girths at least should be loosened to prevent sores developing from the pressure of the saddle or back pads. When the march is resumed it is not enough to tighten the girth; the saddle cloth or horse blanket must be straightened out.

When there are to be several consecutive days of rest the grain ration should be reduced and the coarse fodder ration increased. Horses should not be allowed to stand more than one whole day in their stalls. They must be walked or ridden for at least half an hour each day.

Model Feeding Plan:

Morning meal: water an hour before beginning regular stable duties. Feed grain ration half an hour after watering.

Between meals: food to be given whenever the time between the morning and noon meals would be too long.

Noon meal: water half an hour before feeding. After the grain ration, which is fed at this time, has been eaten, a generous supply of hay should be made available.

Evening meal: water half an hour before feeding the grain ration, then plenty of hay. Water again two hours later.

24. Sample Army Field Order on the Care of Horses.

Subject: Training in Service with Horses.

Information on hand indicates that the Service with Horses program has not yet everywhere received the attention necessary to guarantee the preservation of our valuable supply of horses and equipment.

The following instructions are therefore issued:

a. The officers, noncommissioned officers, and drivers of winter mobile units, established in the field army under

instructions from this army headquarters, are to be instructed in accordance with Service Regulation 72 on the use of sled runners, field kitchens mounted on sleds, and horse-drawn sleds generally, just as soon as the necessary equipment has been received. Service Regulation 72 has been distributed as low as company level. Elements which have not yet received this regulation are to request it through channels from the office for army regulations.

b. Supply trains should be started early enough to enable the column to proceed at a walking pace, with enough time allowed for the required rest periods in sheltered places. Trotting is forbidden, particularly of cold bloods. These should never be made to trot except in an emergency.

c. While the column is moving or resting, the officers, noncommissioned officers, riders, and drivers must not leave the horses or teams with which they are charged. Nor is it permissible for officers and noncommissioned officers to walk or ride in front or behind their unit, paying no attention to what is going on around them. They must frequently walk or ride beside the column and see that discipline is maintained, the horses cared for and correctly harnessed. They should be ready to lend assistance whenever necessary.

d. Riders as well as drivers from the saddle must dismount at every stop, however, short, and while under way they should lead their horses by the bridle for longer stretches, particularly when the road is bad or the ascent is steep. Drivers from the saddle should also see to it that the off horse is pulling its share. When necessary assistant drivers should be assigned to lead the off horses.

e. While under way drivers on the box should control their teams exclusively from their seat on the vehicle.

f. There is to be no riding of horses when walking on a corduroy road. (Have mercy on the horse!) Officers and messengers may remain mounted only when there is justifiable reason for haste.

g. To mount a horse in a double team is forbidden. Four-horse teams going after supplies shall be driven from the box. Reins for this purpose are to be made out of any suitable army or captured material. This will prevent anything from happening to the tired horses, which are predominate in the army these days. When necessary the driver, who is normally mounted on the saddle horse of the lead team, should drive that team while seated beside the driver on the box.

h. Horses must not be tied to vehicles, because they may very easily injure themselves.

i. Vehicle loads must be made and kept as light as possible. To insure this frequent load checks must be made.

j. In order to save leather, all harness parts not actually serving as useful purpose should be removed. Horses harnessed to vehicles equipped with brakes need no breeching strap. Extra equipment should be turned in, and the division or field unit should keep it in reserve.

k. Particular attention must be paid to the care and maintenance of vehicles and harnesses during winter. All possible repairs should be made by the personnel of the unit concerned. Check the brakes; replace worn-down blocks. The vehicles themselves, particularly in rear areas, should be kept under cover. The equipment of horses sent to rear areas must be properly stored and cared for.

m. Bridles, saddles, harnesses, and, in the case of mountain and light infantry divisions, packsaddle model 23, must be properly fitted before starting out and should be checked at every halt.

n. A stable service officer must be assigned to every thirty horses, who, like the forage master, will have attended a course of instruction on the care and feeding of horses in combat.

The above instructions, the observance of which will be checked by special agents, are to be issued to all commanding officers in the field and in the rear areas where horses are recuperating and to all riders and drivers.

An officer will be appointed for each horse-drawn train who will represent the commanding officer and who will be personally responsible to him for the execution of these orders. The training officers of the divisions, the regiments, and even the battalions must follow up on these instructions and visit the mounted and horse-drawn elements of their unit once or twice every month.

25. Converting and Adapting Sleds for Use on Roads Cleared of Snow. (Instructions from Army Group North)

Two wooden rollers, between 180 and 250 millimeters in diameter, and two round iron bars between 20 and 26 millimeters in diameter, which serve as the axles, are fastened between the runners of the sleds. The rollers are cut to the required length, and a hole is made either with an anger or a red hot iron exactly through the middle. Two cup-shaped, steel sockets are driven into each end of the roller. The diameter of the hole through the roller should be larger than the diameter of the socket, since the friction and bearing is only at the socket ends. To strengthen the rollers, iron bands should be fastened around each end, but these are not absolutely necessary.

Experiments have shown that if the middle section of the wooden rollers is thinned to a lesser diameter, the sled is much easier to pull, since the friction is then only on the iron bands at each end. The roller will also suffer less damage from stones and uneven ground and will last longer.

A hole is drilled in the sled runners well below the supporting props of the sled box to receive the roller axle. On the inner side around the hole a piece of tin is nailed to protect the runners and reduce friction. In order that the axle will not turn around when the sled is pulled, the axle, extending through the hole in the runner is bent up at one end and secured with a cotter pin at the other, so that the axle is held firmly and yet may be easily removed. The rollers must be allowed enough play at each end so that they do not pinch. Before inserting the rollers, the sockets must be filled with axle grease.

When there is snow on the road, the rollers can be carried in the box of the sled. On army sled model 1 (Hs.1) the rollers are inserted just under the front and cross beams. It is recommended, however, that the rear roller be inserted below the third cross beam for when the sled is heavily loaded this prevents the runners from being bent; the load capacity becomes greater and the sled is easier to turn.

On double sleds (Hs.3, 3/1, and 5) two rollers must be attached to each section. Experiments have shown that the main weight in each section rests upon the rear roller beneath the cross beam, while the front roller, which is held by the runners alone, serves to prevent any tipping over. In the front section the rollers are sixty centimeters apart, in the rear section they are fifty-five centimeters apart. The rollers otherwise are made and attached in the same manner as in model 1 sled.

## III. GENERAL RULES AND REGULATIONS FOR SERVICE IN A HORSE-DRAWN OR MOUNTED UNIT

If the horses are handled so that their performance exceeds their normal daily average, the value of the horses is greatly increased. The best way to spare a horse, whether it is being ridden or driven, is to set a pace which is reasonable and corresponds to the animal's strength. If the pace set is too fast the inevitable result is exhaustion. On the subject of pace, Riding Regulations, Army Regulation 12, paragraph 61 and Driving Regulations, Army Regulation 365/1, paragraphs 35 to 38.

Every case of rough handling of the horses must be very severely dealt with. Mishandling ruins the character of a horse and does even greater damage to its health, particularly its legs. Moreover, rough handling is a sure sign of incompetence on the part of the rider or driver.

A horse needs even greater care on the march than at the barracks. Even apparently minor neglect may harm the horse or be the cause of its loss. The greatest number of losses sustained among horses while on the march are not a result of their legitimate employment but of the lack of proper care. The hoofs of the horses are to be thoroughly checked not only before starting out but also during the march, especially at each rest. Loose shoes make a clattering sound when the horse puts down its hoof on hard ground. Loose and protruding nails, which may cause cuts, must be detected. In winter the calks should be checked frequently and replaced.

A considerable sparing of the horses can be obtained on a long march, if the riders and drivers would dismount frequently and lead the horses even for a few minutes. Every effort which does not serve the purpose of the march is to be avoided. The need to increase the average speed per hour frequently tempts a rider or driver to trot his horse down hill and accelerate the pace up hill, both of which are injurious. At the beginning of a steep ascent riders and drivers must dismount.

In driving up or down hill the brakes must be handled properly. Going up hill the brakes should not touch the wheel at all, and in descending they should be applied no more than necessary. The brakes should never be applied so tightly that the wheel is held fast. The brakes will be

tight enough if the traces are fairly taut and if the horses maintain their regular pace without effort. During a long climb when frequent rests are required, it may become necessary, in order to spare the horses, to place stones or blocks under the wheels. In the mountains every vehicle must carry a drag.

Whenever possible a long interval between the columns should be maintained in order to prevent raising too much dust and to allow each element to change its pace when it reaches a suitable stretch of road. Lost time must not be recovered by an accelerated pace over a short distance but by a slow increase in speed over a longer distance.

The rules of the road must be strictly observed. However hard the surface may be it is always preferable to ride or drive on the middle of the road, since it is easier on the muscles and sinews of the horses. If the road is highly vaulted, the sloping sides should be avoided. At every halt pull well over to the right, even when a vehicle is traveling alone.

To prevent slipping when there is snow or ice, horseshoes must have calks screwed on. The screw holes must be cleaned out with a special tool provided, and if the thread has been damaged the holes must be rethreaded with the auger from the emergency tool set. The calks are partially screwed

in by hand and are tightened with a special wrench, turning from left to right. The hoof is held firmly to prevent stretching and twisting joints. After setting each calk, make sure that head is flush with the surface of the horseshoe, otherwise they may easily break off within the screw holes. The calks must never be tightened so much that the shoes are pushed away from the hoof. In the stable or even in bivouac the calks should be removed to prevent injuries.

To prevent snow from caking under the hoofs, straw soles may be used. They must be made to fit exactly into the hollow between and just below the rims of the horseshoes. They are compressed and held firmly by flat, wooden splints inserted between the hoof and the shoe. These straw soles and splints are made by the men.

For information on conserving the energies of horses driven from the saddle see Army Regulation 465/4, paragraphs 19 to 21. Mounted drivers must at times lead the horses even on level ground. On these occasions the drivers should lead the saddle horse and an assistant driver the off horse, so that the horses will pull evenly. To spare saddle horses further, the off horse may be switched to the saddle horse position.

During longer rests saddles and harness should be removed if at all possible. To keep the horses from catching cold the

horse or saddle cloths are unfolded and used as blankets. Stopping places should always be near water, in the shade, in summer and in shelter from the wind in winter. During short rests the horses may be watered at once, but if the stop is to be a longer one the horses must first be allowed to cool off. Always try to give the horses some coarse or green fodder.

After saddling the saddle cloth should always be pulled well up into the pommel. No new harness is to be issued just before a long march, as new harness is more apt to cause sores. If the fodder fed on the march differs from the food given earlier, the saddles should be checked for proper fitting after a few days.

IV. LEAFLET ON THE PREVENTION OF ACCIDENTS TO HORSES

The accident rate among horses with field troops is unusually high. Most of the fatal accidents are caused by carelessness.

In handling of horses all excitement and haste must be avoided. Rough handling of horses is strictly forbidden and is to be punished.

Horses must always be led by the halter in and out of the stables, and sharp turns must be avoided especially when the horses are being led in and out of their stalls, if the passage behind the stalls is at all slippery, it should be roughened or sanded.

Horses which have broken loose must not be chased, neither in the stable nor outdoors; they should be approached quietly and tempted with a handful of hay or a basket of grain. In the open a quiet horse may be led to the runaway horse. Horses which habitually slip their halters should be kept in their stalls by stretching a blanket or belting behind them. With such horses the halter should be replaced by a neck strap.

On entering and leaving the stable horses should be protected against bumping their legs against door frames.

A horse which objects to carrying a saddle should have the saddle left on loosely at first and the girth gradually tightened later on. A sudden tightening of the girth may cause a balky horse to rear and fall backwards or may cause it to let itself fall deliberately to the ground. Before tightening the girth it may be necessary to lead the horse for a while.

Chains or straps should be fastened to the stall and not allowed to hang loosely. Ruffled hair around the head and neck and an itching skin disease on the hind legs are very often the consequences of loosely hanging chains.

The side rails of a stall should be suspended about twenty inches above the litter by wire or rope, so that they are easily removable and adjustable in height. (Guard against

exposed wire ends!) Under no circumstance should the side rails be attached to the supporting posts or manger with open hooks.

Before occupying stables the walls, posts, and flooring should be examined for defects which could cause injury. Exposed nails and hooks must be removed.

Handle manure forks with great care; a stab wound generally results in death.

A jealous and greedy horse should be fed before or at the same time as its neighbour, otherwise it might break the other horse's leg with a kick.

Kicking and greedy horses should be put in corner stalls with side rails suspended on the open side. Tie horses outside the stable in same order as inside. Habitual kickers and mares in high heat must be separated. It is dangerous and forbidden to tie horses to movable objects such as doors, wagon shafts, or wheels.

Use caution while riding or driving on public thoroughfares and strictly observe every rule of the road.

Never lead a horse by a curb bit bridle. When halting take up the slack only; to tie the bridle tightly to the saddlebags or the pommel is dangerous and cruel.

Equally dangerous, in the case of hitched teams, is the practice of tying the crosslines to the vehicle or the cross beam of the shafts. The lines should be folded back and looped under the strap running from the back pads to the breast collar.

V. INSTRUCTIONS ISSUED BY THE EIGHTEENTH ARMY ON TRAINING FOR SERVICE WITH HORSES

1. Training Instructions

All officers who are to be assigned as training officers to a division, regiment, or independent battalion are to attend special courses of instruction. This training which must be limited to wartime essentials, is to ensure that our valuable and irreplaceable supply of horses will be in proper condition and correctly used.

To this end the officers' first requirement is to inculcate in his men a sense of responsibility for the horses. A very important part of the riders' and drivers' training is a thorough knowledge of the use and care of the bridles, saddles, harnesses, and vehicles.

It is not enough for riders and drivers to obtain the theoretical and practical knowledge, they must also acquire an understanding of the needs of the animals entrusted to their care, and they must develop a sense of responsibility to preserve the working capacity of these valuable and irreplaceable compagnions.

Also as a part of this training is a thorough drilling in the necessity to check constantly on the bridling, saddling, harnessing, and hitching before and during the march to prevent injuries and accidents, and to see that girths are

loosened during the rest periods. The training must also emphasize the necessity of frequent watering; of developing the foresight to choose resting places where watering facilities, preferably off the main road are available; of using every available source of green fodder in summer, even bringing green and coarse fodder on the vehicles to feed at every stop; of taking advantage of shade in summer and protected places in winter; of selecting and preparing shelters and improvised stables skilfully, in accordance with Army Regulation 319, paragraphs 1 and 2, and in caring for horses in the stable in accordance with Army Regulation 11/1.

Many practical exercises, given during these special courses of instruction, will serve to develop the skill necessary to guarantee the care of the essentials under difficult circumstances: saddling, harnessing, hitching and unhitching at night without lights repairing stables, and maintaining the harnesses and vehicles when there is very little time available.

During longer rest periods the horses must be given daily exercise, even if need be, within a narrowly confined area.

Training in riding: During war most riding is done at a walking pace. The rider must have learned to sit

correctly and at ease even over long distances. Correct sitting will help to prevent saddle sores. A knowledge or feeling when to alternate leading and riding must be an objective of training. The rider, must be capable of guiding his horse to wherever he wants to go at an easy walk or trot. Training in jumping is superfluous; it is important, however, to get a horse to show willingness when traversing difficult terrain, particularly marshy places, deep gullies, water-courses, and road ditches. On these occasions a horse must be ridden with free reins. In difficult terrain the reins should be divided and the curb bit disconnected. Whenever the horse moves forward in response to any aid, the hand must be ready to yield. This technique must be learned in drill exercises. As a rule, the reason for any contrariness on the part of a horse rests on some error by the rider.

The complete omission of curb bit bridling, riding with nothing but a snaffle bit, can only be ordered by commanding officers. The question of where the bits and reins are to be kept must be settled by an order.

Wherever the situation permits, regular riding instruction must be given during which the position in the saddle may be improved. The influence of the rider on the horse may also be improved by appropriate short exercises.

Some attention must be paid to the composition of each training group. Beginners and experienced riders must not be put together in the same class. Beginners must be mounted on the horses which are easiest to ride, and experienced riders can mount the more difficult horses. The horses must be trained to ride unhesitatingly away from the unit and to stand still when being mounted or dismounted.

Training in driving: For field driving it is not necessary for drivers on the box to be familiar with all the driving regulations, but these items must be mastered: the correct handling of the lines; the correct use of aids in starting and stopping, including a thorough knowledge of the shortening of both lines in accordance with Driving Regulation 3, section 22, a and b; right and left reverse turns; the principles of draft equalization through the correct adjustment of traces, which are taught by practical demonstrations; nomenclature of the vehicle and harness; care and maintenance, including emergency repairs; and a knowledge of traffic regulations.

There must be practice in the hitching additional horses in front of the regular team. Cross country driving requires special training, since most of the harmful mistakes are made, such as a misuse of the whip. The composition of a team requires particular care; color, temperament, draft capacity, and length of step must be considered.

Riding horses must also be trained as draft horses. Attempts to use them in an emergency without this training generally proved a failure and ruined the horses.

When horses have not been worked for some time, it becomes particularly important to prepare them for major efforts. The preparation should be gradual. German horses are often overtrained. Trotting cold bloods, except under combat necessity, is forbidden.

The ultimate objective in training should be to produce a driver who even in difficult terrain can keep his proper place in the column conserve the energies of his horses, and equalize their pull by correct adjustments of the crosslines. The rate of march depends on the strength of the horses and their state of nourishment. The length of the march does not tire the horses as much as an unreasonably accelerated tempo. Hurrying is usually caused by the lead vehicle not being properly supervised and setting too fast a pace. Whenever possible the column should be divided into small elements, which helps to equalize the pace and in summer cuts down the dust.

All the responsible officers should see that the vehicles are not loaded more heavily than the strength and condition of the horses permit. Strict enforcement is called for.

The rule that during long and arduous marches only the driver may be on the vehicle must also be strictly enforced. Officers and noncommissioned officers must not ride along disinterestedly but be constantly alert to see that good order is maintained in the column. When the column stops, traffic control posts must promptly be established at each end. One-way traffic may have to be established to prevent two columns coming from opposite directions from getting tangled.

2. Horse Police.

The noncommissioned officers and men of the military police who received special training as horse police at the Army School for Service with Horses in April and May 1943 are to be given priority in enrolling in the military police detachments of the division and corps headquarters, and in the military police battalion of the Army High Command.

They will be most advantageously employed at important traffic points, difficult stretches of road, in places where there is apt to be traffic congestion, such as in the vicinity of ration distribution points, and as patrols on foot or on bicycles. The main duties of the horse police are to watch over the care and proper employment of army horses. Of particular importance is the issue of brief and pertinent on-the-spot advice.

The authority for the surveillance of service with horses is based on an order issued by the commander in chief of the Eighteenth Army, dated 19 December 1942. Every member of the military police who has been assigned duties as horse police must at all times carry a copy of this order on his person. In addition he should take note of the following points:

a. Russian farm horses may not be ridden when part of a team whether they are used as shaft horses or as additional horses in a regular team.

b. Russian farm horses may not be used as a double team harnessed to the light field vehicle.

c. The harness of horses hitched to a vehicle should be continuously checked for proper fitting, particularly the breast collar, the breeching straps for position and width, the traces for the proper relationship between their lengths and their supporting chains and the saddle and back pads for position.

d. Only the driver may sit on a loaded vehicle.

e. Vehicles must be checked as to serviceability, greasing, and condition of the brake blocks.

f. Vehicle loads must conform to the draft capacity of the horses and the condition of the road.

g. Truck drivers must be taught to signal their approach early enough to avoid forcing horse-drawn vehicles to pull over suddenly, with the danger of getting bogged there. Continuous driving on the soft shoulder of the road quickly brings about a complete exhaustion of the horses.

h. When stopping for a rest the horses should be protected against the wind, covered during cold weather, and not exposed to the sun in the heat of summer.

i. Vehicle trains bringing up supplies to the men must not forget to allow rest periods in which to water and feed the horses.

j. Bales of hay or straw which have been dropped from a vehicle must be reloaded and not be left lying by the side of the road because of sheer indifference.

During the muddy period the horse police of all military police units must be most diligent and unyielding in their duties.

3. <u>The Ten Commandments for drivers from the box or saddle</u>.

(1) Spare your horses, and always care for them as if they were your own property and closest friends.

(2) Check your horses' state of health and strength before every assignment.

(3) Give your horses clean food and water served in clean receptacles.

(4) Feed and water frequently, never drive off without a bundle of hay or straw, and in season graze the horses at every rest stop.

(5) Check your harness and vehicle before every march. Oil all leather parts frequently and don't forget the timely use of axle grease.

(6) Always drive at walking pace; on main military roads keep well to the right on the designated lane, keep your distance and observe the rules of the road.

(7) Always drive with your lines in the proper position and correctly buckled; never drive without brakes.

(8) Dismount frequently and lead your team by the halter; a horse which has always been treated with consideration will never let you down.

(9) Never beat or roughly handle a tired horse, nor leave a horse to struggle along on its own; rather unhitch it in good time, let it rest and recover; notify your superior at once; have the horse taken to a shelter in a truck.

(10) When taking up quarters attend first to shelter for your horses, care for them, then stay near them.

If you act in accordance with these simple rules and try to improve daily through the exercise of self control, with the

help of your four-legged companions, you will become a valuable and indispensable helper in the service and contribute to the final victory.