

ORGANIZATION
AND TACTICS

WAGNER

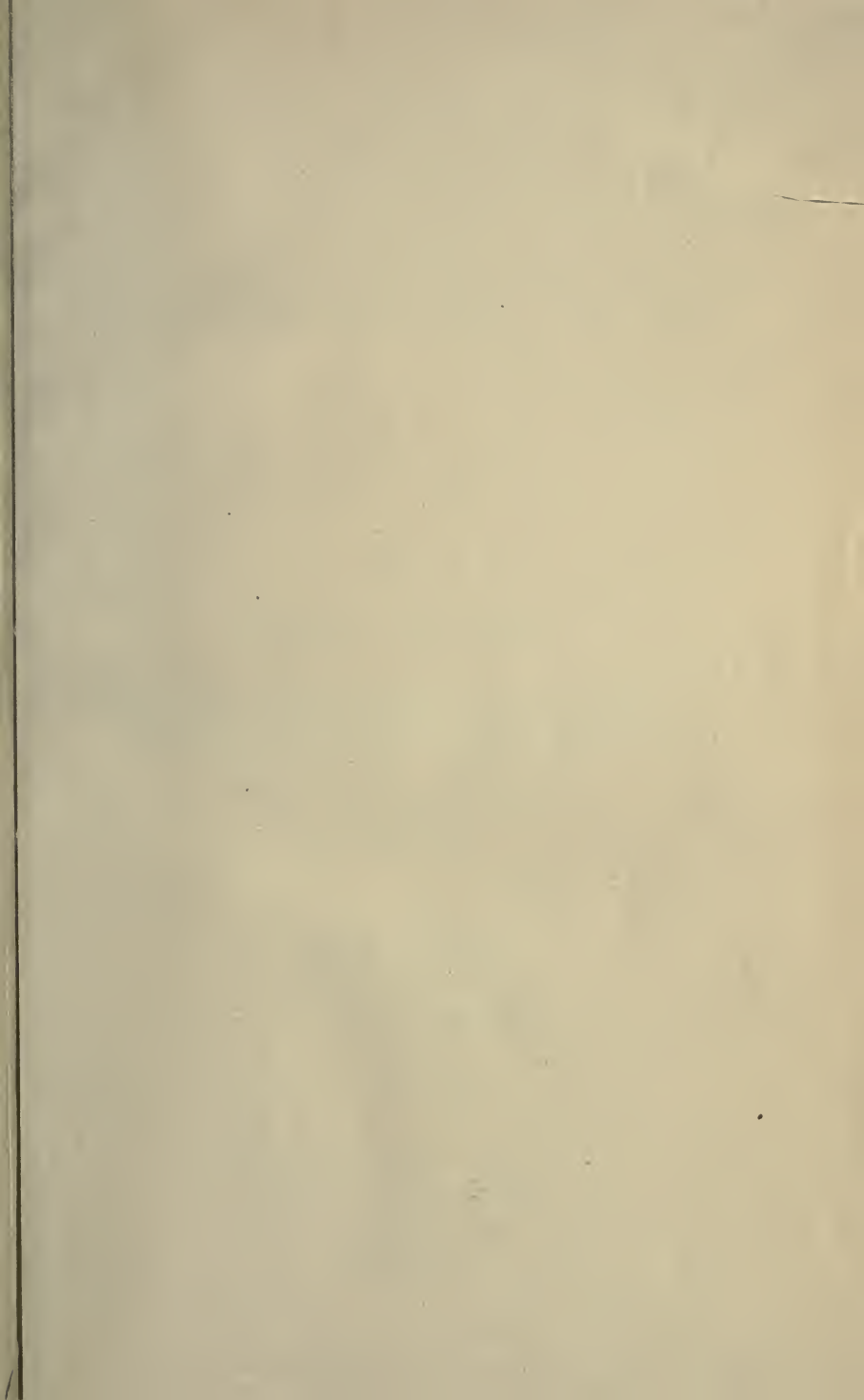
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“No man’s personal experiences can be so valuable as the compared and collated experiences of many men.”—MAURICE.

ORGANIZATION AND TACTICS

BY

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PREFACE.

The best school for acquiring a knowledge of organization and tactics is that furnished by actual experience in war. If a nation were constantly engaged in hostilities, it could always find qualified military leaders among its many veterans, who, having passed through the test of camp, siege, and battle, and having served in all grades, under all circumstances, could readily derive from their own experience a guide by which to shape their action in any contingency that might arise. Fortunately for the happiness of the human race, such schools of perpetual warfare do not exist; but, as war is an occurrence to which all nations are subject, as the duration of the longest conflict is but a brief period in the life of an actor therein, as the intervals of peace are so long that the participators in one war are, if living, generally only superannuated observers of the next, it follows that if an officer would prepare himself to be of service to his country, he must attentively consider the recorded experience of those who have learned war from the actual reality, and must accumulate by reading and reflection a fund of military knowledge based upon the experience of others. Any work on the art of war must, to be of value, be based primarily upon actual facts; and, to be worthy of attention, its theories must be logical deductions from experience gained on the field of battle.

In this work, the author has sought to give historical illustrations and examples as vouchers, so to speak, for the soundness of his premises or for the correctness of his assertions. Where changes in arms and equipments have brought into existence conditions as yet untried in war, he

has endeavored to collect and to weigh carefully the opinions of the best military authorities of both hemispheres, and to adopt such views as seem to him to be the logical outcome of the stated conditions. But, as every war has its surprises, and every conflict brings forth something as yet unforeseen, it must be admitted that any theory as to the tactics to be employed under the new conditions of war may possibly be demolished in the very next collision of armed forces. Only those tactical methods which are based on actual experience, and which may be used again under the same or very similar conditions, can be advocated with confidence.

If armies were always composed of men having the same physical and moral qualities, the same arms and equipments, the same animating impulses, and the same degree of discipline; and if then the operations were always conducted in the same theater, and the battles were always fought on the same terrain, rules might be confidently prescribed for the conduct of all military operations, and war would become almost an exact science. But the conditions vary in nearly every respect; no two battles are fought in the same way; and the most carefully matured plans have to be quickly altered to meet new and unforeseen circumstances. Human nature alone remains the same; all else is subject to many and great alterations. For this reason, the caution will often be found in the following pages, that the line of action to be adopted will depend upon the circumstances of the action and the nature of the terrain. No fear of criticism for this frequent repetition is entertained; the only anxiety in this regard is that the caution may not have been repeated often enough.

It may be asked then, What is the use of prescribing "normal formations," since everything is, after all, dependent upon the circumstances of each case? The answer is simple: They furnish a standard, in the main correct, from which an officer in action can vary according to the

conditions presented, and they do not leave him altogether without a guide. They furnish a basis upon which a commander may construct his own formations; and their value depends upon the indisputable fact that it is much more difficult to create a system in the turmoil of conflict than it is to alter and adapt to circumstances a system already existing, and suited to many conditions, though far from being applicable to all.

Our best military lessons must be sought in the history of wars that were fought under conditions most similar to those likely to be encountered by us in the near future. For this reason, in endeavoring to draw from the experience of the past a guide for the future, preference has been given to those conflicts most recent in date, and to those fought on a terrain similar to that on which our armies must contend in future conflicts. The tactical deductions contained in this work have, therefore, been based mainly upon the history of the War of Secession and the recent European conflicts, though more remote campaigns have been found to convey, in more than one instance, a valuable illustration of a tactical truth. Of even more value than the written records of history, are the ideas of living soldiers derived from their own experience in campaign and battle. The author has accordingly sought to gain, by means of correspondence or personal interview, a knowledge of the views held on many tactical matters by distinguished soldiers of our own army, who, having passed through the great Civil War, have accumulated an invaluable fund of tactical knowledge from their own experience. His inquiries have met with full and courteous replies from many officers whose opinions are entitled to the greatest weight, and he is thus enabled to give to his work a much greater value than it could otherwise hope to possess.

A good understanding of the tactics of an arm being impossible without some knowledge of its history, it has been deemed advisable to present an historical summary

of the tactics of modern infantry, cavalry, and field artillery. It is believed that these chapters constitute a valuable feature of the book; but they are intended for individual perusal rather than for use in the section-room, and may be omitted when the work is used as a text-book, without destroying the symmetry or continuity of the rest of the course.

NOTE.

The author has, in some cases, expressed in foot-notes his obligations to officers who, in reply to his inquiries, have favored him with information on various points. He desires here to extend his thanks especially to Brigadier-General Wesley Merritt, U. S. A.; Colonel H. S. Hawkins, 20th Infantry; Brevet Brigadier-General Guy V. Henry, 5th Cavalry; Major H. C. Hasbrouck, 4th Artillery; Major Arthur MacArthur, A. A. G.; Brevet Major W. A. Kobbé, 3d Artillery, and Captain E. S. Godfrey, 7th Cavalry—for valued criticism and comments on several chapters of the work which appeared in the *Journal of the U. S. Cavalry Association* and in pamphlet form.

To Lieutenant-Colonel C. R. Greenleaf, Lieutenant-Colonel A. A. Woodhull, and Major J. Van R. Hoff, Medical Department, he is indebted for information relative to the organization of the hospital service in the field; and he is under similar obligations to Captain J. G. D. Knight, C. E., and Captain C. W. Whipple, Ordnance Department, for information in regard to their respective corps.

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To Lieutenant C. B. Hagadorn, 23d Infantry, he is greatly obliged for the preparation of the figures with which the work is illustrated.

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ERRATA.

- Page 90, Figure 17, for *of* read *at*.
Page 140, line 12, for *permatute* read *premature*.
Page 224, line 1, for *exist* read *exists*.
Page 394, line 34, for *right* read *left*.
Page 401, line 17, for *right* read *left*.
Page 473, question 15, for (8) read (7).
Page 473, question 27, for (12) read (11).
Page 473, question 40, for (19-20) read (18-19).
Page 476, question 87, for (46) read (45-46).



CHAPTER I.

INTRODUCTION.

"Not many officers are required to exercise strategy, but it is with tactics that most of us have to deal."—*Boguslawski.*

The two great divisions of the Art of War are Strategy and Tactics.

Strategy is the art of moving an army in the theater of operations, with a view to placing it in such a position, relative to the enemy, as to increase the probability of victory, increase the consequences of victory, or lessen the consequences of defeat.

Tactics is the art of disposing and maneuvering troops on the field of battle.

The Art of War also embraces Logistics and Military Engineering; the former comprising everything relating to the movement and supply of armies, and the latter, all that pertains to fortification and siege operations. Logistics belongs mainly to the province of Strategy, while Military Engineering pertains chiefly to the domain of Tactics. Logistics, it is true, runs almost imperceptibly from strategy into tactics, and military engineering, especially that part relating to permanent fortification, furnishes a great element to be considered in strategical questions. Still it is essentially correct to assign the former to the province of strategy and the latter to that of tactics.

Sooner or later, all strategical operations must terminate in a battle; for, as a rule almost without exception, no army will surrender without a final resort to the chances of the battle-field, however desperate its strategical situation

may be.* Tactics is therefore the necessary complement of strategy, and the most brilliant strategical movements must be fruitless if they be not supplemented with successful tactical operations.

Tactics is often divided into Minor Tactics and Grand Tactics; the first relating to the movements of small bodies and the tactics of separate arms, while the latter includes the combination of the several arms and the handling of armies in battle. This division of the subject is not an essential one, however, as the general principles of tactics are the same whether the body of troops considered be large or small. [Tactics may also be divided into Maneuver Tactics and Fighting Tactics; the first relating to the movements by which troops are brought into position on the field of battle, and the second having reference to the formations for attack and defense and the handling of troops in actual battle.] Maneuver Tactics furnishes the connecting link between strategy and tactics; as it consists entirely of drill movements, which, being also employed in marching, pertain as well to strategy; moreover, it forms the transition from the movements in the theater of operations to those of actual conflict. All essentials of maneuver tactics can be learned from the drill regulations; but fighting tactics, or tactics proper, requires more extended consideration.

Strategy is largely independent of all details of organization, arms, etc., of the army; but tactics varies with all such details, and a consideration of the organization of armies and the weapons and general characteristics of the several arms of the service is, therefore, a necessary preliminary to the study of the methods of handling troops on the field of battle. For this reason, the subjects of Organization and Tactics are here treated together.

* (The surrender of Mack at Ulm supplies an exception to this rule) but it furnishes no exception to the disgrace that inevitably overtakes a general who yields without a last effort to extricate himself from strategic toils by a vigorous resort to battle.

CHAPTER II.

ORGANIZATION AND DISCIPLINE.

"The advantages of military science and discipline cannot be exerted unless a proper number of soldiers are united into one body and actuated by one soul."—*Gibbon*.

A perfect army would be one in which each part could respond to the will of the commander as quickly and certainly as the muscles of the body respond to the impulse of the brain. The more closely a military force approaches to this impossible ideal, the more does it merit the title of an army; and the farther it recedes from it, the more certainly does it become a mere armed mob, highly susceptible to the influence of chance, and uncertain in its action, even when opposed by a foe no better than itself.

It is not sufficient that an army be composed of intelligent, well instructed, brave, and obedient soldiers, well armed and equipped. There is a limit, quickly reached, to the size of the command that can be controlled directly by one man; and the proper direction of an army requires that it should be divided primarily into units small enough to be controlled by the voice, and influenced by the example, of their leaders. These units are grouped into larger units, and these again into still larger ones, each group under its special commander; steps being thus formed, as it were, by which the will of the commander of the army can descend to touch the lowest soldier. Tactical organization may, therefore, be defined as the arrangement of an army for the purpose of obtaining its most prompt and powerful action in response to the will of the commander.

THE LINE.

Infantry.—The tactical unit on which the organization of an army should be based is the largest body of troops that can be directly commanded by a single leader, and, at the same time, be able to appear in close order on the battle-field without risk of quickly incurring ruinous losses from the enemy's fire.

(The battalion was formerly universally regarded as the tactical unit) but in the German army (which may be regarded as the European model) its place, in this respect, has been taken by the company, though, as a matter of convenience, the army is still reckoned by battalions. In the Napoleonic wars the French battalion of about 500 men seems to have been a very satisfactory unit.* The German battalion now numbers 1,000 men, while the company numbers 250. With the murderous fire and extended order of fighting of the present day, a smaller unit is necessary than in the early part of the century, and in the German organization the company is undoubtedly better than the battalion as a tactical unit.

In our organization, however, the battalion would seem to be the correct tactical unit. It is much less unwieldy than the German battalion, and is not much larger than the German company. Moreover, our small battalion has, in an indirect but positive way, been approved by our own experience in war. General Schofield is of the opinion that our deplorable methods of recruitment in the War of Secession (by which veteran regiments were allowed to dwindle away) were not without a partly redeeming feature; for the unwieldy battalions, consisting each of a full regiment, were reduced to flexible, well-seasoned, small battalions, easily handled, and furnishing, quite by accident, the tactical unit which should have been adopted at the beginning and con-

*At Rivoli the French battalions were each about 300 men strong. At Austerlitz each battalion numbered 550. Although sometimes reaching a paper strength of 700 men, the battalions were much oftener under than over the strength of 500.

stantly maintained.* Many of the Union regiments in 1864-5 were about the size of a Prussian company; and in Sherman's army, at the close of the war, the infantry regiments averaged in strength less than 400 men. On our greatest battle-fields the best work was done by these small regiments, which were, in fact, excellent tactical units.

It might be argued from this that the Germans have the proper tactical unit in their company, and that we should adopt their organization in this respect. But the present methods of fighting render a greater proportion of officers necessary than was formerly the case. The German company, with its five officers, is not so handy an organization as the American battalion (of less than twice the strength) with its thirteen officers. In fact, it is probable that the Germans themselves would reduce the strength of the company to 100 men, but for considerations of necessary economy, which, by reason of our small army in peace and our enormous resources in war, we need not entertain. It may, then, be safely assumed that the best organization for our infantry requires companies of 100 men each, and battalions of four companies—this organization being most in accord with the teaching of our own experience and with the conditions of the modern battle-field. Assuming this as our company and battalion organization, the battalion is the natural tactical unit.

The almost universal division of the battalion is into four companies.† The company is sometimes designated as a "fighting unit" or "unit of combat," but these designations seem quite superfluous; the battalion is the tactical unit, and the company is merely a convenient fraction thereof. The company is divided into two platoons, each under

*This opinion, expressed in conversation with the author, is not to be construed as an approval, in any sense, of the unfortunate system of recruiting the armies during the war, but merely as pointing out a single mitigating feature of the evil.

†The British battalion is divided into eight companies, but they are formed into two "wings" of four companies each.

command of a lieutenant; the platoon is again divided into two sections, each under command of a sergeant; and the sections are finally divided into squads of eight men each. The squad is the smallest aggregation of soldiers.*

The company is the largest organization in which the commander is in immediate contact with the soldiers. The captain has direct charge of the instruction, drill, clothing, and subsistence of his men, being assisted by his lieutenants; and the company may, therefore, be regarded as the administrative unit. The most efficient armies are those in which the captains are given the greatest latitude in the methods of instructing and providing for their companies, and held to the most rigid accountability for their good condition and military efficiency.

There is a limit to the number of battalions that can be conveniently handled by one man, and experience has placed this limit at three or four; the former being the number usually composing the regiment, though the latter number is adopted in the armies of Russia and Austro-Hungary, and in the new regiments of the German army. The regiment is an important administrative as well as tactical body. As a rule, it is the largest organization whose component parts are unchangeable; it is the only organization in the army permanent enough, and at the same time of sufficient importance, to have a history; it is the first body large enough to insure a diversity of talents on the part of its officers; and it is the body around which the strongest *esprit de corps* clusters.† Tactically, it is a necessity; for a brigadier-general can easily command three regiments where he would find the control of nine battalions a matter of much difficulty.‡

*In the United States army the infantry company at full war strength is assumed to consist of one captain, one first lieutenant, one second lieutenant, one first sergeant, four sergeants, twelve corporals, two musicians, and eighty-four privates; total, 106 officers and men.

†Von der Goltz.

‡The war organization of an infantry regiment in the United States army

The brigade is the largest organization composed exclusively of infantry. In the United States army it consists of three regiments, and has, therefore, a strength, in round numbers, of 3,600 rifles. Though composed of only one arm of the service, the brigade almost invariably acts in conjunction with the other arms; and when detached it usually has some artillery attached to it. In the Franco-German War the Germans invariably attached artillery to detached brigades; the artillery, in the case of a brigade acting as an advance guard, usually consisting of two batteries. In the War of Secession both the Union and Confederate armies had at first one battery permanently assigned to each brigade; but a brief experience sufficed to condemn the system of brigade artillery, which disappeared entirely before the end of 1863. *

Artillery.—The tactical unit of artillery is the battery.* The experience of many wars has demonstrated that six is the best number of guns for a battery; and that is the number now contained in the batteries of all great armies, except those of Russia and Austro-Hungary, in which the batteries consist of eight pieces each. (In Sherman's march to the sea it was found expedient to reduce the number of guns in each battery to four; but this was mainly with a view to obtaining eight horses to each gun.)

Batteries rarely work alone, but are united in battalions consisting of two, three or four batteries; the last number being usually regarded as the best. Our battalion of three

is assumed to be as follows: one colonel, one lieutenant-colonel, three majors, one adjutant, one quartermaster, one sergeant-major, one quartermaster-sergeant, one chief musician, two principal musicians, and twelve companies. Each major commands a battalion, and is assisted by an adjutant detailed from the lieutenants belonging to the companies.

*The organization of a light battery in the U. S. army, in the time of war, is as follows: one captain, four lieutenants, three staff sergeants (first sergeant, quartermaster-sergeant, and stable and veterinary-sergeant), six sergeants, fifteen corporals (six gunners and nine caisson corporals), five artificers (three blacksmiths, one saddler, one machinist), two trumpeters, one guidon, one wagoner, forty-eight drivers, eighty-four cannoneers, eight supernumerary drivers, two range-finders; total, 175 men. The battery contains six guns, nine caissons, a battery wagon and forge, and a store wagon.

batteries corresponds to the British "brigade division"; our battalion of four batteries, to the German *abtheilung*.

The regiment of artillery is a purely administrative unit.

Cavalry.—In most armies the tactical unit of cavalry is the squadron of 150 sabers. In the United States army the squadron has a war strength, in round numbers, of 400 sabers, and is divided into four troops. Marmont's dictum, based upon his great experience in war, that ninety-six is the largest number of mounted men that a single leader can effectively handle, would indicate our troop as the proper tactical unit. The squadron is, however, generally considered as our tactical unit, as the troop, unless at full war strength (which would rarely be the case), would be too small. Neither our troop nor our squadron seems to be as satisfactory a unit for pure cavalry action as the squadron of 150 sabers, which, owing to the casualties of war, rarely has more than 100 troopers present for duty; but when dismounted action is considered, the squadron of four troops is quite as important a tactical unit for cavalry as the battalion is for infantry. As in the infantry, the regiment is both an administrative and a tactical organization; indispensable in the former quality, and necessary in the latter as a tactical link between the squadron and the brigade.

The United States cavalry regiments consist of three squadrons each.* The cavalry regiments of the French and German armies consist of five squadrons (of 150 men each), only four of which go into the field, the fifth being retained at the regimental depot. The Austrian, Italian and Rus-

*The troop, at war strength, is assumed to consist of one captain, one first lieutenant, one second lieutenant, one first sergeant, one quartermaster-sergeant, five sergeants, seven corporals, two trumpeters, two farriers, one saddler, one wagoner and eighty-five privates; total enlisted, 105. The regiment is assumed to consist of one colonel, one lieutenant-colonel, three majors, one adjutant, one quartermaster, one sergeant-major, one quartermaster-sergeant, one chief musician, one saddler-sergeant, one chief trumpeter, one veterinary surgeon, one commissary-sergeant, and twelve troops. Each major commands a squadron, and is assisted by an adjutant detailed from the lieutenants on duty with the troops.

sian regiments consist of six squadrons each, exclusive of a depot squadron.

In the United States army the regiment is the largest cavalry organization entirely independent of the other arms. The cavalry brigade, which consists of three regiments, should have a battery of horse artillery attached to it,* though when several cavalry brigades are grouped into a division, the horse batteries are generally united in a battalion.

The cavalry division consists of three brigades of cavalry and a battalion of horse artillery.

The cavalry corps consists of three divisions, and at least six batteries of horse artillery, and at full strength contains, in round numbers, 33,000 men. Such a force of cavalry will very rarely be found united in one body. The entire cavalry force under Sheridan in the Shenandoah Valley numbered less than 12,000 "present for duty," though it was, with a single exception, the largest body of cavalry under one command in the War of Secession.† In the Austro-Prussian War the Prussian cavalry was assembled into corps of two divisions, aggregating 7,200 sabers; but the results did not encourage this organization, and four years later the German cavalry, operating in France, worked altogether by divisions. It is probable, however, that a cavalry corps will often be formed of three depleted divisions.

The Arms Combined.—The division is generally composed of all arms of the service, but is known as an "infantry division," not only because it contains the largest proportion of that arm, but also as a means of distinguishing it from one composed of cavalry and horse artillery. The division (which is an important administrative as well as tactical organization) consists of three brigades of infantry (numbered in each division as the first, second, and third) and a number of troops and batteries, varying according to

*Our cavalry brigade is exactly the size of a German, French, or Austrian cavalry division, to which at least one battery of horse artillery is always attached.

†Wilson's Cavalry Corps, in 1865, numbered 13,000 troopers.*

circumstances. The best proportion of artillery to the division is generally a battalion of four batteries. The cavalry attached to the division is known as divisional cavalry. In the U. S. army the "divisional" cavalry consists of "one or more" regiments assigned to the army corps, and might better be termed corps cavalry. In this respect we follow the French, who have a brigade of cavalry (1,200 sabers) to each corps, instead of the Germans, who have a regiment (600 sabers) to each division. This gives the same amount of cavalry to the corps in each case, but in the latter organization it is permanently assigned to the divisions, while in the former it is attached to the divisions from time to time, as circumstances may demand. The best German authorities are not agreed as to the amount of cavalry that should be assigned to a division. Von der Goltz is of the opinion that one or two squadrons (150 to 300 sabers) are sufficient, while Bronsart von Schellendorf maintains that the minimum has already been reached in a regiment (600 sabers). No German soldier of repute advocates the abandonment of the system of purely divisional cavalry for that adopted by France and the United States; but American experience in the War of Secession was altogether against the permanent assignment of cavalry to the infantry divisions. It was found that the cavalry thus assigned was senselessly frittered away in innumerable detachments of "body guards," orderlies, etc., and that the divisional cavalry as a body practically ceased to exist.* For us the French system is undoubtedly the best.

The divisional artillery is under the command of the general commanding the division, and passes from his con-

*Our experience in this respect was similar to that of the British in the Peninsular War. In his description of the battle of Fuentes Onoro, Napier says: "Montbrun turned the right of the Seventh Division, and charged the British cavalry which had moved up to its support. The combat was unequal, for, by an abuse too common, so many men had been drawn from the ranks as orderlies to general officers, and for other purposes, that not more than a thousand English troopers were in the field."

trol only under circumstances which will be considered later.

The army corps is the strategical unit.^{*} It should be complete in all its parts, and constitute an army in itself, capable of acting independently at any time, and always able to act promptly as a whole. In the armies of the United States, army corps are organized only by special authority of the President, and are numbered according to the date of their organization. cax

The fighting strength of the army corps consists of three divisions (numbered in each corps as the first, second, and third), one or more regiments of cavalry, and the corps artillery. The latter is independent of the divisional artillery and is under the control of the corps commander, being under the immediate orders of the chief of artillery of the corps. The divisional artillery may be united with that of the corps, by order of the corps commander, in which case it is under the charge of the chief of artillery of the corps. If, however, batteries are sent from the corps artillery to reinforce the divisional batteries, the chief of artillery assumes command only when at least half the corps artillery is engaged, unless otherwise ordered by the corps commander. The corps artillery, in a theater suited to the use of artillery, consists of a brigade of two battalions of four batteries each, thus giving the corps 120 guns—divisional and corps artillery combined. At least two of the batteries of the corps should be horse artillery. X

The strength of the regiments, brigades, and divisions varies in the armies of different nations; but the size of the corps is practically the same throughout the armies of the world, it being everywhere approximately 30,000 strong.^{*} Its paper strength exceeds this in all armies, but it is the manifest intention in every case to have a fighting strength of 30,000 men in actual campaign. (As a result of his experience, General Sherman declares that the corps should never be allowed to fall below a strength of 25,000 men.)^{*}

In very rare cases only may it be advisable to reduce its strength. In the campaign of 1864, in Virginia, the five corps of the Army of the Potomac were consolidated into three, of nearly 25,000 infantry each. (Of this organization General Humphreys says: "In a country so heavily wooded as that in which the operations were to be conducted, five infantry corps of about 15,000 each would have been a judicious organization, owing to the difficulty of communication between the corps commanders and the subordinate commanders in a battle in such a country, and the consequent difficulty of prompt and efficient control of extensive lines of battle, especially at critical moments, or when unforeseen exigencies occurred.*)" It should be observed that the region in which these small corps would have been preferable was densely wooded, and probably offered altogether the most difficult theater ever operated in by modern armies.

The strength of 30,000 men for a corps has not been assumed by accident. (A corps of the given strength forms, in ordinary marching formation, a column about fifteen miles long, the infantry being in fours, the cavalry in twos, and the guns and caissons being in single file.) When the corps is marching on a single road, its rear is consequently about a day's march from the head of the column. A greater strength of the corps would, therefore, make the column so long that its head could be defeated before its rear could arrive on the field. The strength assumed may, therefore, be regarded as a maximum. Considerations of marching and deployment also render it undesirable to have a corps of a smaller size. The number of parallel roads within supporting distance of each other is limited, and experience has shown that it is rarely practicable to march an army so as to have less than 30,000 men to a road. To reduce the size of the corps would, therefore, necessitate the marching of two or more corps on the same road, which, far from mitigating the evil of having the rear of the col-

*"The Virginia Campaign of 1864-65," p. 4.

umn at a great distance from the head, would only aggravate it, even though the aggregate of the column should not exceed 30,000 men; for the trains of the first corps must either precede the second or be separated from their own corps by it. In the former case, the rear of the second corps would be considerably more than a day's march from the head of the column, and its progress to the front would be retarded by the intervening wagons; in the latter case, the first corps would be separated from its supplies, which often would not reach it for days at a time.

When the force operating in the theater is large, a final organization larger than a corps becomes necessary. This organization, which is known as an "army," should consist of not less than three nor more than six army corps. More than six corps form an unwieldy army, as was shown in 1870 in the case of the French "Army of the Rhine," and to a lesser degree by the German "Second Army," the former consisting of eight, and the latter of seven, army corps. An army of less than three corps is an inconvenient organization, as it is impossible to have a reserve in the hands of the army commander without breaking up the unity of one of the corps. When an army consists of less than the number of men requisite for three corps, it would be better organized with divisions as the highest unit.*

It is prescribed† that, in the armies of the United States, from one-fourth to one-third of the field batteries shall be united into an artillery reserve. In all other armies the artillery reserve has disappeared, and the guns are found in the divisional and corps artillery. An artillery reserve

*The corps composing an army should have distinguishing badges, which should be of a different color for each division. Thus, in the War of Secession, the various corps of the United States army were designated by badges in the form of an arrow, an acorn, a cartridge-box, etc., the design being red for the first division, white for the second, and blue for the third. The badge was worn on the cap by each soldier, whose corps and division were thus made evident at a glance. Similar designs were on the flags used to distinguish the headquarters of the different corps and divisions. When the corps contained four or five divisions, the fourth wore a green badge, and the fifth an orange one.

†"Troops in Campaign," par. 23.

rarely produced a result commensurate with the number of batteries which it contained; it rarely took part in the battle in time to make its weight felt, and it required exceptionally open country for its effective use. As corps artillery the same number of guns are much more effective; they march with their corps, instead of following at the rear of the columns, and are not deadened unconsciously by the name *reserve*. Russia has, indeed, gone to the extreme of placing all the guns in the divisional artillery. In all armies but our own the artillery reserve may be regarded as a thing of the past, and an army may be generally defined simply as an aggregation of army corps and cavalry divisions.

Proportions of the Three Arms.—According to Napoleon, if the infantry of an army were represented by unity, the artillery should be one-eighth and the cavalry one-fourth, or, in a mountainous country, one-fifth. In the German army at the present time the cavalry compared to the infantry is a little more than one-sixth and the artillery somewhat more than one-seventh. In the French army these proportions are a trifle greater.* With an active army in the field, the proportion of cavalry would probably be considerably greater, for large numbers of infantry and artillery are often held in garrison or on the lines of communication, while the cavalry is almost entirely at the front.

The question of the proper proportion of the three arms cannot, however, be definitely determined, for it depends upon many considerations, such as the nature of the theater of operations, the composition of the enemy's forces, the special adaptability of the people of the country to one arm or another, and even upon the casualties of the campaign.

The proportion of artillery is generally from three to four guns for every thousand men of the other arms of the service; but in a mountainous or heavily wooded country

*Germany has 538 battalions, 173 "half-battalions," 465 squadrons, and 494 batteries. France has 584 battalions, 446 squadrons, and 480 batteries.

this proportion would have to be reduced, as it would, indeed, in any country where the roads are few and poor. In Lombardy, in 1859, the French found it impossible, owing to the narrow roads and marshy fields, to get all their guns into action, though they had only three guns to a thousand men. The heavy woods of Virginia offered equal or greater obstacles. General Grant says: "Artillery is very useful when it can be brought into action, but it is a very burdensome luxury where it cannot be used. Before leaving Spottsylvania, therefore, I sent back to the defenses of Washington over one hundred pieces of artillery, with the horses and caissons. This relieved the road over which we were to march of more than 200 six-horse teams, and still left us more artillery than could be advantageously used."*

(In Sherman's march to the sea, and in his subsequent campaign in the Carolinas, his artillery was reduced to one gun to every thousand men of the other arms.) On the other hand, the Germans, in 1870, had nearly four guns to a thousand men of other arms, and used them with great effect. The difference between the "dirt" roads of the Southern States and the broad and hard *chaussées* of France is sufficient to account for this difference in the proportion of artillery.

In the latter part of a campaign, the proportion of artillery is generally greater than at the beginning. The brunt of the fighting falls upon the infantry, however daringly, vigorously, and effectively the artillery may be used. The infantry divisions are rapidly depleted, while the number of guns practically remains the same; for the destruction of *matériel* is comparatively slight. In the Franco-German War, notwithstanding the admirable recruiting methods of the Germans, the army corps of the invading army were at times reduced temporarily to 15,000, or even as low as 7,000, men, while the number of guns remained unchanged. Nor was this increased proportion undesirable;

*"Memoirs," Vol. II., p. 241.

for an infantry weak in numbers or *morale* needs, even more than ever, the support of a large and efficient artillery.

While the proportion of artillery to the infantry cannot be definitely fixed, it may safely be prescribed that the guns with an army should be as many as can be promptly brought upon the field of battle and effectively used there: Malvern Hill and Sedan bear witness that, under favorable circumstances, artillery may, almost alone, crush an opposing army.

(The proportion of cavalry varies exceedingly. In Sheridan's army in the Shenandoah Valley the cavalry comprised somewhat less than one-fifth of the entire force. In Sherman's march to the sea it formed only one-fifteenth of the army.) When the Germans entered France, in 1870, their cavalry constituted between one-ninth and one-eighth of their entire strength, the three German armies (aggregating 447,000 men) containing 336 squadrons. On the subject of the proper proportion of cavalry, Hohenlohe says: "Considering the great importance of the possession of a large mass of cavalry, and the immense advantage which a superior force of cavalry will give us at once over the enemy, in that it will blindfold him and open our eyes, will shut him in closely and give us all freedom, and will tie his hands while it will assist us to strike, we cannot have too many cavalry. The answer to the question is, therefore, simple: We must have as many regiments of cavalry as possible." With us the proportion should be such as to enable our cavalry speedily to overwhelm any to which it may be opposed, whatever the proportion may be to the other arms.* The extended use that may be made of cavalry in raids and in dismounted fighting would render it much easier to have the proportion too small than too large.

*The Mexican army can put in the field 8,000 regular cavalry. This can be increased from the reserve of the permanent army and the general reserve to 26,000. This is the largest force of cavalry that our armies seem at all likely to encounter.

SPECIAL TROOPS.

The troops of the Engineer and Signal Corps, the Medical Department, and the Quartermaster's Corps (if there be one) may be classed as special troops. To this classification belong also troops employed in the construction and management of military railroads; but in the service of the United States the duties performed elsewhere by these troops would probably be performed by the Quartermaster's Department, or by people in the employment of the railroad companies. *

Engineers.—In the United States army the engineers perform the duties of sappers, miners, and pontoniers.* (In the War of Secession, owing to the presence of many skilled mechanics in the ranks of the line, and the lack of a sufficient body of engineer troops, the engineers were obtained mainly by details from the infantry; and it was found best to make the details permanent, as the troops once instructed in engineer duties were hard to replace, and were more valuable as engineers than they would have been as infantry. In the Army of the Cumberland the men were detailed individually from the different regiments, and then grouped into an engineer brigade. In the Army of the Potomac the better plan of detailing organizations was adopted, the Fifteenth and Fiftieth New York Volunteers, which had an unusual number of sailors and mechanics in their ranks, being detailed by General McClellan as engineers, and remaining on that duty during the war. In the campaign in the Carolinas, there were two small regiments of volunteer "engineers and mechanics" attached to Sherman's headquarters. In every case the engineer troops were trained as infantry, and were available as such in case of emergency, but they were not habitually so used.) *

In the campaign in Virginia, in 1864, the Engineer Brigade (Fifteenth and Fiftieth New York Volunteers) was

*This refers, of course, to engineers with an army in the field. The engineers also serve in the sea-coast defense, and have charge of the torpedo system.

attached to General Grant's headquarters, and during the campaign to the James it was, as a body, kept at the Engineer Depot at Washington. Eleven companies of the Fiftieth New York were, however, detached and assigned to the Army of the Potomac, being united with the engineer battalion (regular), under the command of the chief engineer of that army. One company of these volunteer engineers, with a bridge train, was attached to each corps. The remaining companies and the engineer battalion, in charge of the reserve ponton and tool train, were at Meade's headquarters. The corps bridge train was able to span a stream 300 yards wide; the capacity of the reserve train much exceeded this. A bridge across the James River, between Windmill Point and Fort Powhatan, thrown by the troops of the latter, was over 700 yards in length.

In the German army, each division has a bridge train with *matériel* for a bridge thirty-five meters long, and the army corps has a larger train, able to throw a bridge 125 meters in length; the length of the combined bridge trains of the corps being thus 195 meters, or about 213 yards.

Combining the results of German experience with those of our own, it may be said that each army corps should have a battalion of engineer troops and a bridge train capable of spanning a stream 300 yards wide. This is considerably in excess of the proportion of engineers in our armies in the War of Secession; but there is no danger of having too many engineer soldiers attached to a corps, as they are always useful, often indispensable, and in an emergency can serve as infantry. A portion of the engineer and bridge train might be assigned to a division when detached, but such partition of the bridge train should not be habitual. General J. C. Duane, U. S. A., formerly chief engineer of the Army of the Potomac, far from favoring the assignment of bridge trains to divisions, prefers the consolidation of the bridge trains into an army train. "It was always necessary," he says, "to maintain a large re-

serve force of men and *matériel* at the army headquarters; and very frequently all the detachments were called in and concentrated at one or two points. Our experience during the late war would indicate that, as a general rule, the engineer troops and *matériel* should be concentrated at the headquarters of the army, temporary detachments being sent off as circumstances may require."* It may, then, be prescribed that the bridge train of the corps should, as a rule, be kept intact; that provision should be made for uniting the bridge trains of the several corps under the chief engineer of the army whenever such combination may be expedient; and that it may often be advisable to maintain a reserve of engineer soldiers and *matériel* at the headquarters of the army.

The engineer battalion assigned to each corps would probably consist of four companies, of four officers and 150 men each.† The engineer train of each corps would consist of about fifty-three six-mule and five four-mule wagons.‡ In the German, army pioneers accompanying a cavalry division are transported in wagons. It would probably be

*Letter to the author in response to inquiries on this subject.

†The strength of the American engineer battalion in time of war cannot be definitely stated. Revised Statutes, Sections 1154 and 1155, fix the organization of the battalion at five companies, and that of each company at ten sergeants, ten corporals, two musicians, and as many privates of the first class, not exceeding sixty-four, and as many privates of the second class, not exceeding sixty-four, as the President may direct. In the engineer battalion as it now exists (1893) the fifth company is a skeleton, and the other four are not equal in strength. The number of officers attached to a company may be regulated by the chief of engineers. In the war organization suggested above it is assumed that analogy to the infantry, when used on the field of battle, would, in time of war, make four companies the proper number for an engineer battalion. The strength of each company is taken at the present legal maximum.

‡The "reserve" ponton train consists of 42 eight-mule ponton carriages, 2 eight-mule trestle carriages, 16 eight-mule chess carriages, 1 six-mule tool wagon, and 1 six-mule forge wagon. The "advance guard" ponton train, which is the kind generally accompanying a corps, consists of 42 six-mule ponton carriages, 2 six-mule trestle carriages, 6 six-mule chess carriages, 1 six-mule tool wagon, and 1 six-mule forge wagon. There is no definite data on which to base the composition of the rest of the engineer train of the corps. An approximate estimate, based, with some modification, on foreign organization, would suggest 4 four-mule wagons, containing intrenching tools and other implements of engineering work, 1 baggage wagon, and 1 six-mule store wagon.

better in the United States army to have such pioneers mounted, and their necessary tools carried on pack mules.

Signal Corps.—The Signal Corps is charged with the management of the field telegraph, the military balloons, and the service of signaling generally. A company of signal troops, consisting of five officers and 175 enlisted men, and provided with *matériel* sufficient for fifty miles of portable telegraph line, should be attached to each corps. Detachments from this force may, when necessary, be assigned to detached divisions. The field telegraph train of the army corps consists of one battery wagon, four wire wagons, and four lance trucks.

Medical Department.—To each regiment are assigned three medical officers, two non-commissioned officers, and eight privates of the hospital corps; to each squadron of cavalry, one medical officer, one non-commissioned officer, and four privates of the same corps; and to each battery, one medical officer and one hospital private. To each brigade is assigned a chief medical officer with one non-commissioned officer and one private of the hospital corps; and to each division a medical director, with one non-commissioned officer and one private of the same corps. In addition to the above is the sanitary organization proper of the division, consisting of one bearer company, one ambulance company, and one field hospital with accommodations for 500 patients; giving a total strength of forty-four medical officers and 274 enlisted men of the hospital corps to the division. The duties of the bearer company are to establish a dressing station and carry the wounded to it. Here the wounded receive such bandaging and attendance as is necessary before their removal to the field hospital. Minor surgical operations are performed, as well as more important ones that will not admit of delay. The ambulance company conveys the wounded to the field hospitals.

In addition to the above, each corps has a medical director and a reserve of men and *matériel* sufficient to ex-

pand the capacity of the field hospitals to at least 2,000 patients. Three medical officers and ten enlisted men of the hospital corps are attached to the regiment of corps cavalry; and the same number are assigned to the medical service of the special troops as to other bodies of the same size.

General hospitals, to which the sick and wounded are sent for extended treatment, are established farther to the rear, either at the base of operations or at convenient points on the line of communication with the base. They are not, as a rule, under the charge of the general commanding the army in the field; but he should detail suitable officers of the medical or other staff corps to hunt out malingerers and shirks who would otherwise hang around the hospitals indefinitely. At the beginning of the campaign of 1813 in Spain, confidential officers, commissioned by Wellington to detect abuses in the general hospitals, returned so many skulkers to duty that a single division alone recovered 600 bayonets in a month.* Similar methods were successfully employed by General Schofield in the Army of the Ohio in 1864.

Military Police.—In most armies the military police, or *gendarmerie*, constitute a body of special troops; but in the armies of the United States it has been customary to detail organizations for duty as provost guard, preference being given to regiments or battalions which have suffered severely in action, and especially to those which have conducted themselves with great credit. It is believed that in an American army this system would produce better results than one based on the employment of special *gendarmerie*.

The provost guard of an army corps is of varying size, but rarely exceeds a full battalion or a depleted regiment. In an independent division it is rarely more than a full company or a weak battalion. In the Army of the Poto-

*Napier.

mac, under General Meade, the provost guard consisted of two regiments of cavalry and three of infantry; none, however, of full strength. In the Franco-German War the headquarters guard at the King's headquarters consisted of a detachment of military *gendarmerie* and a force of 250 infantry and 180 cavalry.

THE TRAIN.

Arrangements should be made for promptly supplying the infantry with at least 200 rounds of ammunition per man, and the artillery with 273 rounds per gun. One hundred rounds of cartridges are carried by the men on their persons, the small-arm ammunition wagons carry 36 additional rounds per man, and 64 rounds more per man are carried in the ammunition column. With each field battery 231 rounds per gun are carried (42 in each limber, and 126 in each of the nine caissons), the remaining 42 rounds per gun being with the ammunition column. The same number of rounds per gun is provided for the horse batteries, but as the caissons with those batteries have only two chests, only 168 rounds per gun are carried with the batteries, the remaining rounds (105 per gun) being with the ammunition column.* The ammunition column is attached to the corps artillery, and is under charge of an artillery officer. It is divided into four sections, one for each division and one for the corps artillery, each section being commanded by an officer. The *personnel* of the ammunition column should consist of trained artillerists, the column forming a reserve of men and horses for the batteries. Ordinarily the *personnel* of the ammunition column should be equivalent to that of two batteries.

*The Germans provide 295 rounds of cartridges for each infantryman, 150 rounds being carried on the person of the soldier, 45 rounds in the company ammunition cart, and 100 rounds in the ammunition column. They also provide 255 rounds of ammunition for each field gun. The greatest number of rounds fired by a battery in a single battle in the Franco-German War was 245 rounds per gun, fired by a Wurtemberg battery at Villiers-Champigny. At Nicopolis, in 1877, a Russian battery fired 180 rounds per gun.

In addition to the ammunition column is a corps train carrying five day's supplies of rations and forage. It should ordinarily be divided into four parts; namely, three provision columns and one forage column. The provision columns would generally be each divided into two equal parts, one of which might accompany a division, or they might be all kept together in the corps train, as might be most expedient. If forage can be obtained plentifully in the theater of operations, only one day's supply is carried by the train.

In addition to the above is a baggage train carrying the necessary camp equipage of the several headquarters. For the corps headquarters, six six-mule wagons may be allowed; for each division headquarters, three; for each brigade headquarters, two; and for the headquarters of each regiment, one.

Horse Depot.—Accompanying the army corps, and pertaining to the Quartermaster's Department, should be a horse depot, containing a reserve of 100 horses and 100 mules to replace losses in the corps.

The Total Corps Transportation.—The number of wagons accompanying an army corps is necessarily very great. An approximate estimate, based upon the assumption that the load for an army wagon is 2,500 lbs., plus the forage of the team for five days;* the weight of the artillery ammunition, 18 lbs. gross per round; the weight of 1,000 rounds of rifle cartridges (new model), 76 lbs.; the weight of the soldier's ration, 4 lbs. gross; and the forage ration 9 and 12 lbs. for a mule and horse respectively, gives for the total transportation of an army corps at full strength, 50 six-horse, 801 six-mule, 62 four-mule, 4 four-horse, 162 two-horse, and 7 one-horse vehicles, exclusive of the wagons and caissons attached to the batteries.†

The number of wagons accompanying a German army corps, as given by Bronsart von Schellendorf, is 775 two-

*See "Army Transportation," by General S. B. Holabird, U. S. A., Ordnance Notes, No. 189.

†For an enumeration of the corps transportation, see Appendix I.

horse, 261 four-horse, and 469 six-horse wagons. This may be regarded as a minimum estimate. Colonel Exner, on the same subject, says: "While it has been the constant aim of the authorities to reduce the number of wagons to what absolute necessity requires, the train of an army corps at present comprises at least 1,700 wagons and 6,000 horses."

* In the Army of the Potomac the number of wagons, in 1862, was in the proportion of 49 to 1,000 men. (In 1864 it had been reduced to 34, and in the final campaign to 22, to 1,000 men.) * This was at the rate of less than 700 to a full corps of 30,000 combatants, with its complete allowance of special and train troops. It should, however, be observed that the Army of the Potomac was generally operating at only a short distance from its base. Moreover, American armies have usually had fewer impedimenta than those of Europe.

The service of the train should be performed by men regularly enlisted in a quartermaster's corps. If such a corps do not exist, the service must be performed by men detailed from the line or by hired civilians. The former method is open to the serious objection that it would reduce the fighting strength; the latter is objectionable as a matter of discipline. The following description of the condition of affairs in the United States army during the War of Secession deserves attention: "As soon as our regiments arrived at their posts, details began to be made for all the uses of administration—details in the trains, in the hospitals, at headquarters, for engineers, for telegraph corps, for the post-office, for ordnance duty, for permanent hospitals, for store-houses, for bake-houses, as clerks, as mechanics, as sick bearers. Then came that greatest of all enemies of 'fighting strength reports,' a quartermaster's department. . . . The worst of all this was that so-called staff officers, at the heads of these departments, would by some means learn the names of the best men in the regiments, who, by their character, gave tone to all about them, and these men would be

detailed by name, until a regiment would be left at the end of six months with a full complement of officers, a thousand men on its rolls, and about three hundred in its ranks, and these the miserable remainder after subtracting its best components."*

The extent to which this evil of taking men away from the colors was carried has hardly been adequately set forth in the above quotation. In the Army of the Cumberland, out of a total strength of 122,708 men, 8,184 were present on extra or special duty, and 12,962 absent on detached service, making a total of 21,146 men, or more than seventeen per cent of the entire army, detached from the fighting organizations. The extravagance of such details was marked; the number of men in the special services being greater, by at least one-third, than would have been the case had the same service been performed by organizations of specially trained troops. If the Army of the Cumberland had had in its ranks at Chickamauga all the men needlessly detached from the colors, the result of that great battle might have been different.

THE STAFF.

The commanding general is charged with the maintenance of the efficiency of his army and the proper conduct of military operations; and his responsibility extends to multifarious details, a personal supervision of which is beyond the physical and mental power of any one individual. The army must be clothed, fed, paid, provided with medical attention and supplied with ammunition; discipline must be maintained and enforced by legal methods; the condition of the army must be constantly known by its chief; information of the enemy must be gained; the orders of the commander must be accurately drawn up and promptly communicated; and, on the field of battle, the commander must have means of obtaining prompt reports from every portion

*General Hazen in "The School and the Army in France and Germany."

of his command, and needs someone to represent him in emergencies where the issuing or interpretation of an order may not admit of a reference of the matter to the personal attention of the chief.

gwh These details are attended to by the staff; and on the quality of the staff depends in the highest degree the efficiency of the army. "The staff is to the army what steam is to a locomotive. The machine itself may be of the highest order, the engineer who directs it may be a man of first-class talent, but without the motive power of steam it is merely a huge collection of well-polished material."* In the German army an alternation of staff and line duty is so arranged that a staff officer can never lose touch with the line. Indeed, an intimate connection of the staff and line is essential to the efficiency of the former, and it may in general be said that nothing is more injurious to the efficiency of an army than the complete segregation of the staff and line.

The composition and duties of the several staff corps of the United States army are set forth in the Army Register and the Army Regulations. It remains to consider only the organization and duties of the staff of an American army in the field.

The most important member of the staff (as the name implies) is the chief of staff. It is his function to relieve the commander of all annoyance in regard to details, and thus leave the mind of the latter free to grapple with the strategical and tactical problems which continually confront him. The chief of staff gives expression in written orders to the will of the commander, and to him is addressed all correspondence from all other members of the staff and subordinate commanders with the commanding general. He is responsible for all details involved in the general instructions of the commander relative to the marching, camping, and security of the army; he performs such func-

*Wolseley.

tions pertaining to the commander as may be delegated to him; he sees that the orders given are properly executed; and he must be prepared to render to the chief, at any moment, an accurate account of the numbers, position, and condition of any part of the general command. It is not the duty of the chief of staff to prepare a plan of campaign or battle for his chief; his opinions, like those of any other subordinate, should be given only when called for. Instances have, it is true, been often mentioned where the chief of staff was commander in all but name, but such cases have been extremely rare and not always well authenticated.*

The Military Staff.—The chief of staff should have under his command such officers of the Adjutant General's and Inspector General's Departments as may be necessary members of the commander's staff. These, with the aides-de-camp of the commanding general, the provost marshal general, the chief signal officer, and the chief of artillery, the chief (or inspector) of cavalry, and the chief engineer, constitute the military staff in contradistinction to the administrative staff.

In time of war the essential requisites for an aide-de-camp are intelligence, presence of mind, and mental readiness, combined with energy, courage, discretion, tact, and good health. (The aide should have a military education, should be a good horseman, and should always be able to give a clear statement of the military situation in any part of the field or theater which he may have visited.)

The provost marshal general is charged with the preservation of a proper police throughout the army, with the

*Schwartzberg's chief of staff, Radetzky, was given the credit for planning the battle of Leipsic, but afterwards the credit for Radetzky's own great victory at Novara was given to *his* chief of staff, Hess. Blucher was unable to comprehend the simplest strategical combination, and was totally dependent upon Gneisenau for his plans; and it is well known that Von Moltke was the real commander of the army of which King William was the nominal chief; but, in most cases, the chief of staff has been a valuable manager of details, and nothing more. Frederick the Great was his own chief of staff, and the same was true of General Sherman at a later date; but neither of these commanders ever had an army of the magnitude of those that now take the field.

protection of the inhabitants from pillage and violence, with the arrest of stragglers and deserters, with the control of camp-followers, and with the custody of prisoners of war and deserters from the enemy. He is chief of the secret service and commander of the provost guard, though the immediate command of this body is generally delegated to another officer, who also takes charge of the headquarters camp. The field post-office is under the charge of the provost marshal general, who makes the necessary regulations for its service in all things not prescribed by the Postmaster General. The service of the field post-office, if not performed by civilian employés of the Post-Office Department, should be placed in the hands of general service clerks.*

The chief signal officer has charge of the military telegraph, signal stations, and balloons, and is in general command of all signal troops of the army.

The chief of artillery has general charge of the artillery *matériel* of the army, is the inspector of the artillery, and is the principal assistant of the commanding general in everything pertaining to that arm. He does not exercise actual command, except when assigned to it by the commanding general, as in the case of the combined action of the artillery of two or more corps. Formerly the chief of artillery commanded the artillery reserve.

The chief of cavalry should be in active command of all the cavalry belonging to the army; and should habitually remain in person with the force under his command. The distant and semi-independent operations of the cavalry

*"In the Army of the Potomac each regiment had a post-boy, who carried the letters of his command to brigade headquarters. There the mails of the different regiments were placed in one pouch and sent up to division headquarters, and thence to corps headquarters, where mail agents received them and delivered them, at the principal depot of the army, to the agent from general headquarters. The cases for the letters were made of rough boards, which on a march were packed away in the bottom of an army wagon, one wagon being sufficient to carry the whole establishment, including the tent and its furniture." — *Battles and Leaders of the Civil War*, Vol. IV., p. 90.

render it imperative that he should not be tied down to the staff of the general commanding the army, but that he should exercise the functions of an independent commander under the orders of the general commanding or with his acquiescence in the absence of orders.*

The duties of the chief engineer are analogous to those of the chief of artillery. He takes general charge of all engineering operations on a large scale, such as throwing a bridge over a large river, where the bridge trains of two or more corps have to be combined.

The Administrative Staff.—The chief ordnance officer, chief quartermaster, chief commissary of subsistence, chief paymaster, medical director, judge advocate, and commissary of musters, with such assistants of their respective corps as they may need, constitute the administrative staff. ★

The judge advocate at the headquarters of the army supervises the proceedings of courts martial, military commissions, courts of inquiry, etc.

The commissary of musters is charged with making all musters into and out of the military service, and exercises general supervision over all muster and pay rolls.

The chief ordnance officer is charged with the supply of ammunition, arms, artillery carriages, and equipments for the troops of the three arms.

The chief quartermaster is responsible for providing the army with forage, transportation, clothing, camp and garrison equipage, and for the management of the trains.

The chief commissary of subsistence is charged with providing food for the army, and the chief paymaster is responsible for the payment of the troops.

The medical director has charge of the hospital and

*Chiefs of cavalry who have been kept at headquarters, as Pleasonton was under Meade, and whose functions have practically been limited to those of a staff officer, have, in our service, generally been failures; while those have been successful who have actively commanded the larger cavalry units and delegated the staff duties to an inspector of cavalry. The position of the Confederate chief of cavalry, Stuart, in the Army of Northern Virginia, is a model which can be safely followed.

ambulance service, and everything pertaining to the care of the sick and wounded. The troops of the hospital corps are under his command. Any civilian society for the aid of the sick and wounded (such as the Sanitary Commission during the War of Secession) should be required to have a representative at the headquarters of the commanding general, as a *sine qua non* to its official recognition, or even toleration. Such representative should be held responsible for the equitable distribution of all supplies contributed to the sick and wounded by the society, and to this end should be required to confer with the medical director.

It is the rule in most armies for the chiefs of the staff departments of an army in the field to communicate with the heads of their respective departments at the War Office through the chief of staff of the army with which they are serving. It is deemed necessary that every staff officer should feel that the commander of the army with which he is serving is first, and above all, his chief. The avoidance of friction, and perhaps the safety of the army itself, requires that there should be nothing with the army that is not under the control of its commander. Among the many evils of organization in the French army in 1870-71—evils sufficient to neutralize bravery and make victory impossible—the independence of the several military departments was one of the most prominent. Vinoy says: "The segregation of the various military departments, despite the zeal of each, produced everywhere difficulties and delays which were irritating and much to be regretted. The artillery and engineers during the siege [of Paris] were entirely distinct from, and independent of, the commanding officers of corps and divisions, and the confusion consequent on these arrangements caused disastrous consequences. Batteries were often built, armed, and even opened fire, without the commandant of the troops in the immediate vicinity being informed; the batteries being thus unsupported and in danger of capture."

In the supply departments this condition of affairs led to still greater evils; and in the military *renaissance* of France, following her crushing disasters, a change in the methods of administration was effected. All commanders of army corps in time of peace, and all commanders of armies in time of war, have absolute control over the supplies necessary for their troops. The officer of a supply department on the staff of such a commander merely has to submit his observations to the general and ask his orders in writing. These orders received, the responsibility of the staff officer ceases, no matter how extraordinary the act of the general may be; the latter alone is responsible to the Minister of War. It is the duty of the staff officers of the supply departments to keep their chiefs at the War Office promptly and fully informed of the needs of the army, and to see that there is no unnecessary delay in obtaining and issuing the needed supplies. It is the great object and duty of the entire staff to secure the harmonious action of all parts of the army towards a common end.

The staff of a commander should never be any larger than necessity absolutely demands. The most successful generals have, as a rule, had small, but carefully selected and efficient, staffs. Bronsart von Schellendorf (probably the first authority in existence on the subject of staff duty) says: "There cannot be the slightest doubt that the addition of every individual not absolutely required on a staff is in itself an evil. In the first place, it unnecessarily weakens the strength of a regiment from which an officer is taken; and again, it increases the difficulty of providing the staff with quarters, which tells on the troops which may be quartered in the same place; and these are quite ready enough, as it is, to occasionally look with a certain amount of dislike—though in most cases it is entirely uncalled for—on the *personnel* of the higher staffs. Finally, it should be remembered—and this is the most weighty argument against the proceeding—that *idleness is at the root of all*

mischief. An unnecessarily numerous staff of officers can not always find duty and occupation sufficient for its mental and physical welfare; and its superfluous energies soon make themselves felt in every conceivable kind of objectionable way. Experience, at any rate, shows that whenever a staff is unnecessarily numerous, the ambitious before long take to intrigue, the litigious soon produce general friction, and the vain are never satisfied. These feelings, so common to human nature, even if all present, are considerably counteracted if the persons to whom they apply have plenty of hard work. Besides, the numbers of the staff being few, there is all the greater choice in the selection of the men who are to fill posts on it."*

Grants staff { General Grant's staff, in the Virginia campaign, consisted of one chief of staff, two military secretaries, seven aides-de-camp, two assistant adjutants general, one assistant inspector general, one chief quartermaster, with one assistant quartermaster, one chief commissary of subsistence, with one assistant commissary of subsistence, one chief engineer, one provost marshal general, and one assistant provost marshal general. In rank, the staff consisted of five brigadier generals, one colonel, nine lieutenant-colonels, four captains, and one lieutenant; total, twenty officers. This was a thoroughly good working staff. It does not seem to have contained a superfluous member, nor to have lacked a necessary one.

The staff of an army corps should consist of one assistant adjutant general, one chief quartermaster, one chief commissary of subsistence, one commissary of musters, one assistant inspector general, one chief engineer, one medical director, one chief paymaster, one chief signal officer, one ordnance officer, one judge advocate, and the authorized aides-de-camp of the corps commander.† The senior officer

*"The Duties of the General Staff" (translated by Hare), Vol. II., p. 35.

† The titles used here to designate the officers of the various administrative departments are those officially recognized in our service. It has been

of artillery of the corps, in addition to his other duties, acts as chief of artillery. The staff of the corps does not always contain a paymaster, signal officer, or ordnance officer. The chief of artillery of the corps may also perform the duties of chief ordnance officer, and the senior officer of the signal troops may also act as chief signal officer of the corps. The commander of an army corps in the field should have administrative powers equal to those of the commander of a military department in time of peace.

The staff of a division should consist of an assistant adjutant general, an assistant inspector general, a chief quartermaster, a chief commissary of subsistence, a medical director, an acting judge advocate, an assistant commissary of musters, a provost marshal, and the authorized personal aides. On every staff the medical director may be assisted by one or more officers of his corps. The duties of ordnance, engineer, and signal officers on the staff of a division commander may often be performed by the aides.

The brigade staff needs only an acting assistant adjutant general, a quartermaster, a commissary of subsistence, a surgeon, and the aides of the brigadier-general.

In addition to the officers, the staff comprises clerks and messengers, who should *never* be taken from the line, if it can possibly be avoided, but should be taken from a non-combatant general service corps. It cannot be too often said, nor too strongly emphasized, that the fighting force should be left intact, and that all encroachments upon it by details should be jealously guarded against. Nothing but death, disease, or capture by the enemy should ever reduce the number of effectives with the colors.

Twelve clerks and five messengers may be allowed to

suggested that the titles "brigade surgeon," "brigade quartermaster," "division medical director," etc., would be better, as designating at once the status and functions of the officers bearing them. The title of "chief" might better be limited to the superior officers of the administrative departments on the staff of the commanding general.

each division.* In addition to these, each paymaster, quartermaster, and commissary of subsistence should have one non-combatant clerk. The clerks of the quartermaster and the commissary of subsistence should preferably be a quartermaster sergeant and commissary sergeant respectively.

Eighteen clerks and eight messengers would probably suffice for the headquarters of an army corps. In time of war, two clerks and two messengers should suffice for each brigade.†

The following tables give the strength and composition of the larger units of an army of the United States at war strength:

THE DIVISION.

	Officers.	Medical Officers.	Non-Commissioned Officers and Privates.			Aggregate.	Guns.	Other Carriages.	Horses.	Mules.	Total Animals.
			Combatants.	Non-Combatants.	Total.						
C. O. and Staff.	11	1	22	22	34	3	28	18	46		
Three Infantry Brigades	405	30	11,142	222	11,364	69	258	378	636		
Four Batteries.	22	4	703	4	707	733	24	44	635	635	
Bearer Co.	3	3	60	60	63	4	12	12	24		
Ambulance Co.	3	3	72	72	75	53	118	18	136		
Field Hospital.	3	3	40	40	43	7	12	30	42		
Grand Total.	438	44	11,845	420	12,265	12,747	24	180	1,063	456	1,519

*Sheridan's division, consisting of twenty-eight regiments, had, on December 31, 1863, twelve clerks, enlisted men detailed from the line. At present the number of clerks at the headquarters of the several departments varies from ten to fourteen, and the number of messengers from four to six.

†No positive data is available on which to base the estimate of the number of general service clerks needed for the different headquarters. The above is believed to be not far from the required number, though it probably is not strictly accurate.

THE ARMY CORPS.

	Officers.	Medical Officers.	Non-Commissioned Officers and Privates.			Aggregate.	Guns.	Other Carriages.	Horses.	Mules.	Total Animals.
			Combatants.	Non-Combatants.	Total.						
C. O. and Staff..	15	1	.....	31	31	47	....	6	37	36	73
Three Divisions	1,314	132	35,535	1,260	36,795	38,241	72	540	3,189	1,368	4,557
Corps Artillery..	48	8	1,409	8	1,417	1,473	48	88	1,386	.....	1,386
Cavalry.....	43	3	1,239	28	1,267	1,313	....	7	1,359	40	1,399
Engineers.....	19	1	601	7	608	628	....	58	12	338	350
Signal Corps....	5	1	.....	175	175	181	....	9	38	.....	38
Hospital Res'v'e	.....	3	.....	40	40	43	....	7	12	30	42
Ammunition Col	10	2	.....	350	350	362	....	121	332	420	752
Supply Train....	24	2	.....	774	774	800	....	469	153	2,814	2,967
Horse Depot	3	.....	.....	100	100	103	....	1	106	100	206
Grand Total.....	1,481	153	38,784	2,773	41,557	43,191	120	1,306	6,624	5,146	11,770

When a division is detached as a distinct unit, its composition will often vary from the above. Generally, it will be reinforced with several batteries of artillery, and always, except in a very mountainous country, at least a squadron of cavalry will be assigned to it. If, however, the division be detached to occupy a region already conquered, the amount of cavalry could generally be reduced, and it might even be possible to dispense altogether with the cavalry usually assigned to it.

The difference between the "fighting strength" and the "ration strength" of the corps should be noted; the former is (exclusive of officers) 38,784, and the latter is 43,191.

RANK AND COMMAND.

The rank of the commanders of the different organizations should be as follows: The company should be commanded by a captain; the battalion, by a major; the regiment, by a colonel; the brigade, by a brigadier-general; the division, by a major-general; and the army corps, by a lieutenant-general. An army should be commanded by a general, and an aggregation of armies, by a general in chief, generalissimo, or captain-general.

* In the United States army rank has never been commensurate with command. In the War of Secession major-generals commanded divisions, army corps, and armies; and (General Grant, while commanding forces aggregating more than a million men actually under arms, and operating over a theater extending from the Potomac to the Rio Grande, had only the rank proper for the commander of an army corps.) This incongruity was without a single advantageous feature, and was open to several cogent objections. Justice to the military leaders should have given them rank corresponding to their responsibilities, and the interests of discipline would have been subserved by not requiring generals to serve under the orders of commanders holding the same grade as themselves. In Napoleon's armies the generals cheerfully served under marshals, and the marshals loyally obeyed the orders of the Emperor; but the conduct of marshals serving under marshals was often insubordinate, and not infrequently led to disaster.

RECRUITMENT.

The diminution of the effective strength of an army commences with the very beginning of a campaign, and generally reaches its maximum at the time of greatest fighting, which is generally also the period of the greatest fatigue and hardship, and the worst sanitary conditions. In addition to the losses by battle, death and disability from disease and exhaustion reduce the list of effectives,* and straggling and desertion assist, to a greater or less degree, in depleting the strength of the army. Some means must, then, be adopted to make good the losses of war, or the army will, sooner or later, be brought to a standstill from sheer exhaustion.

*"The Guard Corps left the Rhine on the 3d of August with a strength of about 30,000 bayonets. It lost nearly 8,000 at St. Privat, and 350 in the battle of Sedan, while on the morning of that action it numbered only 13,000 men; on the day of the investment of Paris it had only 9,000 bayonets. Thus over 12,000 infantry were deficient, owing to losses from fatigue."—*Hohenlohe*.

There are two general methods of recruiting an army :
 1st. By replacing the losses in each regiment with recruits from its own regimental depot; 2d. By adding new regiments to the army. The first system is undoubtedly the best, and is the one adopted in all the great armies of Europe. Recruits joining an old organization speedily learn their duties, and take the tone of their more experienced comrades, from whom they acquire, almost unconsciously, a great deal of practical military information that is neither taught on the drill-ground nor learned from books; they are at once under the command of experienced officers, and they are inspired by the *esprit de corps* of a regiment that has a history and has gained confidence from experience.

The second system was generally employed in the armies of the United States during the War of Secession, and it has met with universal condemnation. Veteran regiments were allowed to dwindle away, while new ones were raised in which all, from the colonel down, had to learn their duties together. (As a result, the old organizations were often ineffective for want of numerical strength, and the new ones were inefficient for want of military training.) Altogether, the system was so costly, so pernicious, and so demoralizing, that it may be regarded as a thing of the past, and the depot system may be assumed as the one that will be adopted in our future wars.

In addition to the organization already given, each regiment of infantry should have a depot battalion, to which all recruits should be assigned for clothing, equipment, instruction, and drill. The depot battalion should have its full quota of officers, who might, from time to time, be replaced by invalided officers from the front. The depot battalion should be kept at full strength, troops drawn from it being replaced by fresh recruits. Whenever the casualties of the regiment amount to ten per cent., requisition should immediately be made on the depot battalion for enough men to replace the losses, and the reinforcing detachment should

be sent from the depot to the front under charge of officers and non-commissioned officers, who might either be required to join the regiment or return to the depot, according to the necessities of the case.

Each regiment of calvary should have a corresponding depot consisting of two troops; and each artillery regiment, one consisting of two batteries.

DISCIPLINE.

In addition to proper organization, good discipline is an indispensable condition to the efficiency of an army. Discipline is that quality possessed by efficient soldiers which causes each to appreciate and accept without question the powers and limitations of his rank; which inspires each with confidence in the military steadfastness of his comrades, and makes obedience to his lawful superiors a second nature. The object of discipline is in every case the same—to cause the army, under all circumstances, to respond promptly, and with united effort, to the will of the commander—but the means to be adopted vary with the nature of the troops. With intelligent and zealous volunteers, discipline becomes mainly a matter of instruction and guidance; with unwilling conscripts and venal “substitutes,” a dread of the consequences of disobedience must be made to exceed a fear of the enemy, and discipline must be strict and severe.

It is not necessary here to consider the details of promoting and enforcing discipline; such details can be found in the Army Regulations, the Articles of War, and treatises on military law. Some general remarks on the subject may not, however, be out of place.

Both rewards and punishments are used as means of promoting discipline; the former being, as a rule, more efficacious than the latter, as they appeal more strongly to the pride, self-respect, and better nature of the soldiers, though the latter are necessary for many men whose coarser nature renders them insensible to the influences of praise or reward.

In administering punishment it should be borne in mind that circumstances in the field are not the same as in garrison. Many minor offenses, for which adequate punishment is provided in the latter case, must be overlooked in the former; but, on the other hand, grave military offenses, such as cowardice, insubordination, and willful neglect of duty, must be punished in the field with promptness and unrelenting severity. In every case the spirit, rather than the letter, of the law should be observed; and the punishment should be suitable to the offense, and calculated to serve as a deterrent example to others. Punishment ordered by a subordinate should never be remitted by a commander; but if it be unjust, the subordinate should be privately ordered to remit it himself. Discipline requires that nothing should be done by any officer to weaken the authority of any other, whether he be a senior or a junior.

A commander should never give an order when there is reason to believe that its execution will be impossible; for the soldiers, becoming accustomed to disobeying orders through necessity, will fall into the habit of disregarding those that can be obeyed, and discipline will be ruined. An order, once given, should not be revoked, or in any manner changed, unless it be evident that its execution in its original form would lead to disastrous results, for soldiers will soon lose confidence in a leader who seems to indicate by frequent changes in his orders that he does not know his own mind. When the end in view justifies it, any sacrifice, however great, may be demanded of soldiers, but useless sacrifices of life, or even of comfort, should be carefully avoided. Soldiers should not, however, be in any way pampered, but the full measure of their proper duty should be exacted, for idleness and indulgence are scarcely inferior to hardship and suffering as an inspiration to discontent. In the matter of prompt obedience to orders and regulations every officer should be an example to his men, and should remember constantly that obedience is the very corner-stone of the military edifice.

Drill is an important means of promoting discipline, but it is merely one of the means, not the end. Many militia organizations noted for expertness in certain drills are not in a high state of discipline, and faultless evolutions are often seen executed on the stage by totally undisciplined people. Drill is an indispensable means of imparting military instruction and promoting military efficiency, but well-drilled troops (though usually) are not necessarily well-disciplined soldiers.

There are certain outward signs which are generally evidences of discipline, chief of which are a careful attention to the requirements of military etiquette and ceremonious marks of deference to one's lawful military superiors. But while these visible indications of the existence of discipline are highly desirable and should be sedulously cultivated, they must not be confounded with the desired quality itself. *The best evidences of true discipline are found in the uncomplaining endurance of hardships by the soldiers, and in their willing, energetic, and intelligent efforts to perform their whole duty in the presence of the enemy.* (A minimum of stragglers on the march and of skulkers in battle is the best proof of good discipline.) General De Chanal says of the Union army in the War of Secession: "At the core, and in all that is essential, its discipline is as good as, if not better than, that of the European armies; but it has not the external marks, and an observer who merely passes through the American army may thus be deceived."* Only he who can perceive the difference between outward signs and inward essence, and who appreciates the fact that discipline is not secured among all troops by the application of the same inflexible rules, can command the best efforts of an army.

"There is a soul to an army," says General Sherman, "as well as to the individual man, and no general can accomplish the full work of his army unless he commands the soul of his men as well as their body and legs." To appeal

* *L'Armée Americaine*, page 243.

to and control this soul of the army, the commander must thoroughly understand his men, and know the motives which brought them into the ranks and the impulses which rouse their ambition.

When Cæsar, finding his troops dismayed by the report that the German barbarians whom they were to encounter were a race of giants, declared that those who wished to remain behind might do so, but that he and the Tenth Legion would march against the enemy, he made a direct appeal to the pride of the designated legion, and inspired the emulation of the others in such a manner as to rouse the very soul of his army.

The greatest leaders have always felt the pulse of their armies, as it were, and have keenly touched the national characteristics of their troops. Different nations need different inspiration. The stirring addresses and orders of Napoleon were admirably calculated to rouse the enthusiasm of French troops, but such appeals would doubtless be coldly received by British soldiers, who could be more strongly influenced by an appeal to their self-respect or their sense of duty than by any sentimental ideas of glory. An imitation of Napoleonic addresses by an American commander would be quite as likely to excite ridicule as enthusiasm; but a suitable appeal to the American soldier has rarely failed to receive a satisfactory response on the battlefield.

The order issued by General Sherman to his army on the eve of its departure from Atlanta, on the famous March to the Sea, shows a thorough appreciation of the nature of American troops. It reads as follows: "The general commanding deems it proper at this time to inform the officers and men of the Fourteenth, Fifteenth, Seventeenth, and Twentieth Corps that he has organized them into an army for a special purpose known to the War Department and to General Grant. It is sufficient for you to know that it involves a departure from our present base, and a long and

difficult march to a new one. All the chances of war have been considered and provided for, as far as human sagacity can. All he asks of you is to maintain that discipline, patience, and courage which have characterized you in the past; and he hopes, through you, to strike a blow at our enemy that will have a material effect in producing what we all so much desire, his complete overthrow. He hopes to lead you to achievements equal in importance to those of the past." There is here no appeal to a love of glory, a sense of duty, a greed of spoil, or a spirit of revenge. The address is a plain appeal to the common sense, pride, and patriotism of the American soldier, and how well it was answered history attests.

(General Pope's address to his soldiers on taking command of the Army of Virginia was, perhaps, one of the most unfortunate ever made to an army.) Though issued "with the purpose to create in it a feeling of confidence and a cheerful spirit, which was sadly wanting," it offended the men to whom it was addressed by instituting an unfavorable comparison of themselves with the Western armies. It seemed to contain reflections upon a chief who was beloved by the troops addressed, and the general effect was such that even a sullen silence on the part of the commander would have been infinitely better than his unhappy attempt to rouse the enthusiasm of his army.

Hatred of, and resentment towards, the enemy are potent stimulants to the ardor of soldiers, and these sentiments can be appealed to in all armies. Many diverse sentiments may influence the same army. In his description of the storming of Badajos, Napier gives a striking picture of the many influences which intensify the ardor of soldiers: "The French, confiding in Phillipon's direful skill, watched from their lofty station the approach of enemies whom they had twice before baffled, and now hoped to drive a third time blasted and ruined from the walls. The British, standing in deep columns, were as eager to meet that fiery destruc-

tion as the others were to pour it down, and both were alike terrible for their strength, their discipline, and the passions awakened in their resolute hearts. Former failures there were to avenge, and on both sides leaders who furnished no excuse for weakness in the hour of trial. The possession of Badajos had become a point of personal honor with the soldiers of each nation, but the desire of glory with the British was dashed by a hatred of the citizens on an old grudge; and recent toil and hardship, with much spilling of blood, had made many incredibly savage, for these things render the noble-minded indeed averse to cruelty, but harden the vulgar spirit; numbers also, like Cæsar's centurion, who could not forget the plunder of Avaricum, were heated with the recollection of Ciudad Rodrigo, and thirsted for spoil. Thus every spirit found a cause of excitement, the wondrous power of discipline bound the whole together as with a band of iron, and in the pride of arms none doubted their might to bear down every obstacle that man could oppose to their fury."

The personal influence of the commander should be felt. He should be known by his troops and regarded as the impersonation, or at least the chief representative, of the cause for which the army is fighting. He should cultivate the *morale* of his troops as carefully as he provides for their food, clothing, and ammunition. In the Crimean War the British commanders (Lord Raglan and General Simpson) were, in this respect, all that a commander should *not* be. "During the siege of Sebastopol," says Wolseley, "I verily believe that a large proportion of our men did not know the name of the general officer commanding. They seldom saw him; he did not live amongst them. If he had feelings in common with them, they did not know it. No touching appeals were made to their feelings of honor and patriotism. All our attention was bestowed on their stomach, and the result was we never got much out of our men,

and that in August, 1855, our army was in a discreditable condition of demoralization."*

The best of discipline may be shattered by making demands upon the troops beyond their capacity of endurance. Want, distress, and, above all, useless hardships and unnecessary and costly attacks, are destructive of discipline. General Grant truly remarks, that "no man is so brave that he may not meet such defeats and disasters as to discourage him and dampen his ardor for any cause, no matter how just he deems it.† Wellington's troops, flushed with the great victory of Salamanca, were so disheartened by a series of unsuccessful assaults, and by suffering from inclement weather in the trenches of Burgos, that the siege works were neglected, insubordination gained ground, and discipline was almost ruined. Unsuccessful operations in other parts of the theatre compelled the abandonment of the siege; and Wellington, in an outburst of angry denunciation, declared that discipline had deteriorated during the campaign in a greater degree than he had ever witnessed or read of in any army. Yet his army at Salamanca was an unusually well-disciplined and a superlatively brave one.

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forber* { The Army of the Potomac was doubtless one of the bravest and best disciplined in existence; yet the effect produced upon it by the useless slaughter at Cold Harbor was disheartening in the extreme. An ill-considered attack "all along the line" was repulsed with the loss of some 12,000 men, in about ten minutes, during which time the loss of the enemy was trifling. An order to renew the assault was sent to the corps commanders, and by them transmitted in the usual manner to their subordinates. But the limit of endurance had been reached, and the soldiers, who had fought valiantly on many a bloody field, recognized the hopelessness of further effort, and, remaining silent and immovable, they ignored the order. That the spirit of the

*"Soldiers' Pocket-Book," p. 5.

†"Memoirs," Vol. II., p. 419.

Army of the Potomac was not crushed by such occurrences is proof that its discipline was of the highest kind.

For the enforcement of discipline, in so far as the prevention and punishment of military crimes is concerned, rules can be, and are, prescribed; but for that higher discipline which calls forth the supreme efforts of self-denial and daring—which, in fact, controls the soul of an army—there is no law of universal application; justice, kindness, firmness, earnestness, a solicitous regard for the physical welfare of the troops, an appreciation of what men can do and what is beyond their power, a deep knowledge of human nature, an understanding of the national characteristics, a visible willingness to share all the dangers and hardships to which the men are exposed, an appreciation of the special conditions under which the army is acting, and a thorough sympathy with the motives which inspire the best efforts of the soldiers are requisite on the part of the commander. A knowledge of human nature is half of the science of war.

CHAPTER III.

CHARACTERISTICS OF THE THREE ARMS.

"A general looks on the different arms as instruments for attaining his object, precisely as a carpenter regards his tools; but no good carpenter would use his chisel as a saw, or his mallet as a hammer."—*Home*.

INFANTRY.

Powers and Limitations of Infantry.—Both numerically and in the effects of its action, the infantry is the most important part of an army. It can operate on all kinds of ground; it is equally adapted to offensive or defensive ac-

tion, and it can act either at a halt or in motion. It is more easily equipped, more cheaply maintained, more quickly made efficient, and is more nearly independent than any other arm. The efficiency of an army is mainly measured by the efficiency of its infantry, and the Austro-Prussian War of 1866 showed that the deficiency of infantry cannot be counterbalanced by the skill and daring of the cavalry or the devoted heroism of the artillery.

Infantry is, however, limited to the pace of the individual man, and its effective action is confined to the range of the rifle. An army composed exclusively of infantry could not keep informed of the movements of an adversary possessing cavalry, and infantry unaided by artillery might be crushed by the enemy's guns before it could become effectively engaged.

Arms and Action.—The arms of the infantry are the rifle and bayonet, and its action consists of fire, shock, and a combination of the two. (Of these the fire action is the most important, though a position is rarely carried, and an assault is rarely repulsed, except when fire action is supplemented by real or threatened shock.) Actual shock is very rare, the defenders usually giving way or the assailants retiring before bayonets can be crossed. The moral effect of the threatened collision is, however, decisive in such a case, the defeated side retreating to avoid a shock which seems inevitable, and which it feels unable to withstand.

In rare cases, fire action alone may decide a battle, as at New Orleans, in 1815, where the British, unable to carry Jackson's works, had no alternative but to reëmbark and abandon the invasion. But such exceptions only mark the rule. At Waterloo, notwithstanding their heavy losses from the British fire, the French were broken only by the shock of the counter-charge; and Fredericksburg was not decisive, because the terrible effects of the Confederate fire were not supplemented by a counter-attack.

The fire of the breech-loading rifle is sensibly felt at a

distance of more than 2,500 yards, and becomes serious at nearly 1,700 yards,* but it is only at 1,000 yards that the fire becomes really effective. At 500 yards it may be called "decisive," while at 300 yards and under it is practically annihilating.

The bayonet is valuable as a weapon of last resort. Its possession implies a means of conducting a hand-to-hand conflict, and its value depends mainly upon moral effect. Its actual use is rare. Jomini says that in his long experience in the Napoleonic wars he saw actual bayonet conflicts only at the heads of columns which encountered each other unexpectedly in villages or defiles; and Boguslawski declares that in the Franco-German War bayonets were never crossed in the open field, and but seldom in village and wood fights. (On the other hand, General Hancock states that in the desperate fighting at the "Bloody Angle," at Spottsylvania, most of the dead were victims of the bayonet.†) The abolition of the bayonet has been advocated by some military authorities, but, in view of its possible use in actual combat; of its undoubted moral effect in causing the troops to feel that the enemy has no superiority over them by being armed with the bayonet, and that they will not be totally helpless if their ammunition be expended, its retention would seem to be advisable. Against this can be urged nothing but the slight additional weight that the bayonet gives to the soldier's burden. The bayonet retained, the men should be carefully trained in its use.

Intrrenching Tool.—The intrrenching tool now forms an indispensable part of the equipment of the infantry soldier. Napoleon says that a soldier should never be separated from his musket, his cartridges, his knapsack, his rations for

*At Gorni-Dubnik the Russian Guards began to suffer loss at 3,000 paces, and at 2,000 paces their men fell rapidly.

† "The interior of the intrrenchments presented a terrible and ghastly spectacle of dead, most of whom were killed by our men with the bayonet when they penetrated the works. So thickly lay the dead at this point that at many places the bodies were touching and piled upon each other."—*Official Report of Major-General W. S. Hancock, U. S. A.*

at least four days, and his intrenching tool.* This estimate of the value of the intrenching tool by the greatest of soldiers, notwithstanding the small part played by intrenchments in the wars of the Republic and Empire, is significant. (In the War of Secession the art of constructing hasty intrenchments was brought to great perfection, and the extensive use of such intrenchments has been noted by every historian of that conflict.) General Howard says: "No regiment was long in front of Johnston's army without having virtually as good a breast-work as an engineer could plan. There was a ditch before the embankment and a strong log revetment behind it, and a heavy 'top log' to shelter the heads of the men. I have known a regiment to shelter itself completely against musketry and artillery, with axes and shovels, in less than a hour after it reached its position."† This lesson was tardily learned in Europe when, thirteen years later, it was taught by the Turks, and the intrenching tool is now carried by the infantry of all civilized armies.

Pace of Infantry.—At drill the pace of infantry is at the rate of 100 yards a minute. In advancing to attack this pace would probably be maintained before opening fire. Advancing while firing, but without seeking cover, the pace would be reduced to 40 yards, and advancing by rushes, to 20 yards a minute.

The maximum pace to be relied upon in marching is about 3 miles an hour, or 88 yards a minute. At double time the pace is increased to 5 miles an hour, or 147 yards a minute; but this pace should not be kept up more than two or three minutes at a time, and should never be resorted to except in emergencies, as the men would not only be fatigued, but, if brought immediately into action, would be blown, and unable to use their rifles with good effect.

The marching pace of infantry, in good condition and on good roads, may, then, be taken at 3 miles an hour.

* "Maximes de Guerre."

† "Battles and Leaders of the Civil War," Vol. IV., p. 307.

Heat and bad roads reduce the rate of marching to a great but uncertain degree. In great heat and dust the rate would probably be reduced to little more than 2 miles an hour. Strong head winds and driving rain-storms from the front make similar reductions in the pace. Sandy, muddy, and slippery roads also reduce the pace; but severe cold (except where the roads are icy or cut up) generally accelerates it. The average rate of march of infantry, including halts, is from $2\frac{1}{2}$ to $2\frac{3}{4}$ miles an hour, but while actually marching the pace may generally be assumed at 3 miles an hour.*

Essential Qualities of Infantry.—A consideration of the tactics of infantry will be reserved for another chapter. It is sufficient here to observe that the value of the infantry depends upon the effectiveness of its fire action and upon its ability to avoid destructive losses from the fire of the enemy. The infantry soldier must, therefore, be carefully trained in fire discipline and in tactical maneuvers; must be armed with a magazine rifle; must carry at least one hundred rounds of cartridges on his person; must be equipped with a serviceable intrenching tool, and must be provided with a bayonet as a weapon of last resort.

CAVALRY.

The action of cavalry consists of shock action, dismounted fire action, mounted fire action, and detached action.

Shock Action.—If not armed with fire-arms and trained in their use, cavalry is limited to shock action, in which case it is of value only offensively and in motion. When shock action is employed, the effect depends upon the combination of mass and velocity, and the horse must be regarded as the trooper's principal weapon, the force of concussion being supplemented by the use of the revolver, saber, or lance.

* For the space and time required in the formations and marches of infantry, see Appendix II.

Dismounted Fire Action.—In order that it may not be helpless on the tactical defensive, that its use may not be limited to the few and fleeting opportunities of making an effective charge, and that it may be capable of independent operations, cavalry must be armed with a good magazine carbine, and well trained in its use. The opportunities for dismounted fire action are many. An important point may be quickly seized by cavalry and held until the infantry can come up; a sorely beset body of infantry can be reinforced quickly by the cavalry, which can then add at least three-fourths of its carbines to the infantry firing line; bodies of partisan troops and infantry behind barricades can be dislodged, and, in general, dismounted fire action gives to cavalry an independence and a power which add immeasurably to its value.

Mounted Fire Action with the Carbine.—Mounted fire action is not frequently used, but it is nevertheless of sufficient value to be seriously considered, and there is nothing to justify the assertion of some European writers that the trooper's carbine should never be fired from the saddle except as a signal.

The carbine may, in fact, be used from the saddle, not only in signaling, but by skirmishers in pushing back a retiring line of the enemy, or in covering a retreat when the pursuit is so active and so strong as to make it unsafe to dismount and inexpedient to charge. Mounted fire action was thus used with success by the cavalry division near Kearneysville, in August, 1864, in falling back before the Confederate cavalry supported by four divisions of Confederate infantry.

Instances of effective mounted fire action are, however, extremely rare. In the battle of the Thames, in 1813, a charge of the Kentucky mounted troops, using the rifle, was quickly repulsed by the enemy, and dismounted fire action was then successfully resorted to by the repulsed riflemen. It is said that, in 1849, the Cossacks, in charg-

ing, fired a volley from their carbines just before the moment of shock, and then, quickly throwing the carbine over the shoulder, drew saber. They were thus victorious over the famous Hungarian cavalry. Mounted fire action was also used with effect on several occasions by the Cossacks against Tcherkesses in 1877; but these instances are either not well authenticated, or occurred under exceptional circumstances, for the best Russian authorities, while advocating the use of the carbine dismounted, discourage mounted fire action. Under certain conditions, mounted fire action with the carbine may have a positive value, and it should not, therefore, be ignored in cavalry instruction; but it may be safely prescribed that it should never be used in line of battle, and never, under any circumstances, when either shock action or dismounted fire action is practicable.

Detached Action.—It implies no disparagement of the value of cavalry on the battle-field to say that the most important service of mounted troops is in that class of duties known as “detached action”; for on this action the safety of the army and the soundness of the plans of the commanding general mainly depend. Detached action embraces all scouting, reconnoitering, and raiding duty, whether by a great force of cavalry acting as a screen in front of the army, by a raiding column, a mere patrol, or even a single scout. The subject of raids will be discussed in a subsequent chapter. The other features of detached action are elsewhere considered.*

Classes of Cavalry.—Cavalry is divided into heavy, medium, and light cavalry, and is also classified according to its arms, equipments, and training, as cuirassiers, lancers, hussars, and dragoons. Heavy cavalry consists of large men mounted on heavy horses; and light cavalry, of small and active men mounted on horses selected for their fleetness, agility, and endurance. The former are mainly for shock action, and the latter are designed principally for detached

*In “The Service of Security and Information,” Chapters IV. and V.

action. Among European troops, the English Household Cavalry may be regarded as typical heavy cavalry, and the Cossacks as representative light cavalry. Medium cavalry is, as the name implies, a mean in weight and employment between the other two; of this class of cavalry the Prussian Uhlans may be regarded as the best type. Of a total of ninety-three regiments of cavalry in the German army, twelve are heavy, twenty-seven medium, and fifty-four light.

(Heavy cavalry was until recently provided with the cuirass and steel helmet;) but the ease with which the cuirass can be penetrated by the bullets of modern small-arms has caused it to be discarded as a part of the field equipment, and it is now worn only at ceremonies. The distinctive mark of cuirassiers has, therefore, ceased to exist in war. The distinctive feature of the lancers is their weapon. The hussars are light cavalry. Dragoons are troops armed and trained with a view to fighting effectively either mounted or on foot.

The classifications of cavalry, as given above, were once plainly marked, but they are now rapidly merging into each other. The distinction of heavy, medium, and light is still observed, and the distinctive appellations of cuirassiers, dragoons, etc., are still maintained; but all troopers are now armed with the carbine, and trained to a more or less efficient dismounted fire action, thus acquiring the essential characteristics of dragoons. In addition to this, all cavalry in the German army, and a great portion of the cavalry in other European armies, are armed with the lance, thus sharing with the lancers the arm which formerly distinguished the latter. All are armed with the saber.

* The dragoon is essentially the cavalryman of the present day, and the American cavalryman of 1864-5 is the type to which all European mounted troops are more or less reluctantly, or perhaps more or less unconsciously, approaching. A cavalry is now demanded which can seize the transient opportunities of charging with the saber, can fight

sturdily on foot, and can operate independently. All this the American cavalry could do, and did do, in the War of Secession. (Probably no troops in the world have been so persistently—it might seem willfully—misunderstood by foreign critics as our cavalry of 1861-65.) This is largely due, no doubt, to the fact that European critics have quite generally failed to note the difference between the mounted partisans of Morgan or Mosby and the cavalry of Sheridan or Stuart. The cavalry was trained to the use of the saber, and used it whenever opportunity offered. When such opportunity did not offer, it fought efficiently on foot instead of calling upon the infantry for assistance. These troops were true dragoons, and were not “mounted infantry” or “so-called cavalry,” as European critics are fond of calling them, unless mounted infantry or “so-called cavalry” be armed with the saber and taught to use it in preference to any other weapon.

Arms.—The arms of the trooper are the saber, the magazine carbine, and the revolver. To these the Europeans generally add the lance, but usually discard the revolver, except for officers. Of the merits or demerits of the lance it is hard to speak with any degree of confidence. It has never found favor with American soldiers; but its general adoption in the armies of Europe would seem to be based on some good military reasons, for the great expense of money and time entailed by the introduction of this weapon and training the troopers in its use would hardly be incurred unless the necessity of adopting it seemed imperative. The advocates of the lance claim that its moral influence increases the bravery of the troops armed with it, and decreases that of their opponents if not similarly armed; that in the shock of cavalry against cavalry the longer weapon will have the advantage; and that infantry lying down to receive a cavalry charge could be reached with the lance, while they could scarcely be harmed with the saber. It is granted by those who favor the lance that after the first

moment of the shock that weapon is comparatively worthless, and that the saber must be used in the resulting *mêlée*. It is accordingly recommended that the lance be given to the first rank and the saber to the second. The opponents of the lance claim that it is impossible, in an ordinary term of service, to make the trooper expert with both lance and carbine, and that the latter is the more important arm; that the lance is inferior to the saber in the *mêlée*; that it is a serious incumbrance in a wooded country; and that it is a tell-tale nuisance on scouting duty, often disclosing the presence of the cavalry, and being of no compensating advantage. The lance is about nine feet long, and the staff is either of bamboo or steel. Whether it is a desirable weapon for cavalry in the existing conditions of warfare, probably cannot be decided except by the actual test of war.

The relative merits of the saber and the revolver have been discussed with much ability by American officers, without, however, determining military opinion on the matter even in our own cavalry force. It is claimed for the revolver that its reach exceeds that of the saber; that it can injure the enemy materially just before the shock, in this respect being even better than the lance; that the shock—the horse being the weapon—is the same whether the revolver or the saber be used; and that the use of the revolver in the *mêlée* would be very effective. On the other hand, it is claimed that an expert swordsman can be made in less time than a really expert "shot" with the revolver; that only men very skillful in the use of the revolver could avoid injuring each other as much as the enemy in the *mêlée*; that the officers cannot lead the charge, but must be in, or behind, the line; that the line invariably "checks up" as the fire is delivered, thus lessening the force of the shock; that the saber is "always loaded," while the revolver, once emptied, leaves the trooper temporarily defenseless; and, finally, that there have been several instances of the successful use of the saber against the revolver, not the reverse.

The question of the revolver, like that of the lance, must be left to the decision of actual use in war. So long as shock action constitutes the first great use of cavalry on the battle-field, the saber must be the weapon *par excellence* for mounted troops; and if the cavalry would not be reduced to a condition of dependence upon the infantry, and relegated to the *rôle* of a purely auxiliary arm, it must be armed also with the carbine. In the United States army it has been deemed best to supplement these arms with the revolver; in Europe it is thought advisable to reinforce them with the lance. In any case, the saber and the carbine are the indispensable arms of the cavalry.

Pace of Cavalry.—At a walk, cavalry covers 4 miles an hour, or 117 yards a minute.

The maneuvering trot is at the rate of 8 miles an hour, or 235 yards a minute. At "slow trot," the rate is from 6 to 6½ miles an hour, or about 180 yards a minute.

At an alternate trot and walk, the pace of cavalry is 5 miles an hour, or 147 yards a minute.

The maneuvering gallop is at the rate of 12 miles an hour, or 352 yards a minute.

Alternately galloping and trotting, the pace is 10 miles an hour, or 293 yards a minute.

The full, or extended, gallop is at the rate of 16 miles an hour, or 470 yards a minute.*

Powers and Limitations of Cavalry.—Cavalry constitutes a force which can be rapidly transferred to any point where it may be needed; which can take advantage of fleeting opportunities that would vanish before infantry could strike; which can be used in reconnaissance to a degree that would be impossible for foot troops; which can often hold in check a hostile force by its mere presence and manifest readiness for delivering a quick blow; and without which a vigorous pursuit of a defeated enemy would be almost impossible. Its disadvantages are that it is an expensive arm to equip

*For the space and time required in the formations and marches of cavalry, see Appendix II.

and maintain, costing, as it does, three times as much as the same number of infantry; that it requires long training to become efficient; and that its use on the field of battle is more rare than that of the other two arms.

Mounted Infantry.—Influenced by conservatism and corps prejudice, the European cavalry has submitted reluctantly to the adoption of the carbine as an essential part of its armament; but, appreciating the necessity of fire action to enable mounted troops to act independently and with vigor, some writers (mostly English) have advocated the employment of mounted infantry, attached to the cavalry after the manner of horse artillery. One of the ablest English advocates of mounted infantry* says: "The rôle of mounted infantry may be summarized as, mainly, offensive. When an enemy has occupied villages, buildings, coppices, defiles, or bridges, which cannot be turned, when nothing can be effected by the mounted action of cavalry, mounted infantry may be usefully employed. With horses or ponies, linked or held in some secure or sheltered spot, the infantry soldier, with his magazine rifle and careful training in musketry, is able to deal with an enemy's infantry in a manner which the cavalry, armed with the carbine, and equipped for mounted service only, could not hope to attempt. Again, upon the field of battle, mounted infantry thrown forward with the dash and spirit of initiative in action characteristic of British troops, should be able to seize and hold important points of vantage, and by their fighting power should be able to deny them to the enemy's infantry." There is nothing in this summary of mounted infantry duties that has not been successfully accomplished by American cavalry, and that, too, without sacrificing any of its distinctive cavalry characteristics. American cavalrymen are not prepared to subscribe to Hohenlohe's dictum, that cavalry cannot conduct an efficient dismounted offensive, except against infantry which is numerically weak or

*Major E. T. H. Hutton, D. A. A. G., King's Royal Rifles.

morally worthless—such as armed crowds, *franc-tireurs*, etc. In the United States army there would seem to be ordinarily no place for mounted infantry; for it could do nothing that our cavalry cannot, while the latter can do much that would be impossible with mounted infantry. In case of a numerical deficiency of cavalry, mounted infantry might be improvised by mounting certain infantry organizations. In 1877 General Miles mounted a battalion, consisting of four companies of the 5th U. S. Infantry, on ponies captured from the Sioux; and the mounted infantry thus created did excellent service in several Indian campaigns. This was a happy adaptation of the means at hand to the conditions of the campaign, as the Indians themselves were practically mounted infantry, and the only qualities to be sought in opposing them were mobility and fire action. Such improvisation of mounted infantry will often be profitable in operations against a savage foe or partisan troops, but will rarely be advantageous in a campaign against regularly organized and trained forces.

ARTILLERY.

Classification.—Artillery is divided primarily into *heavy artillery* and *light artillery*.

Heavy artillery embraces all the batteries used as siege or position batteries. Siege guns are generally limited to siege operations, and do not, therefore, pertain to the subject of tactics. Position batteries are not capable of rapid movement, and are generally used in the defense of important points on the battle-field or in intrenchments. They are generally composed of siege guns, or other heavy ordnance which happens to be available—such, for instance, as Tyler's and Kusserow's batteries at Malvern Hill--and are not definitely provided for in any system of organization.

Light artillery comprises *horse*, *field*, and *mountain batteries*.

(Horse artillery is specially designed for service with cavalry, and mobility is its essential characteristic.) In this

class of artillery each cannoneer is mounted on horseback, and the mobility is further increased by having only two chests on the caisson. Horse batteries in the United States service are armed with the 3.2 inch gun.

Field artillery is divided into *heavy field batteries* and *light field batteries*; the former, in our service, being armed with the 3.6 inch, and the latter with the 3.2 inch gun. In field artillery the cannoneers march beside the guns or are mounted on the ammunition chests, axle seats, or off horses.

Mountain batteries are designed especially for use in mountainous regions, or in countries where the roads are bad and traction difficult. The gun, which is generally jointed, varies in caliber from 2.3 to 3.15 inch, and carries a shell weighing from seven to twelve pounds. The gun and carriage are generally carried on pack-mules, the former being carried on two mules, and the latter on three. The gun and carriage are so constructed that they can be quickly unpacked and assembled.

Arms.—The gun is the special arm of the artillery; but the cannoneers are provided with arms for the performance of guard duty, and for their individual defense in hand-to-hand conflict. The sergeants are all armed with the saber and revolver; all the other men are provided with the revolver and knife. Although supplied with individual weapons, the cannoneers must be impressed with the fact that the gun is their proper weapon and main defense, to be used until the very last moment. Hohenlohe, indeed, would provide them with no other arm were battle alone considered; but he regards the individual weapon as necessary for the protection of the soldier against hostile inhabitants of the country in which the battery may be serving.*

Pace of Artillery.—The pace of field and horse artillery is the same as that of cavalry. For field batteries the trot

*"Letters on Artillery," Walford's translation, pp. 233-4.

is the pace of maneuver, the gallop being used only in case of great emergency. In horse artillery the gallop may be used whenever the circumstances are such that it would be required of cavalry.

On the march the walk is the habitual pace of field batteries, but in rapid marches the slow trot alternates with the walk. In urgent cases the batteries may be required to trot four or five miles without breaking the gait.*

Powers and Limitations of Artillery.—Artillery is a powerful arm, and every advance in the science of warfare adds to its potency. It is the only arm that can destroy material obstacles at a distance; and if not opposed by hostile guns, it could greatly injure, and perhaps destroy, the other arms of the enemy before they could deliver effective blows in return. It is, moreover, independent, to a great degree, of the personal factor which enters so largely into the action of the other arms. The piece properly laid, its accuracy is not affected by the nervousness which might destroy the aim of the infantry soldier; there is no human muscle to be bruised and disabled by recoil; and the greater distance at which it habitually engages the enemy renders it free from much of the excitement which generally prevents the perfectly cool handling of the other arms at the time of their most decisive action.

On the other hand, artillery is incapable of independent action;† it is limited to fire action; it is effective only when at a halt in battery; it is expensive and difficult to train; it is bulky and occupies great space on the march; it can be injured disastrously in *matériel* as well as *personnel*; and its effective action is largely dependent on the state of the ground and weather.

*For the space and time required in the formations and marches of artillery, see Appendix II.

† "We find mentioned in many writings an outspoken desire to argue, and to prove practically, that artillery is an independent arm. For my part, I can find nothing intelligible in these words. I should like very much to know how an army corps would act independently if it were composed of artillery alone."—Hohenlohe, "*Letters on Artillery*," p. 156.

Range.—If provided with telescopic sights, and having an unobstructed field of fire, field artillery could produce good results at a range of more than three miles; but, owing to the obstructed view and broken *terrain* of most battle-fields, and the limits of human vision, the extreme effective range of field guns may generally be taken at 3,000 yards. From this distance to the enemy's position, the field, in reference to the fire of artillery, may be divided into three zones, as follows:

First zone (long range): From 3,000 yards to 2,000 yards. Within this zone artillery can act with effect, and has but little to fear from opposing infantry.

Second zone (medium range): From 2,000 to 800 yards. As the artillery enters this zone, its fire rapidly increases in effect, but it is exposed seriously to infantry fire.

Third zone (short range): Within 800 yards. Except when well covered, artillery should not be used in this zone, unless the effect to be produced by it justifies the risk of its annihilation by infantry fire.

Kinds of Fire.—Artillery fire is of the following kinds:

Direct fire, which is from guns with service charges, at all angles not exceeding fifteen degrees of elevation.

Indirect or curved fire, which is from guns with reduced charges, and from howitzers and mortars, at all angles of elevation not exceeding fifteen degrees. This fire is used to reach an enemy behind a parapet or concealed behind some obstacle.

High angle fire, which is from guns, howitzers, and mortars at all angles of elevation exceeding fifteen degrees.

Frontal fire, in which the line of fire is perpendicular to the enemy's front.

Oblique fire, in which the line of fire is oblique to the enemy's front.

Enfilade fire, which is from the guns placed on the prolongation of the enemy's line. In this case, the line of fire is coincident with the enemy's front, which it sweeps.

When fire is used to sweep along the front of a defensive line, and thus enfilade the assailants as they approach the position, it is known as *flanking fire*.

Reverse fire, which is directed upon the rear instead of the front of the enemy. Enfilade and reverse fire are very demoralizing to an enemy, owing to the impossibility of his replying without first effecting a change of front.

Cross fire, in which the projectiles from guns in different positions cross each other's path on, or in front of, the enemy's line. This fire is only less demoralizing than enfilade or reverse fire, and the power of the artillery for its employment increases with the range of the guns.

Projectiles.—Artillery projectiles are classed as shell, shrapnel, and canister.*

Shell.—Shell may be classified as *common shell* and *torpedo shell*. The common shell is "a hollow cast-iron or steel cylinder with an ogival head, closed at the end and filled with powder." The torpedo shell is filled with gun-cotton, or other high explosive. Either shell may be characterized as a flying mine, the chief object of which is to destroy material objects at a distance.

Case Shrapnel.—Shrapnel differs from common shell in being filled with bullets, and having only a sufficient bursting charge to rupture the envelope and release the bullets, which then move with the velocity which the projectile had at the moment of bursting. The bullets are assembled in circular layers and held in position by "separators," which are short cast-iron cylinders with hemispherical cavities into which the bullets fit. The bottom separator fits by means of lugs into recesses at the base of the shrapnel and prevents independent rotation of the charge of bullets. The top separator is smooth on its upper side and is kept firmly in place by the head of the projectile, which screws against it. The separators prevent movement or deformation of the bullets under shock of discharge; and, being

*Termed *case shot* by the English.

weakened by radial cuts, increase the effect by furnishing additional fragments of effective weight. The shrapnel for the 3.2 inch guns contains 162 bullets one-half inch in diameter and weighing forty-one to the pound. The total number of bullets and individual pieces in the shrapnel is 201.* Small bullets pack closely, but lose their velocity quickly, and have less disabling power than larger ones.

Canister.—Canister consists of a tin cylinder filled with bullets, held in place by filling the interstices with sawdust, clay, or sand. The cylinder is ruptured and the bullets scattered by the discharge of the piece.

Fuses.—Shell and shrapnel are exploded by means of fuses, of which there are three classes, as follows:

1. Time fuses, ignited by the flame or shock of the discharge, and so arranged that the ignition will be communicated to the bursting charge in a certain number of seconds, determined beforehand.

2. Percussion fuses, by means of which the bursting charge is ignited by the shock of impact.

3. Combination fuses, possessing the properties of the other two. This class of fuses is now being quite generally adopted, to the exclusion of the others.†

Use of Different Projectiles.—Common shell is used to destroy parapets, buildings, palisades, abatis, etc., or to set fire to houses and villages. It is also used against troops in mass or when enfilade fire is practicable. Indeed, this projectile was habitually, and almost exclusively, used by the Germans in 1870-71 with the best results. Common shell is effective at 4,000 yards, and has been known to give good results at a range of 5,500 yards. Common shell is also used in trial shots to find the range, even when it is

*See description of the Frankford Arsenal shrapnel in Report of Chief of Ordnance for 1892, pp. 945 *et seq.* Two other kinds of shrapnel have been experimented with in the United States service; namely, the Hotchkiss (Report of Chief of Ordnance, 1891, p. 559) and the American Projectile Co.'s electrical welded steel shrapnel (Report of Chief of Ordnance, 1892, p. 948).

†For a description of the "Frankford Arsenal fuse" (the American combination fuse), see Report of the Chief of Ordnance, U. S. A., for 1891, p. 213 *et seq.*

intended to use shrapnel, for the puff of smoke from a bursting shell can generally be clearly distinguished, while that from shrapnel cannot be plainly seen. In order to facilitate the use of common shell as range-finders, they have the same weight as shrapnel, and consequently the same ranges for equal elevations.

Torpedo or mine shells are used against troops under cover. The French shell, which is of steel filled with cresylite, is designed to deprive troops of their cover by demolishing it. The German shell has a charge of wet gun-cotton in the front of the shell, and is designed, by means of the location and power of the bursting charge, to reach troops behind cover, when burst directly overhead, just beyond them. Neither the French nor the Germans contemplate the use of these shells against troops in the open, as the tremendous action of the high explosives produces small fragments, which soon lose their velocity. High explosive shells are, in fact, still largely experimental. They are open to the objections of being dangerous to carry in the ammunition chests, somewhat uncertain in their effects, and giving no smoke on explosion.

Shrapnel is used against troops, in all formations, in the open or behind slight cover. It is preëminently the projectile to use against flesh and blood, just as the shell is the one *par excellence* to use against material obstacles. Shrapnel is effective at 3,000 yards and has produced good results at 3,800 yards. Its effect from 2,000 to 1,500 yards is decisive, while at 1,100 yards and under it is absolutely annihilating, if the field of fire be open and the guns be skillfully served. To disable a man, a shrapnel bullet must have a striking velocity of 500 feet per second. The velocity of the bullets exceeds this at the longest ranges at which the *terrain* or the limits of human eyesight permit field guns to be used. Shrapnel can, therefore, be used at all ranges.

Shrapnel should be burst in the air with a time fuse, as the velocity of the bullets is then increased by gravity

* and retarded only by the resistance of the air. If burst on graze, the bullets ascend, and are retarded by the two forces. The explosion should take place in front of the line of hostile troops, as, the motion of the projectile being imparted to the falling bullets, they would otherwise pass beyond their object; and, moreover, at a high angle of fall the bullets strike so that ricochet is impossible.

* Shrapnel, known then as spherical case shot, was used very effectively in the War of Secession, notably at Malvern Hill and Gettysburg. The projectile of those days was used with the twelve-pounder Napoleon gun, and was immeasurably inferior to that now in use. Shrapnel has since been used with great effect in the Russo-Turkish War and in the British campaigns in Egypt. At Aladja Dagh the Turks lost about 4,500 men, the greater part of whom are said to have been killed or placed *hors de combat* by Russian shrapnel. It is becoming more and more prominent as the great artillery projectile. Under favorable circumstances, it is from ten to twenty times as destructive as shell against troops;* but its effective use requires that the range be known accurately and that the gun be laid with care and the fuse adjusted with the greatest precision.† These considerations caused the Germans to hesitate to replace shell entirely by shrapnel as a "man-killing projectile," though they have now practically done so, the use of the former being restricted to range-finding and to the demolition of earthworks and other material obstacles.‡ In the United States artillery the proportion of common shell and shrapnel is one-fourth of the former and three-

*Major T. Fraser, R. E.

†"The operation of 'laying' the gun consists of two distinct parts: 1. Bringing the axis of the piece into the *direction* of the object aimed at. 2. Elevating the muzzle of the gun in proportion to the range, so that the projectile may reach as far as the mark."—Pratt's "*Field Artillery*."

‡In the German shrapnel the interstices between the bullets are filled with a smoke-producing composition, which fulfills the double purpose of holding the bullets in place and rendering the bursting of the projectile plainly visible.

fourths of the latter, which does not differ materially from the proportion found in all the European armies.

Canister is essentially a projectile for close quarters, its effective range being generally not more than 400 yards, though the Austrians and Italians claim to be able to use it with good results at a range of 700 yards. Canister was frequently used with great effect in the War of Secession, but more recent wars have not been so fruitful in instances of its use. Hohenlohe says that in the Franco-German war the batteries of the Prussian Guard expended about 25,000 shells and one case [canister] shot, and that this one round was broken in transport. Still, at Wörth and Sedan the French cavalry was driven back in confusion with canister, and in 1877 the Russians found opportunities for the expenditure of 1,100 rounds of the same projectile. In the United States service from two to four rounds of canister per piece are still issued, but canister is practically an obsolete projectile; for the powerful shrapnel now in use could, with its fuse set at zero, do everything at short ranges than could be expected of canister.

Field Mortars.—The low trajectory of modern field guns unfits them, to a certain extent, for shrapnel-firing when the hostile troops are under cover. Field mortars have accordingly been designed for shrapnel-firing, and experiments with them in various countries have, in the main, been very satisfactory. The United States 3.6 inch field mortar, using shrapnel weighing twenty pounds, weighs only 500 pounds, and can be carried in a single one-mule cart; its mobility being, in fact, almost equal to that of infantry. Field mortars have the advantage of reaching objects covered from the direct and curved fire of field guns. Their disadvantages are that the fire is slower and the time of flight greater; that the fire is hard to direct against anything but a fixed object; that the battery is almost helpless against surprise; and that the projectile, owing to the great angle of fall, covers less dangerous ground in its explosion

than those from field guns. The use of the field mortar is yet purely theoretical, and the organization of the mortar batteries is yet undecided. They will probably be entirely separate from the other field batteries, and will vary in number from one to four batteries to each army corps.

Rapid-firing Guns.—Rapid-firing guns embrace all single-barreled guns using fixed ammunition,* and having a breech mechanism working by levers so arranged as to enable several shots a minute to be fired. Among the best known and most efficient rapid-firing guns are the Hotchkiss, Driggs-Schröder, Nordenfelt, Krupp, Canet, and Armstrong, firing from five to ten shots a minute. The lighter calibers, from 1.45 to 3.54 inches, which might be used for field artillery, fire projectiles ranging from one to twenty-two pounds in weight. The smaller calibers use shell only; the larger, both shell and shrapnel.

Powerful as these guns are, their use as field artillery is doubtful. The rate of fire in action is governed mainly by the time consumed in bringing the gun into position and laying it. The operation of loading can be performed very rapidly with all breech-loading field pieces, and the rapid-firing gun offers no advantage that could compensate for the extra weight of its fixed ammunition in metallic cases.

Machine Guns.—"A machine gun may be defined as consisting of any number of breech-loading rifled barrels grouped about an axis, or arranged in a horizontal line, which are loaded and fired in continuous succession, or by volley, by the action of suitable machinery at the breech, the power applied by crank and gearing, or by levers, and using fixed ammunition, the empty cartridge shells being automatically ejected."†

The best known machine guns are the Gatling, which

*Ammunition in which the projectile, charge, and primer are combined so that only one operation is necessary in loading.

† Meigs and Ingersoll's "Ordnance and Gunnery."

has ten barrels grouped about an axis, and can be fired at the rate of 1,000 to 1,500 shots a minute; and the Gardner, which has two barrels, and fires 400 shots a minute. Other efficient machine guns are the Maxim, Nordenfelt, Hotchkiss Revolver, Lowell Battery Gun, etc. Machine guns generally use small-arm ammunition.

Machine batteries are known as horse, field, mountain, etc., according to equipment; and Gatling, Gardner, etc., according to the gun.

The functions of machine guns on the field of battle are not yet fully determined. It is generally agreed that they should not be combined with field guns, but used in separate batteries; that they should not be pitted against artillery, which, by its superior range and weight of metal, could annihilate them,† and that they should be a part of the general artillery command.

Owing to the great mobility and the substitute for infantry fire which they offer, machine guns will be of value with cavalry, especially on raids and other detached action. On the defensive, they will always be valuable in holding advanced posts, in flanking the front of a defensive position, etc. On the offensive, their use is more doubtful; they may be of considerable value with an advance guard; but in the general course of the attack the part played by them will probably be small. They can not accompany the infantry in the decisive stages of the fight, and at longer ranges they could not well oppose the artillery that would be brought to bear upon them. Mounted so as to deliver high-angle fire, they may be of considerable use against troops behind cover; but even in this case better results could be obtained with field mortars. The machine gun is undoubtedly a powerful weapon in the defense of positions, but its offensive value is probably very small.

Cover for Guns.—The destructive effect of both infantry

†This mistake was made by the French in opposing the mitrailleuse to the German artillery.

and artillery fire often renders cover for field guns a matter of necessity. This cover may be either natural or artificial. Natural cover consists of any feature of the ground which will intercept or turn aside the enemy's projectiles, or which, by partly or entirely concealing the pieces, will cause the enemy to make an erroneous estimate of the range. Artificial cover consists of ordinary intrenchments, gun pits, or portable shields.

There are several kinds of gun pits, known respectively as the German, French, Austrian, English, and Russian gun pits.* In each case the pit consists essentially of a rectangular excavation, from eighteen inches to two feet in depth, with a ramp leading to it from the rear, an epaulement with wings at the sides being formed of the excavated earth, and further strengthened, if needs be, by earth from a ditch dug in front. The width of the pit is such as to give the piece a field of fire of ninety degrees.

"The main objections to gun pits are the conspicuous targets they present; the restrictions they place on the free movement and full employment of the guns; their limited application to the offensive, and, finally, the difficulty of draining them."†

Portable shields for field guns have been suggested, but no satisfactory design seems yet to have been reached. Any shield attached to the gun has the fatal defect of seriously diminishing its mobility, and it seems scarcely an improvement to devise a system of plates to be carried in a wagon, or wagons, attached to the battery, and built up around the gun as circumstances may require. On the defensive, artificial cover can be easily provided for field guns; on the offensive, the skillful use of natural cover and the effective handling of the piece must constitute the elements of safety for the artilleryman.

* For a detailed description of these gun pits, see "U. S. Artillery Drill Regulations," page 436 *et seq.*

† "U. S. Artillery Drill Regulations," page 445.

CHAPTER IV.

HISTORICAL SKETCH OF MODERN INFANTRY.

"Victorious nations, from the beginning of the world, have owed their success to good infantry."—*Duparcq.*

Strategy is unchangeable in its essential features, and the wars of antiquity still furnish valuable lessons in this branch of military art. Tactics, on the other hand, is dependent upon the nature of the weapons used; with each change in arms the method of handling troops in battle changes, and a knowledge of tactics must be sought in the lessons of the most recent wars, and in the study of existing conditions. The tactical lessons of the wars of ancient times are, therefore, of very little value; though a consideration of tactics from the time of the introduction of gunpowder is instructive as showing a constant tendency toward the extended order of fighting which characterizes the infantry tactics of the present day. ★

The Middle Ages.—In the darkness of the Middle Ages military science, like all other branches of human knowledge, had sunk to the lowest degree. Cavalry existed in the form of knights encased in armor, and, though numerically weak, it constituted by far the greatest part of the strength of the armies which then took the field. Artillery (if it can be said to have existed at all) was composed merely of artisans handling the rude enginery then used in siege warfare; and the infantry was a mere rabble, armed with pikes, bows, halberds, or clubs, and clad in the ordinary garments of laborers.

The victory of the Swiss mountaineers over the flower of the Austrian chivalry at Morgarten raised the infantry into respectability; and the deeds of the English archers at

Crécy, Poitiers, and Agincourt, and the triumph of the Swiss infantry over Charles the Bold at Granson and Morat, restored it to the dignity it had enjoyed in the armies of Greece and Rome. - But the introduction of the musket really marks the birth of modern infantry, and its growth in importance has since been in direct proportion to the improvements in the weapon which the invention of gun-powder first placed in its hands.

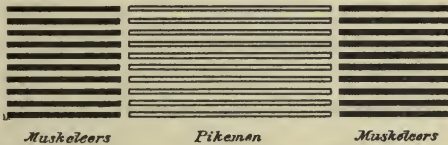
Infantry, when armed with the pike, was formed in solid squares or heavy columns, in which formation the weakness of the individual soldier was remedied, and a degree of resistance that would otherwise have been impossible was offered to the knights. In the front and on the flanks of these great columns were placed several ranks of heavily-armored soldiers, and as the pike carried by these men was more than fifteen feet in length, the weapons of six ranks could project beyond the face of the square. Even when the infantry was armed with the bow, this formation was often used, as it was practicable for many ranks to use their weapons by discharging their arrows over the heads of those in front.

The Introduction of the Musket.—The introduction of the musket necessitated a radical change in tactics. Not more than two ranks (or at most three) could use the musket, and a retention of the old columns would have caused the loss of much of the fighting power, besides presenting too great and dense a target to the newly-invented cannon. Still, the musketry fire being slow, and the range and penetration slight, it was felt that musketry alone could not give sufficient power of resistance; and pikemen were retained to sustain the musketeers in receiving a charge, or to supplement the fire action with the necessary shock of collision. At first these pikemen greatly exceeded the musketeers in number; but Maurice of Nassau (1584-1609) reduced them to a numerical equality, his battalion consisting of 250 musketeers and 250 pikemen—the former on the

flanks and the latter in the center. Maurice's troops were formed in ten ranks, the pikemen being in close order, and the musketeers having an interval varying from three to six paces between files. Each musketeer, after firing, hastened back, through the interval, to the rear rank to load, his place being taken by the second-rank man, and so on, a continuous fire being thus maintained. (See Fig. 1.)

Figure 1

Battalion in the Army of Maurice of Nassau



The Thirty Years' War.—Gustavus Adolphus of Sweden (1611–1632) shaped all the details of the organization and tactics of his army to the great aim of increasing its mobility and the effectiveness of its fire action. The pike was lightened by reducing its length to ten feet. The cartridge was introduced, and the musket was not only made less cumbersome, so that it could be fired without a rest, but in place of the old slow-match it was furnished with a wheel-lock, in which flint striking against a revolving wheel was used to ignite the charge. The infantry was divided into regiments of 1,008 men; each regiment being divided into eight companies, each composed of 72 musketeers and 54 pikemen. The company was divided into three troops; the center troop, consisting of pikemen, being under command of the captain, and the right and left troops, each composed of musketeers, being commanded by the lieutenant and first sergeant respectively. The number of ranks was reduced to six, which in battle deployed into three, the front rank kneeling so that all could fire. The infantry was usually formed in two lines. The imperialists, using a single line of heavy columns, from ten to forty-five ranks

deep, found themselves outflanked by the smaller army of Gustavus and unable to cope with its superior fire. They were also under the disadvantage of having clumsy muskets which required ninety-four distinct motions in loading.

The Wars of Louis XIV.—In the time of Turenne and Condé (1643–1675), the invention of the bayonet and the flint-lock musket caused the pike to disappear and the number of ranks to be reduced to four, each composed of musketeers, the rear ranks loading for the first two. At the same time, a great improvement was made in the mobility and tactical handling of armies, by organizing battalions and regiments into brigades, and grouping the brigades into divisions.

It is remarkable that the many brilliant campaigns of the War of the Spanish Succession (1702–1715), conducted by such great generals as Marlborough, Eugene, Vendôme, and Villars, should have made no important changes or developments in tactical science, but tactics remained practically unchanged from the time of Gustavus Adolphus until the wars of Frederick the Great (1740–1763).

The Wars of Frederick the Great.—Frederick, like the great Swede, recognized the paramount importance of mobility and fire action, and he brought both to a degree of perfection until then unknown. The Prussian soldiers were drilled to the highest state of proficiency. The battalions consisted of ten companies, which always maneuvered in open column, the distance and alignments being carefully preserved, so that line could be quickly and accurately formed for the purpose of opening fire or advancing upon the enemy. The ranks were reduced to three, the iron ramrod was introduced, and the rapidity of fire was so increased that each soldier carried a piece of leather to protect his hand from the heat of the barrel.*

(Frederick's army was divided into two wings, but contained neither divisions nor brigades.) It was formed in

*Grivet's "Études sur la Tactique," p. 19.

two lines for camping and marching, as well as for battle. Both lines were deployed, the interval between the battalions in the first line being eight yards. The interval between those of the second varied; the lines being equal in length, but the second generally containing a smaller number of battalions. The distance between the lines was about 250 yards. There were neither reserves nor skirmishers. Figures 2, 3, and 4 show the manner in which Frederick's army habitually encamped in two lines and marched in two columns by the flank, or in four to the front.

Figure 2

Frederick's Army in Line of Battle or Encampment.

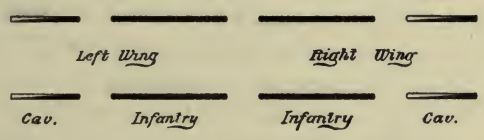


Fig 3 Marching by the Flank

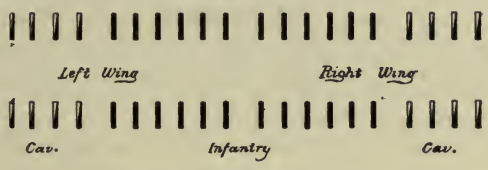
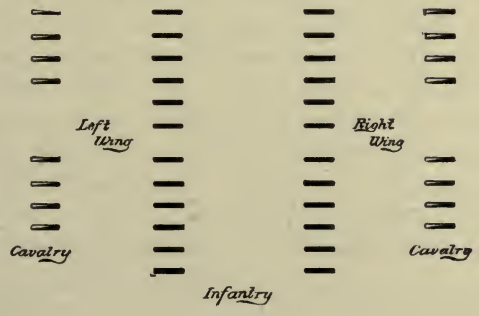


Fig 4 Marching to the front



“The Austrians,” says Hamley, “carried the system of selecting and occupying strong positions to its very extreme. (To its extreme, too, they carried the pedantry of war, embodied in their blind addiction to arbitrary rules and ancient precedents.) Such a foe was, to a dexterous tactician and a highly trained army, a very whetstone of skill. Moving around their slow, inert masses, like a panther around an ox, he found the unguarded part, and cast himself upon it with all his force.” Frederick’s great victories were all won by moving his army by the flank so as to place it oblique to and outflanking the enemy’s line, and then wheeling into line and attacking the hostile flank.*

The effective firing of the Prussians was followed up with repeated bayonet charges. At this time the bayonet was, in fact, a weapon of great importance; for the effective range of the musket was only 100 yards, its extreme range only 165, and in damp weather it was practically useless as a firearm. (Yet the rapid volleys of the Prussians were terribly effective, and Frederick owed his success almost entirely to the firing and maneuvering power of his army, which, though extremely slow and clumsy in comparison with modern armies, was immeasurably superior in these respects to its adversaries.)

The American Revolution.—The next advance in tactics was brought forth by the American Revolution. Though “light troops”—notably the Pandours and Croats of the Austrians—had been employed in former wars to harrass an enemy on the march, the true skirmisher had not yet appeared on the field of battle. The American commanders, finding at their disposal numbers of men expert in the use of firearms and skilled in the arts of forest warfare, but unfitted, by lack of drill and discipline, for the line of battle, threw them forward to annoy the enemy and delay his advance with their fire. Withdrawing rapidly when no

*See, for instance, the account of the battle of Leuthen, in Jomini’s “Great Military Operations” or Carlyle’s “History of Frederick the Great.”

longer able to check the hostile advance, they uncovered the front of the Continental troops, upon whom the brunt of battle always fell. At a later period of the war, select bodies of infantry were sometimes employed for this purpose, and skirmishing was adopted as a regular element of tactics. Its utility was observed by the French soldiers serving in America, and its introduction and development became one of the marked tactical features of the wars of the French Revolution.*

The Napoleonic Era.—Social and political conditions had a peculiar and great influence on the organization and tactics of the French army in the wars waged by the First Republic. The general withdrawal of the Royalist officers from the military service of France opened the way for the promotion of a number of remarkably able non-commissioned officers; some of whom ultimately attained the rank of general, marshal, and even king.† The upheaval of society and the universal demand of the Republic upon its citizens for military service drew into the ranks the ablest and most ambitious men; and, though comparatively deficient in training, the French troops were far superior in intelligence and individuality to any army to which they were opposed. They were admirably adapted to skirmishing, and they furnished many excellent leaders for small commands. The result was soon apparent in important tactical changes, already foreshadowed in the new system of Ménéil-Durand, which, adopted just before the outbreak of the Revolution, seemed made to order for the peculiar troops who were to use it.

In place of the precise linear tactics of Frederick, requiring the most perfect drill and the most rigid disci-

*Though the American Revolution presented the first instances of the practical employment of skirmishers, their extended use had, it is claimed, been advocated by Ménéil-Durand, in France, as early as 1774. For a full and interesting description of the system of that distinguished tactical writer, see Grivet's "Études sur la Tactique," Chapitre IV.

†Murat and Bernadotte rose from the ranks to the thrones of Naples and Sweden respectively.

pline, the organization became flexible, and the great innovation was made of small columns for maneuver and assault and deployed lines for firing. This was an enormous stride in the direction of mobility and effective fire; for small columns can easily march over extended distances and rough ground which would throw deployed lines into disorder; the employment of skirmishers admitted of effective firing on advance, and the deployed lines were suited to defensive action. The division was revived as a unit in higher organization; and it was divided into three "demi-brigades," each consisting of three battalions. There were, at this time, no regiments in the French army.

The French battalion consisted of ten companies, two of which were skirmishers. It habitually operated in close column of divisions (each division consisting of two companies), its front being covered by the skirmishers. In deploying the column, the two skirmish companies moved to the right and left respectively, taking position on the flanks and slightly in rear of the battalion, the interval between two battalions deployed being equal to the front of two companies. In deploying for firing, the skirmishers unmasked the front as each company arrived on the line. When several battalions were employed together, they were in a line of division columns at deploying intervals, the flank companies of all the battalions covering the entire front with a chain of skirmishers. Each company was formed in three ranks. (See Figures 5, 6, and 7.) When the battalions were formed in two lines, those of the second were opposite the middle of the intervals of the first.

Figure 5.

Battalion in Column

Chasseurs Grenadiers

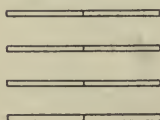


Figure 6.

Battalion in Line



Figure 7.



This system (known as the French, or perpendicular, tactics) was habitually used in Napoleon's earlier campaigns. At Castiglione the demi-brigades of Massena's division were each formed with the center battalion deployed and the flank battalions in column by division. (See Fig. 8.)* At

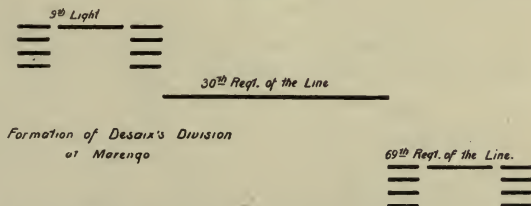
Figure 8.

Formation of a Brigade at Castiglione (Demi-Plain order)



Arcola, Augereau used the same formation. At Rivoli, the French acted offensively with battalion columns covered with skirmishers, and defensively with deployed battalions. At Marengo, Desaix's division was formed in echelon from the left, the first and third demi-brigades formed as Massena's had been at Castiglione, and the second deployed. (See Fig. 9.) In this manner the flanks were protected from the Austrian cavalry, and two-thirds of the division was deployed in suitable formation for firing

Figure 9.

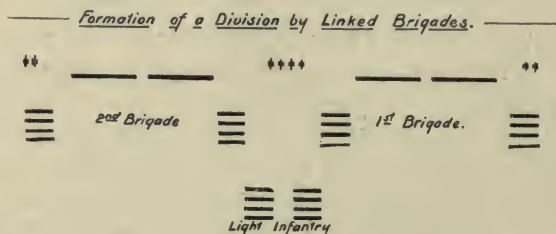


In 1805 Napoleon made some important changes in the organization of his army, instituting the army corps, and

*At this time the number of companies in a battalion had been reduced to eight.

* substituting for the demi-brigade the two-battalion regiment. The brigade consisted of two regiments; and the division, of two brigades and a regiment of light infantry. The "perpendicular" system of tactics was now at the height of its perfection. Recognizing the difficulty of effecting the passage of lines in action, and desiring that the reinforcement of the first line by the second might not cause an intermingling of different brigades, Napoleon prescribed that the habitual formation of a division should be by "linked brigades," or brigades side by side. This had the additional advantage of giving a separate object, when the terrain so required, to each brigade. The battalions of the light infantry regiment, when not employed as skirmishers, were held in rear of the interval between the brigades. (See Figure 10.)

Figure 10.



* At Austerlitz, St. Hilaire's division was formed for assault as shown in Figure 11. Soult's other divisions, as well as those of Bernadotte, were similarly formed.

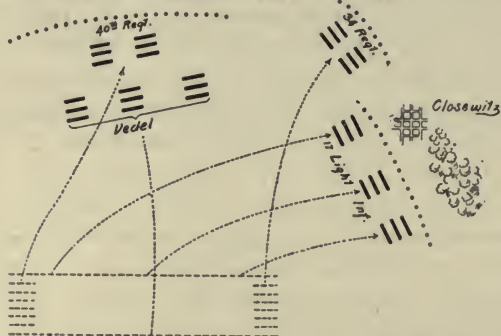
Figure 11.



In 1806, in the period between the campaigns of Austerlitz and Jena, the flank companies of the battalions were consolidated into separate battalions of light infantry; the battalions being thus reduced to six companies each.

The tactical system of Frederick (as employed by the Austrians and Russians) had encountered that of Napoleon at Austerlitz and met with complete disaster; and at the double battle of Jena-Auerstädt, in the following year, the latter system triumphed so decisively over the former as to relegate it completely to the military past. In this battle the Prussians, making no use of skirmishers, advanced, with the precision of the drill-ground, in column of companies, in two or more lines, executed a change of direction, and wheeled into line, suffering meanwhile from a biting fire of the French skirmishers, upon whom they opened with volleys. The French, on the other hand, advanced, at Auerstädt, in a column of battalions, each in close column by division, the whole preceded by a cloud of skirmishers, under whose protecting fire the column deployed into line of battalion columns and then into line. At Jena the French divisions were mostly in three lines of battalion columns at deploying intervals, the first line consisting of the light infantry regiments. Suchet's division, however, being exposed to cavalry attacks, assumed the formation shown in Fig. 12, the 17th Light Infantry and a select battalion being deployed in the first line, the 34th and 40th regiments of the line in close column by division on the right and left respectively, while Vedel's brigade was deployed as a second line. In the course of the battle the regiment and battalion of the first line ployed into columns of attack, and, covered by skirmishers, moved against the wood and village of Closewitz; the 34th attacked on the left of these troops; and the 40th, supported by Vedel's brigade, all in columns of attack, advanced to the former front. At this period the flexibility of the organization of the French, and the ease

Figure 12. Suchet's Division of Jena.



and skill with which their troops were handled tactically, are both remarkable.

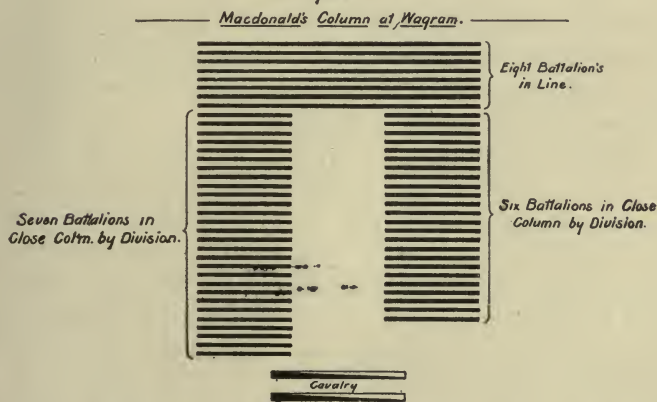
The next change in French tactics was altogether for the worse, but was doubtless the outgrowth of unavoidable conditions. In Napoleon's later campaigns the composition of his armies was distinctly inferior to that of the forces formerly commanded by him. The heavy losses in many great campaigns and the enormous increase in the size of the armies* caused the ranks to be filled with raw conscripts and German, Italian, and other foreign levies of inferior training and *morale* and half-hearted zeal. The casualties of war and the allurements of civil vocations in a well-established government deprived the army of many of its best officers in the lower grades; and the deficiency in qualified battalion and company leaders, and the lack of intelligence and individuality in the ranks, rendered the former tactics scarcely possible. Enormous columns were now used instead of small ones, the indifferent soldiers being herded together, as it were, for mutual confidence. Fire action now devolved principally upon the artillery; and the infantry in huge columns was used mainly for shock. Augereau's corps, at Eylau, was formed in two

*At Marengo the French numbered less than 30,000; at Wagram they numbered 150,000.

columnus, each consisting of a division in a column of battalions, each in close column by division.* In the meantime the Russians had begun to imitate the successful French tactics, and in this battle their tactical formations were actually superior to those of their opponents; Benningesen forming his divisions after the manner of Massena at Castiglione.

The use of heavy columns by the French culminated in the remarkable formation of Macdonald's corps at Wagram, which is, perhaps, the most famous column of attack mentioned in military history. Eight battalions were deployed in line, one behind another at close distances, while on the right flank six, and on the left flank seven, battalions were formed in heavy column, each battalion in close column by division. The rear of the square was closed with cavalry. (See Fig. 13.) This column broke the Austrian line, though at the cost of enormous losses on its own part.

Figure 13.



In the Russian campaign a return was made to

*It is impossible here to avoid sharing Jomini's lament over the poverty of military nomenclature. Each of Augereau's columns consisted of half an army corps (a division), and the front of each column was that of a division (two companies).

smaller columns. In the attack on the great redoubt at Borodino the attacking force was formed in two lines of battalion columns at deploying intervals, each column having a front of two companies. In 1813 Napoleon prescribed for the attack formation of infantry, lines of battalions formed in close column by division. Realizing that untrained soldiers could not be relied upon in these formations, he caused the young conscripts, of which his army was now largely formed, to be drilled assiduously in forming battalion square, deploying into line, and forming column of attack. Every day the troops were halted on the march and exercised in these maneuvers. Qualified leaders were provided for the new levies by summoning officers from the veteran army in Spain. The prescribed formation was generally used at Lützen, Bautzen, and Leipsic, though regimental and brigade columns were also employed. The use of heavy columns was extremely rare. At Bautzen, Ney formed his corps in heavy columns, each consisting of a division; but this was for the purpose of making a turning movement, and the troops made the actual attack in small columns. The Allies had, by this time, completely adopted the tactics of the French, and the use of skirmishers was now universal.

In the extraordinary campaign in Champagne, in the following year, Napoleon made constant use of small columns of attack, which could deploy readily for firing or form square quickly to resist cavalry; but a fatal resumption of heavy columns of attack was made at Waterloo, where Ney formed D'Erlon's corps in four columns, each consisting of battalions deployed one behind another at five paces distance, thus giving a total depth of twenty-four ranks.*

*This is the formation as given by Thiers and usually accepted by military writers; but the exact formation of D'Erlon's corps on this occasion is a matter of much uncertainty. Grivet, following Gen. Lamarque, claims that the columns were composed of battalions one behind another, each battalion in close column by division. Charras is of the same opinion. Brialmont says that it is not clear what the groundwork of the formation was, and Jomini, despairs

On the eve of the battle of Leipsic, in 1813, Napoleon reduced the number of ranks from three to two, in order that his army, though smaller in numbers, might oppose to the Allies an approximately equal front. The two-rank formation had been adopted by the English three years before.

(The tactics of the British was, in fact, superior to the deteriorated tactics with which the French opposed them in Spain and at Waterloo. In the Peninsular War they habitually received the enemy in a "thin red line" of only two ranks, supported by a similar line a short distance in rear, and supplemented the effects of their fire with a counter-charge in line, overlapping the column on the flanks, and pouring into it a concentric fire at short range before closing upon it with the bayonet.) The counter-charge was generally pushed only a short distance, the infantry being quickly reformed to await (in fact, to invite) another attack.* The line was generally limited to defensive action and short offensive returns; for greater mobility and cohesion, the attack was usually made in small columns, which, before collision, deployed into line. Thus, at Salamanca, Pakenham's division advanced in line of battalions, each in close column by division, which deployed into line, overlapped the head of the opposing French column, and speedily overthrew it.

(The French generals in Spain seem to have been seized with a mania in regard to the employment of deep columns of attack.) Notwithstanding the overthrow of the great Austrian column at Caldiero by Massena's skirmishers and small columns, and in spite of their own repeated bitter experience in opposing heavy columns to the British lines, they persisted in this perverted tactics, often forming

of making anything out of the chaos of contradictory statements. It is certain only that the French attacked in deep columns of some sort, and that they suffered disastrously in consequence.

*See Napier's description of the battle of Vimiero ("Peninsular War," Book II., Chapter 5), and the battle of Busaco (Ibid., Book XI., Chapter 7).

an entire division in a column of battalions, each in close column of divisions or even of companies. In thrusting forward these lengthened columns with narrow fronts, they voluntarily gave to the British much of the advantage that an army gains by attacking its adversary's flank; and repeated disaster seemed unable to correct this tactical folly.

These heavy columns were always more formidable in appearance than in fact. At Eylau, Essling, and Waterloo they met with bloody disaster, and Jomini is of the opinion that Macdonald's famous column would have been repulsed also, but for the successes of Davoust and Oudinot against the Austrian left. Napier, in commenting on the battle of Vimiero, makes the following incomparable criticism of the column: "The column is good for all movements short of the actual attack, but as the Macedonian phalanx was unable to resist the Roman legion, so will the close column be unequal to sustain the fire and charge of a firm line aided by artillery. The repugnance of men to trample on their own dead and wounded, the cries and groans of the latter, and the whistling of cannon-shots as they tear open the ranks, produce disorder, especially in the center of the attacking columns, which, blinded by smoke, unsteadfast of footing, bewildered by words of command coming from a multitude of officers crowded together, can neither see what is taking place, nor advance nor retreat, without increasing the confusion. No example of courage can be useful, no moral effect produced by the spirit of individuals, except upon the head, which is often firm and even victorious when the rear is flying in terror. Nevertheless, columns are the soul of military operations; in them is the victory, and in them is safety to be found after a defeat. The secret consists in knowing when and where to extend the front."*

The British infantry fire was also greatly superior to that of the French. Indeed, Baron de Marbot attributes

*Napier's "Peninsular War," Book II., Chapter 6.

Wellington's success mainly to the superior training of the British soldier in musketry firing. Certainly, in this respect, the British army was superior to any other in Europe. (At this period, the fire of the infantry, though very deadly at short range, was not of much account beyond 200 yards;) but by giving the musket a high angle of elevation, it could be used with effect against troops in mass at double that distance.

It is amazing that the British, after having so often triumphed with the line over the heavy column, should afterwards have made use themselves of deep columns of attack. Yet Pakenham—a veteran of the Peninsula, whose small columns and deployed lines had been so effective at Salamanca—in attacking Jackson's position at New Orleans, formed the attacking force in heavy columns, the principal one, consisting of nearly 3,000 effectives, having a front of only sixty men; a formation all the worse as the Americans were mostly skilled marksmen, armed with the rifle. The attacking troops encountered a fire more deadly than any to which they had ever subjected the French; and their enormous losses and complete repulse furnished additional proof of the folly of opposing heavy columns to a line capable of delivering an effective fire.

As a result of his experience in the Napoleonic wars, Jomini advocated for attack a formation in lines of battalion columns, each battalion being in close column by division, the whole front being covered with skirmishers, and the intervals between the columns varying from the front of a single column to the interval necessary for the deployment of a battalion.*

The Crimean War.—The Crimean war showed clearly the tactical stagnation into which the belligerent powers had fallen in the long peace of forty years which they had enjoyed. At the Alma the British, influenced by their

*For a full and interesting discussion of this formation, see Jomini's *Art of War* (Mendel and Craighill's translation), p. 349 *et seq.*

military traditions and apparently forgetting that Wellington's lines were designed for defensive action, advanced to the attack in deployed lines with a front of two miles, marching over a mile of broken ground, crossing a stream, and finally attacking in great disorder. The Russians, on the other hand, awaited the attack, and made a counter-assault, in heavy columns, in which their fire action was reduced to a minimum and every tactical disadvantage seemed to have been voluntarily assumed. At Inkerman the deployed lines used by the British on the defensive again asserted their superiority over the heavy attacking columns. But the Crimean war, as a whole, was merely a "gigantic contest between two vast intrenched camps," in which the few conflicts in the open field were characterized more by stubborn fighting than by military skill, and its bloody struggles produced no improvements in tactical science. Most of the English, and a portion of the French, infantry were armed with the rifle, which greatly increased the losses invited by the Russian tactical formations, and the suicidal nature of heavy columns on the battle field became more evident than ever. The Russian infantry, with the exception of a few select regiments, was still armed with the smooth-bore musket. The range of the rifle at this time did not exceed 800 yards, and it was, in fact, very inaccurate at any range beyond half that distance.

The Italian War.—In the Italian war of 1859 the French and Austrians were both armed with the rifle, but the Sardinians still retained the smooth-bore musket. The Austrian rifle being much superior to that of the French, Napoleon III. depended mainly upon the newly-invented rifled cannon for fire effect, and directed his infantry to close quickly in shock action with the bayonet. Small columns of attack were used, the columns being covered with clouds of skirmishers. Even when on the defensive, the French infantry was to place its reliance on shock tac-

tics. The order issued, in anticipation of an Austrian attack, to the French army covering the siege of Peschiera, prescribes the disposition of the infantry in battalions alternately deployed and in column of divisions. The deployed battalions were to use file firing, and the columns were to charge the enemy with the bayonet. The essence of the French tactics was to close quickly with the enemy, so as either to use the bayonet or to engage in fire-fight at a range such as to neutralize the superiority of the Austrian rifle. This tactics, so different from that developed by later wars, was adopted by the Austrians, and used by them, seven years afterwards, to their own distress.

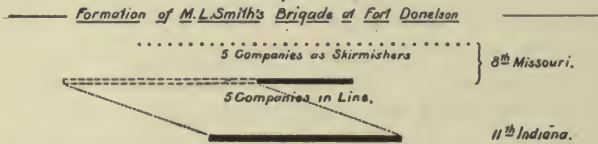
The War of Secession.—The War of Secession, celebrated for its long duration, its stubborn battles, and its enormous loss of life, is also remarkable as a turning-point of tactics, there being scarcely a feature of the tactics of the present day that did not have its germ, its prototype, or its development in that great contest. The Union and Confederate armies were both armed with the rifle (with an extreme range of 1,000 yards, and a deadly range of half that distance), and in the former the breech-loader made its appearance before the end of the war. The marksmanship and skill in handling firearms were of a high order in both armies, and the infantry fire was so deadly as to effect marked changes in tactical formations. The principal tactical developments of the War of Secession were:

- I. Attacks by rushes;
- II. Attacks in successive deployed lines;
- III. The use of heavy lines of skirmishers in place of the old line of battle;
- IV. The use of hasty intrenchments.

The first instance of attack by rushes was at the battle of Fort Donelson, February 15, 1862. General Morgan L. Smith's brigade, consisting of the Eighth Missouri and Eleventh Indiana, was formed for attack with both regiments deployed, the former in front and preceded by five of

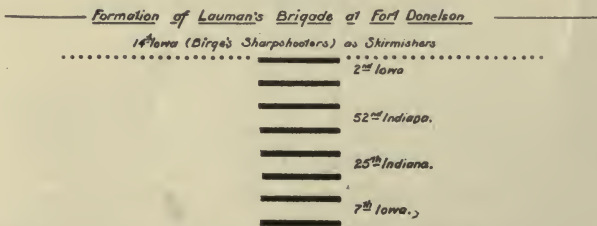
its companies as skirmishers at two paces interval. Advancing up a bare slope, the assailants came under a heavy fire, the regiment in rear quickly formed on the left and abreast of the one in front, the entire brigade lay down, and the skirmishers plied the enemy with an effective fire. When the enemy's fire slackened, the brigade again rushed on, absorbed the skirmishers, and again lay down and opened fire. "Soon as the fury of the fire abated, both regiments rose up and rushed on, and in that way they at length closed upon the enemy, falling when the volleys grew hottest, dashing on when they slackened or ceased. Meanwhile their own fire was constant and deadly."* By a series of such rushes the enemy's position was carried with but slight loss. (See Figure 14)

Figure 14.



This brilliant movement was far in advance of the tactics then generally in use. On the same field Lauman's brigade (to which an additional regiment had been attached) was formed in column of battalions, each consisting of five companies deployed in line; four of the regiments composing the brigade thus forming a column of eight battalions or sixteen ranks, while the fifth regiment was deployed as skirmishers on the flanks. (See Figure 15.) This attack

Figure 15.



*Official report of General Lew. Wallace, commanding Third Division.

succeeded also, but with a loss of nearly twice as many men per regiment as Smith's brigade incurred.

The formation of French's division at Fredericksburg (December 13, 1862) may be taken as a typical attack formation of the War of Secession. Kimball's brigade was in advance, deployed in line of battle; Andrews' brigade, in similar formation, followed at a distance of about 150 yards; and at an equal distance and in the same formation, Palmer's brigade formed the rear of the column. The head of the column was covered by three regiments deployed as skirmishers. (See Figure 16.) Hancock's division, in this battle,



Figure 16.



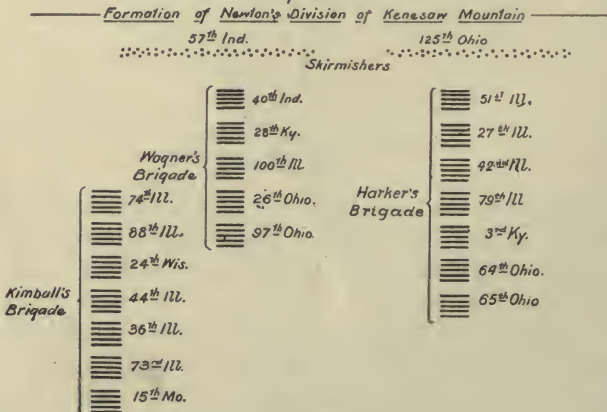
was formed in the same manner; and Pickett's division at Gettysburg, and Sheridan's at Chattanooga, had essentially the same formation in successive lines, though in the two latter cases the lines were only two at the time of assault.

Though the attack formations varied considerably in matters of detail, the following may be given as the one so generally used as to constitute practically a "normal formation." The division was formed in three lines of deployed

brigades, at distances varying from 150 to 300 yards, the leading brigade being preceded by one, or sometimes two, lines of skirmishers. The skirmishers being reinforced by, and absorbed in, the first line, and the latter, if checked, being reinforced and pushed forward by the second, and the third line being, if necessary, similarly absorbed, the assaulting force, at the moment of collision, generally consisted of all the successive lines merged into a dense and irregular one.

Heavy columns of attack were not, however, infrequently used, and the lessons taught by their employment are a confirmation of those learned from the wars of the early part of the century. (At Kenesaw Mountain (June 27, 1864) the assault upon the Confederate position was one of the great tactical failures of the war.) The attacking columns consisted of three divisions; one (Newton's) from Howard's corps, one (Davis') from Palmer's corps, and one (M. L. Smith's) from Logan's corps. Newton's division was formed as shown in Figure 17. Seven of the eight regiments composing Harker's brigade were formed one behind another, each in close column by division. At deploying interval from Harker, five regiments of Wag-

Figure 17.



ner's brigade were likewise formed in close column by division left in front; and, echeloned to their left and rear, Kimball's brigade, consisting of seven regiments, was formed in a similar column right in front. It was originally intended that these two brigades should form a single column; but Wagner could not gain enough ground to the front, owing to the obstacles presented by the Federal shelter-trenches, and Kimball could not take sufficient distance to the rear, owing to the irregularity of the ground. The two brigades thus overlapped, and Kimball's formed a separate column. Each of the leading columns was covered by a regiment deployed as skirmishers. These skirmishers, advancing slowly and firing, were overtaken by the assaulting columns, in the intervals of which they continued to advance. The leading brigades met with a bloody check, and Kimball, moving up and attacking on the left, was also repulsed with heavy loss. Davis' and M. L. Smith's divisions were each formed in column of deployed regiments at close distance. The regiments being at this time much reduced, and the number of regiments in a brigade being correspondingly increased, these columns also presented a narrow front and great depth; and, like the others, they suffered heavy loss, and were unable to make a lodgment in the enemy's works.*

Columns of deployed regiments were used also by the Confederates in the attack upon McPherson, near Dallas, May 28, 1864, and in the battle of Atlanta, nearly two months later. In each case the columns met with enor-

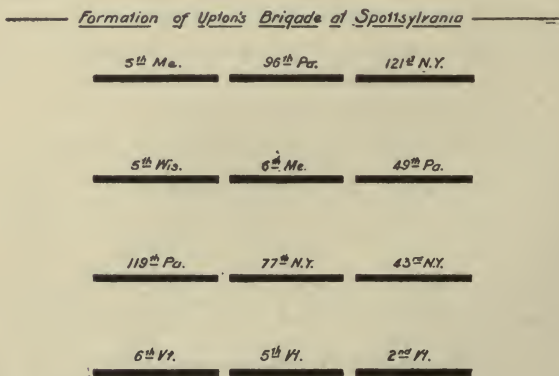
*The author is indebted to Brevet Brigadier-General L. P. Bradley, U. S. A., and Major-General Nathan Kimball, U. S. Vols., for valuable information and comments relative to the attack of Newton's division at Kenesaw. The former says: "The assault on Kenesaw was a bad affair, badly planned and badly timed, and the formation of our column was about the worst possible for assault on a fortified line—a column of regiments, each regiment in column of divisions." The latter says: "Harker and I were at Newton's headquarters when we received our orders. We condemned the formation at the time. Newton said that such were the orders, and of course we obeyed and did the best we could. Such formations have only the appearance of strength, but are really suicidal in their weakness." (Upton)

mous losses, though temporarily successful in the latter instance.

In the attack of Hancock's corps on the Confederate position at Spottsylvania, Barlow's division was formed in two lines of masses, each regiment in close column by division, Brooke's and Miles' brigades in the first line, Smyth's and Brown's in the second. Birney's division was formed in two deployed lines on Barlow's right. Mott's division was deployed in one line in rear of Birney, and Gibbon's division was held in reserve. In Barlow's division, in the excitement and carnage of the assault, the intervals and distances between the regiments and lines were lost, and the division entered the enemy's works in a confused and almost solid mass.

(The assault of Upton's brigade upon the "Angle" at Spottsylvania was one of the most skillful attacks made during the war.) The brigade was formed in four lines as shown in Figure 18. The result of this charge also shows

Figure 18.



the inevitable mingling of successive lines whenever stubborn resistance is encountered. The 121st New York and 96th Pennsylvania were instructed to turn to the right as soon as the works were carried, while the 5th Maine was to

change front to the left and enfilade the enemy in that direction. The second line was to halt at the enemy's works and open fire to the front if necessary. The third line was to lie down behind the second and await orders; while the fourth was to halt at the edge of a wood about 200 yards from the works and also wait further instructions. The Confederates were driven out of their works, but only after a hand-to-hand struggle so stubborn that each successive line of the assailants was merged with its predecessors in the *mêlée*. The Confederate line was completely broken, but Upton, being unsupported by a formed body of troops, was compelled to withdraw.

The effective rifles with which the troops were armed and the wooded country which formed the theater of so many of the principal campaigns combined to develop the use of skirmishers, and to carry their employment to a degree before unknown. Sherman's army habitually fought in strong skirmish lines, the men taking advantage of every feature of the ground to increase the effect of their own fire and shelter themselves from that of the enemy. In some instances the regimental skirmish line consisted of half the strength of the regiment;* the remaining half being held in reserve, generally in line of battle, ready to reinforce the skirmishers or absorb them in its advance. This was the dawn of the tactics of the present day.

Perhaps the most marked tactical feature of the War of Secession was the employment of hasty intrenchments. These were unknown in the early part of the war, and were the outgrowth of the intelligence of the American volunteer applied to the experience of many bloody battles. In the latter part of the war, an army in the vicinity of the enemy always proceeded to intrench as soon as it halted. (See p. 48 *ante*.) Even the skirmishers were in the habit of rolling logs together, or of making a lunette of rails with

*This formation does not seem, however, to have been general.

earth in front to cover their bodies.* In many cases the intrenching was done while the troops were under heavy fire.† At Mud Creek, Ga., June 16, 1864, Baird's division, in a comparatively open field, intrenched itself under fire within four hundred yards of the Confederate intrenched position; a heavy skirmish line was thrown out to the front, keeping up an effective fire while the troops in rear labored vigorously at the trenches until "a good set of works" was completed.‡

The tactical lessons of the War of Secession were to be confirmed in a striking manner by great wars on the continent of Europe a few years later.

The Austro-Prussian War.—In the Austro-Prussian war of 1866 the Prussian infantry was entirely armed with a breech-loading rifle—the "needle gun"—while their opponents were armed with the muzzle-loader. The Prussians generally attacked in company columns, which were a great improvement in mobility and flexibility over the battalion columns formerly in use. These company columns were habitually supported by half-battalion columns or by bat-

*Sherman's "Memoirs."

†The following extract from the "History of the Fifty-fifth Illinois Infantry," referring to an action in front of Atlanta, August 3, 1864, gives a vivid picture of the manner of seizing and fortifying a position under the enemy's fire:—

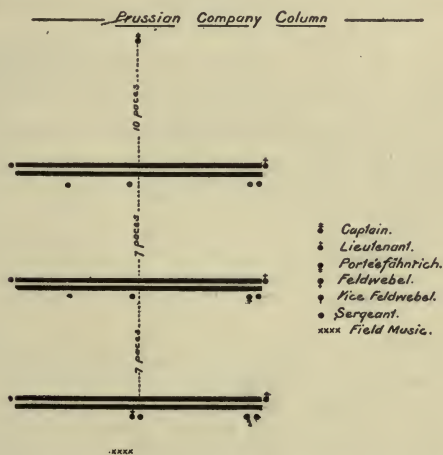
"The point to be gained was about three hundred yards in advance of the main Union line, and about the same distance from the intrenched position of the enemy. The advance was gallantly made across open ground the whole of which was swept by an enfilading fire from the skirmishers in the rifle-pits on the right. The rebel batteries in the main line also kept up a vigorous bombardment of the position we were aiming to reach. The summit was speedily gained, and with astonishingly small loss; for experience had taught the veterans how to move rapidly while hugging the ground closely, and to take advantage of every inequality. The grass, moreover, though scanty, was tall enough to seriously interfere with the rebels' aim. Upon arrival at the desired point, a few minutes sufficed to dig burrows for individual protection. We lay upon face or back in the roasting rays of the afternoon sun, slowly sinking ourselves into shallow pits to avoid the shower of balls that hissed a foot or two above us; and when darkness came these little pits were enlarged into a continuous trench with a traverse embankment upon the exposed flank."

‡"Battles and Leaders of the Civil War," Vol. IV., p. 409.

talions formed in double column.* The columns were preceded by skirmishers, designed simply to feel and develop the enemy, and not, as at present, to commence the fight and maintain it from beginning to end. But the Prussian soldiers were not slow to appreciate the power of their weapon; and they felt an irresistible temptation to leave the column, which offered too good a target to the enemy, and rush forward to the skirmish line, where they could use their weapons with effect. The result was an immense and decisive development of fire, accompanied with much disorder and a melting away of the columns designed for

*The Prussian company consists of 250 men, and the battalion is composed of four companies. In 1866 the Prussian infantry was formed in three ranks; but the company column consisted of three platoons of two ranks each, as shown in Figure 19. The captain's position was in front of the first platoon. The lieu-

Figure 19



tenant commanding each platoon was on its right and abreast of its front rank. The German infantry is now formed in two ranks, and corresponding changes have been made in the formations in line; but the company column remains essentially as it was in 1866.

In explanation of the figure, it should be stated that the *portefée-fähnrich* is a candidate for a commission serving a probation as a non-commissioned officer. Perhaps the best English translation of this term would be *service cadet*. The *feldwebel* is a kind of company sergeant-major, his authority and duties being of somewhat more importance than those of our first sergeant.

shock action. The Austrians, adhering to columns and trusting to the bayonet, were mowed down hopelessly by the terrible fire of their adversaries, against whom their own antiquated arms and obsolescent tactics gave them no chance from the beginning.*

This war, like the War of Secession, foreshadowed the extensive use of skirmishers, and rendered it evident that fire action, instead of merely preparing the way for the shock, must accompany the latter to the last moment, and must be the prime consideration in tactics. The Prussian officers do not seem, however, to have appreciated quickly the new conditions of warfare; for they deprecated the disorder and tumult of the impromptu attack formation which had sprung into being under the Austrian fire, and they waited for the appalling losses of a greater war to emphasize the necessity of a change in their prescribed tactical methods.

The Franco-German War.—The Franco-German war (1870-71) found both combatants armed with breech-loading rifles. The French weapon was considerably superior to that of the Germans, the Chassepôt rifle being effective at 1,300 yards—nearly twice the range of the needle gun. The Prus-

*The complete failure of the Austrians to appreciate the paramount importance of fire action, and their fatuous reliance on the bayonet, are shown by the following extracts from the regulations in force in their army in 1866. After stating certain circumstances in which columns or lines should be used, these regulations say:

"You will decide, then, to attack in line or in column, according to the configuration of the terrain, the relations of other existing combats, the *morale* of your troops, or their degree of tactical skill; but, once decided in this respect, rest assured that in order to strike the enemy with terror, to protect yourself in some degree from his fire, and to gain the victory, nothing is necessary but a rapid, uninterrupted march, followed with an impetuous shock with cold steel.

"Marching upon the enemy, be careful, then, whatever happens, not to halt to reply to his fire. The time thus lost will cause the attack to fail, and will lead to disorder. In a critical moment, on the contrary, always accelerate your march If circumstances require that you should wait firmly a bayonet charge by the enemy, deploy your troops and receive him with battalion fire. After the last volley, delivered at about fifty paces, you will immediately fix bayonets and throw your troops upon the enemy, with *ensemble* if possible, but always with impetuosity."

In the light of subsequent events, it is hard to realize that these regulations were ever seriously prescribed.

sians still adhered to their old tactics, and the French had produced nothing new. In the famous attack of three brigades of the Prussian Guards upon the French position at St. Privat each regiment was formed in two lines, the first consisting of company columns, and the second either of company or half-battalion columns. Thus, the Kaiser Franz Regiment had one battalion in company columns in the first line, and

Figure 20.

— Attack of the Fourth Brigade of Prussian Guards at St. Privat. —



two battalions in half-battalion columns in the second; while the Fourth Grenadier Guards* on its right had nine companies in the first line, and three in the second, all in company column. (See Figure 20.) The attack by the Kaiser Franz Regiment may be regarded as a typical one. As soon as the enemy's fire began to be felt, the flank companies of the 2d Battalion, which was in the first line, deployed as skirmishers, and, soon after, the half-battalion on the right pushed forward abreast of the leading battalion, while the other three half-battalions formed similarly on the left of the Second. The fire of the French was murderously effective. The men fell rapidly on all sides. In an instinctive desire to close with the enemy, the troops rushed forward. The columns lost their cohesion. The companies melted into small groups; and, unable longer to endure the enemy's fire, the regiment finally halted and united the wrecks of the companies at about 500 yards from the French position. Here, unable to advance and unwilling to retire, it lay down and continued to fire. The experience of the other regiments was essentially the same. In ten minutes the three brigades had lost nearly 6,000 men; within half an hour five battalions had lost all their officers, and in the Fourth Brigade only one field officer remained unharmed. The attack, though heroically made, was a dismal failure, and it became evident that tactical science had not kept pace with the improvement in weapons.

Fortunately for the Germans, their military system is one which requires ends, not means; which has decentralization as its marked feature; and which, by ignoring methods and asking only results, leaves subordinate commanders free from the stunting influence of the opposite system, and renders them able to solve the problems presented by new conditions. A new tactics soon appeared without having been regularly formulated or sanctioned by official order. This tactics, born of experience and common sense, was seen

*Forming with the Kaiser Franz Regiment the 4th Brigade.

on the next great battle-field, and is described in the German Official History as follows:

"In the battle of Sedan the German infantry fights almost entirely in open order. The conditions of the ground and other circumstances lead, even during the first introductory movements, to a division of the units, which open out by battalions and companies in different directions, so as to dominate from the first as large a space as possible, and to act in support wherever it may be necessary. Under the superior musketry fire of the enemy, the company columns mostly break up into skirmishing lines as soon as the engagement begins; the troops of the next line find themselves shortly under the necessity of following the example, and during the course of the struggle intermix with the front line. In rear of these there remain but a few formed or reassembled detachments as the immediate fighting reserve."

CRUX

The tactics of the German infantry as developed in the course of the war was generally as follows: As soon as it was intended to use the infantry actively, company columns were formed in the first line and covered with skirmishers, generally a *zug* from each company.* Company columns or half-battalion columns were used in the second line. When the skirmishers arrived within effective range (450 or 500 yards) of the hostile position, they sought cover and generally lay down. At this point they were usually reinforced by a second *zug* also deployed as skirmishers; a heavy skirmish line now being necessary to answer the enemy's fire. The supports, not nearer than 100 or 150 paces to the skirmish line, were now extended, partly to avoid loss and partly to facilitate the reinforcement of the skirmish line. In extended order and in the din and tumult of battle it was found impossible to keep the supports under

*The three platoons constituting the company column were termed "*zuge*," and the *zug* thrown out as skirmishers was generally the third. For the Prussian method of deploying skirmishers at this time, see Upton's "Armies of Asia and Europe," p. 274.

thorough control. A desire to answer the fire whose effects they felt, and the encouraging example of their officers, speedily absorbed them in the skirmish line; and it generally happened that soon after the beginning of an action, a whole regiment was engaged in the skirmish line, another regiment in second line acting as its support; or if the second regiment were by the course of the action deflected to the right or left, the battle at this point was fought by a regiment in a heavy, irregular, skirmish line without supports. In no instance were troops in close order brought into the front line in action. If the fight became stationary and reinforcements were sent up, they were "doubled up" with the old skirmishers, and men of different battalions and regiments were thus intermingled.* The skirmishers almost invariably advanced by rushes, seeking some shelter as the objective point of each rush, or throwing themselves flat on open ground as soon as the enemy's fire became unendurable. Hohenlohe thus describes the attack of the Kaiser Franz Regiment at Le Bourget: "At this point there were two battalions of the Franz Regiment who had to attack over 2,000 paces of open ground. The officer commanding this regiment had already practiced it in the attack. In accordance with his practice, he sent forward the whole of the leading line, which consisted of two companies, in thick swarms of skirmishers, and made them advance over the open ground in two parts (by wings) which alternately ran in 300 paces. After each rush the whole of the wing which made it threw itself down, and found some cover among the high potatoes; there they recovered their breath while the other wing rushed in. As soon as they arrived within the range of the needle gun, the wing which was lying down opened a fire of skirmishers on that edge of the village which they were attacking. I can still remember, as I write, the delight which we felt as from our position we watched this attack which had been so carefully thought

*Boguslawski.

out and was so well carried through. The best of the thing was that, as the commander of the regiment assured me, these troops suffered no loss up to the time when they reached the edge of the village. It was not until the street fighting began that the regiment endured the losses which it had to deplore on that day.”*

The development of infantry tactics in the Franco-German war is well summarized in Von Scherff's statement that “in the war of 1870-71 the enemy's position (whether in the open field or on the borders of woods and villages) *was invariably carried by swarms of skirmishers*, followed only at greater or less distances by lines and columns in close order.”

The Russo-Turkish War.—The tactical developments of the Franco-German war were carefully noted by all European nations, and each changed its drill regulations, more or less, to conform to the new conditions of tactics. The Russo-Turkish war demonstrated, however, that the lesson had not yet been entirely learned, and that some features of warfare altogether new, and others old in America but novel in Europe, were still further to influence tactics.

The Turks, armed with the Peabody-Martini rifle, a weapon vastly superior to any heretofore used, were able to pour out upon their adversaries a fire of unprecedented severity; while the adoption and development of the American system of hasty intrenchments gave them, at the same time, a shelter from their assailants that was unknown to the French in the great war seven years before. “The whole campaign,” says Greene, “may be said to have consisted—practically—of the attack and defense of more or less hastily fortified positions.”†

The old tactics of the Crimean war had been abandoned by the Russians, and an assimilation to the Prus-

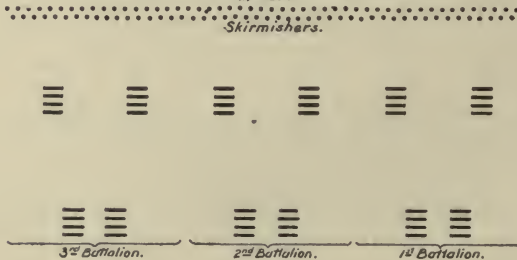
*“Letters on Infantry” (tr. by Walford), p. 135.

†“Russian Campaigns in Turkey,” p. 422.

sian tactics had been adopted in 1875. In place of the heavy columns of battalions or regiments, company columns were substituted, and the typical formation for attack may be described as follows: In each regiment* the battalions were formed side by side, two companies of each in the first line and two in the second, while the fifth or rifle company was held in reserve, ready to be thrown around the flank to pursue the defeated enemy or to receive his counter-attack if the assault should be repulsed. The formation was in two ranks, and the companies of the first line were either in column of platoons or deployed, while those of the second line were either in columns of platoons or half-platoons. Each of the leading companies threw forward a half-platoon as skirmishers in groups of four. The distance from the skirmishers to the first line was about 300 paces, and that from the first to the second line from 300 to 400 paces. (See Figure 21.) Another forma-

Figure 21.

*Attack Formation of a Russian Regiment
in 1877.*

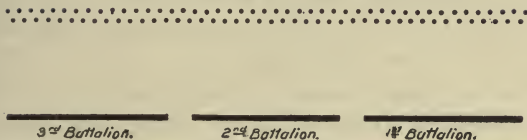


tion sometimes used was one in which the battalions were deployed in line, side by side, the rifle companies preceding the line as skirmishers. (See Figure 22.) "In no instance, however, does it appear that there was more than one line of skirmishers; behind them the troops marched with dogged bravery, in solid line of two ranks, shoulder to

*Nearly all the regiments consisted of three battalions. In some, consisting of four battalions, the formation was slightly different.

Figure 22.

Russian Regiment in Line with Skirmishers
1877.

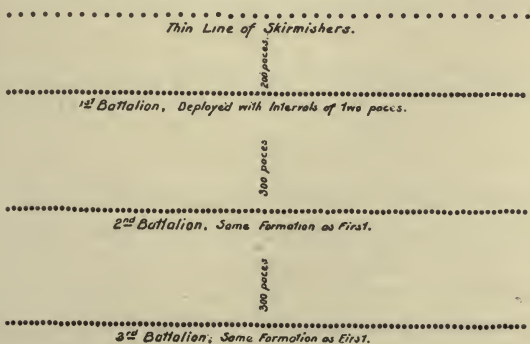


shoulder, or in company columns with platoon fronts, far inside the line of rapid effective fire; and they continued this march until the fire caused a break in their lines and a retreat, or until they reached the work after enormous losses, and held it as the result of a hand-to-hand fight. The skirmish line was so small in comparison with the main force that it really amounted to nothing, and the attack was in fact made in solid line.”*

In this war, as in the war between France and Germany, a new tactics was born of necessity on the field of battle. In Skobelev's assault at Plevna the regiments were formed in successive lines of deployed battalions, the intervals between the men in each battalion being about two paces, and the distance between battalions being about 300 paces. The leading battalion deployed its rifle com-

Figure 23.

Formation of a Russian Regiment in Skobelev's Assault at Plevna.



*"Russian Campaigns in Turkey," p. 448.

pany about 200 paces to the front in a thin line of skirmishers, the whole regiment thus forming, in reality, a succession of skirmish lines—the only formation, according to Skobelev, in which infantry can successfully assault entrenched positions.* (See Figure 23.)

Since the Russo-Turkish conflict there have been no wars of sufficient magnitude to effect any appreciable changes in tactics.

In summing up this sketch of the history of infantry tactics, we see that the development has constantly been on the lines of increased mobility and more effective fire action. The heavier columns suitable to an earlier epoch give way to the lines of Frederick; the latter succumb to the more flexible perpendicular system of the French; this in turn is unable to cope with the thin lines of the British; and finally the line is dissolved into skirmishers, and the columns, reduced to the smallest size, no longer appear in the forefront of the action.

CHAPTER V.

INFANTRY IN ATTACK AND DEFENSE.

"All great wars will, as heretofore, depend chiefly on the infantry."—*Sherman.*

THE OFFENSIVE.

General Theory of the Attack.—The object of the attack is the forcible expulsion of the enemy from the position in which he strives to maintain himself. Fire action being unable to accomplish this end alone, and the shock being a necessary supplement, it follows that a successful

*"Russian Campaigns in Turkey," p. 450.

attack implies primarily an ability to reach the defenders' position. The improvements in the range and destructive effect of firearms subject the attacker to a more severe fire, and one of longer duration than was formerly the case; and, *in this respect*, the defense has, of late years, gained enormously in comparison with the offensive. The old shoulder-to-shoulder line of battle, or the columns formerly used, are no longer possible attack formations. They would be shot to pieces before they could reach the hostile position, and their shattered fragments would be unable either to give a forceful shock to the enemy, or to resist his counter-stroke.

The object of the attack formation must, then, be to arrange and move the troops so as to escape destructive losses, and reach the enemy's position with a force superior (or at least equal) to that of the defender. To this end it must be such as :

1. To enable the troops to make the most telling use of the rifle, and thus diminish the effect of the enemy's fire by subjecting him to heavy loss in return.
2. To present the least favorable target to the enemy, and profit by the sheltering features of the ground.
3. To admit of celerity of movement, and thus minimize the time of exposure to hostile fire.
4. To be able to deliver a heavy shock at the end of the fire action.

Experience has shown that a firing line composed of skirmishers or of squads at suitable intervals best fulfills the first two conditions. But an entire battalion formed in this manner would present a front of such extent as to be quite beyond the control of its commander. Moreover, it would offer but weak resistance to a counter-stroke, its flanks would be without protection, and its losses could not be replaced. A second battalion following in support might obviate all these objections, except the first; but a reinforcement of the firing line, for the purpose of replacing losses, would

cause at once an intermingling of troops of different organizations, and a further objection would lie in the fact that the demanding and furnishing of reinforcements for the firing line would rest with two different battalion commanders. We may conclude, then, that the firing line should be supported by troops belonging to the same battalion.

It being the intention to throw the whole battalion upon the hostile position in the final shock, and, in fact, to utilize its entire firing power at close ranges, the front of the firing line must be equal to the front of the battalion in close order; and when several battalions are acting together this front is generally increased by half the intervals between the battalion and those on either side. The extreme fighting front of the battalion in a regiment should not exceed one and one-half times the front of the battalion in close order.* The maximum front of any firing line will be regulated by the necessity of supervision and control by the battalion commander. The minimum front will depend upon the requirement that each man should have space enough to enable him to use his rifle with the greatest effect.

As soon as the engagement fairly commences, the losses on the firing line begin, and must be quickly replaced; and as the line draws nearer to the enemy the number of rifles must be continually increased, so that the fire may steadily grow in intensity as the range becomes more deadly. A portion of the battalion must, therefore, follow as a support, at such a distance and in such a formation that it can readily reinforce the firing line without incurring in the meantime heavy losses itself.

The thin firing line attracts and holds the attention of the enemy, and it formerly screened, to a great degree, with a curtain of smoke, the support from the view of the opposing infantry. Even since the introduction of smokeless powder, it affords considerable protection to the support;

* Infantry Drill Regulations, paragraph 604.

for it is a well-known fact that soldiers in battle instinctively and invariably fire at those who are shooting at them. It follows, therefore, that only those bullets which pass through the intervals in the firing line, or over the heads or through the bodies of the soldiers composing it—in other words, *accidental* shots—will strike the men in the support. It is thus possible for close-order formations to live in the line of supports, when they could not hope to exist in the firing line. The distance of the support from the firing line is mainly influenced by the nature of the rifle in the hands of the enemy. If the rifle has a high trajectory, the angle of fall of the bullet will be great, and the support may approach comparatively close to the skirmishers; but with the flat trajectory of most of the rifles now in use, the support must be held farther back, in order that it may not become a butt, as it were, for the living targets on the firing line.

As the assailants approach the hostile position, the supports diminish the target they offer, by extending into a line of sections, squads, and finally skirmishers. As the firing line halts to fire, and at the closer ranges kneels or lies down, its rate of progress is diminished; as the support continues an uninterrupted advance, the distance between the two bodies steadily decreases; and the latter, being continually pushed forward as reinforcements into the former, is soon absorbed by it.

As the firing line becomes thoroughly committed to the fight, all movements on its part save a direct advance or retreat become more and more impracticable; and it thus happens that its flanks are peculiarly exposed to counter-attacks, and that this danger increases as the support is absorbed. There must, consequently, be another formed body in hand, available for use on either flank or at any part of the line that may be pierced by a counter-thrust of the enemy. This force is known as the *reserve*, and is generally equal in strength to the firing line and the

support combined. For reasons similar to those given in the case of the support, the reserve can be held in column, or in several small columns or extended line, in the earlier phases of the action; but it afterwards extends in suitable formation to enable it, in addition to its earlier functions, to replace the support as the latter is absorbed in the firing line. As the firing line comes within close range of the enemy, the fire becomes so severe as to render further advance impossible until a renewed onward impulse is given by reinforcement from the reserve; the reinforcement being made either by fractions or simultaneously. The fire now being at the most effective range, it is, moreover, desirable to have in the firing line every rifle that can be used. The union of the reserve with the firing line raises the fire to such a furious intensity, and the losses become so heavy, that the strain can not be borne many minutes before either the assailants or the defenders must give way. In order that the attacking force may be strengthened physically and morally by reinforcement at this critical juncture, there must be a second line at hand to rush forward and carry the firing line with it in a charge on the hostile position. That this reinforcement may reach the firing line in time, it should never at this phase of the action be more than 500 yards in its rear, and, indeed, the distance is usually much less.

Sometimes the reserve is sufficient to carry forward the firing line to the final assault, but a second line is generally necessary; and, in order that the troops may not, in the disorder of victory, be easily thrust out of the captured position by a counter-charge of hostile reserves, a third line, well in hand, in close order, is necessary to occupy the position and hold it while the troops of the other lines are re-forming. We thus find the attacking force divided primarily into a *firing line*, a *support*, and a *reserve*; the first two together forming the *fighting line*, and the fighting line and reserve together forming the *first line*. This is

generally supported by a *second line*, and the two are often supported by a *third line*.

The above is merely a brief outline of the general principles of the attack. Each of the component parts of the attack formation must now be considered separately and in detail.

THE FIRING LINE.

Measures for Its Control.—The functions of the skirmishers have been greatly changed by the evolution of tactics in the present century. Formerly used merely to feel and develop the enemy, or to cover the deployment of troops in their own rear, they have become the most important element in modern tactics, and now not only begin the action, but fight it out to the end.

This change in the method of employing skirmishers has added greatly to the difficulty of command; for a firing line in extended order is, from its very nature, more difficult to control than the same number of men in the old close-order formation. Each soldier is necessarily left more to his individual impulses than ever before; and the greatest care is now necessary to prevent the men from getting completely out of hand and wasting ammunition in a wild and ineffective fire. The most important measures for securing the control of the men are a subdivision of the company into small squads or groups, the most stringent discipline, and careful instruction in that branch in military training known as "fire discipline." The squad is held together in close order until compelled to deploy as skirmishers either for its own protection or in order to increase the effect of its fire. It should be small enough to enable its leader to exercise superintendence over it in any formation. In an extended line, in the turmoil of battle, the squad leaders are often left quite to their own resources; and the position of a non-commissioned officer, like that of an officer, has become much more important than it was

formerly. Good subalterns and non-commissioned officers are, in fact, one of the first requisites for an efficient firing line; and one of the ablest military writers of the age* declares that only an army that possesses a thoroughly experienced, intelligent, and brave corps of subaltern officers, all trained for independent action, can be successful on the offensive.

As the men in extended order in battle often get beyond the control of their own officers; as they are mingled during successive reinforcements with men of other commands, and consequently find themselves under the immediate orders of officers of different organizations; it is necessary that their discipline should be such as to insure prompt obedience to any officer of their own army, and that each should be instructed, when separated from his own squad or company, to place himself at once in another, and obey its leader with the same loyalty that should characterize his service under the commanders of his own proper organization. Whenever necessary, new squads should be formed of such men as are separated from their own commands. No unwounded men should be allowed to drift to the rear, but should be picked up by, and incorporated with, the organizations following.

Fire Discipline.—By “fire discipline” is meant the “unhesitating habit developed in the men by instruction and training, of commencing, or ceasing, or relaxing the fire, or of concentrating it upon a defined object, all in obedience to the will of the commander.”† In addition to being carefully trained in rifle firing, the soldier should be impressed with the importance of the following rules:‡

1. Never fire except when ordered, and then only the number of cartridges indicated.
2. Never fire after the command or signal “Cease firing.”

*Von der Goltz.

†Mayne.

‡U. S. Infantry Drill Regulations, par. 534.

3. Never fire except at the named objective.
4. Never fail to adjust the sight at the range named.
5. Always aim at the feet of the enemy.

The observance of these simple rules in action is a matter of the greatest difficulty. In the excitement of battle the men become so absorbed in the act of firing that they perform the motions automatically rather than intelligently, and seem to be actuated by a desire to shoot rapidly rather than with effect. Of about 27,000 muskets picked up on the battle-field of Gettysburg, at least 24,000 were loaded. About half contained two charges, one-fourth held from three to ten charges, and one musket contained twenty-three cartridges. Yet the troops in this battle were seasoned soldiers of exceptional experience in war. (The Austrian rifles left on the field of Königgrätz were found in a similar condition.) The introduction of the breech-loader has changed the *kind* of indications of this absence of mind on the firing line, without in the least modifying their emphasis. It was observed in the Franco-German war that as the Germans drew close to the French position their casualties diminished; partly, no doubt, because of the effect of the German fire at short range, but largely because of the neglect of the French soldiers to lower their sights. At Majuba Hill many of the British soldiers had their sights at 800 yards when the Boers were closing upon them; and at St. Privat a sergeant of the Guards seems to have quite immortalized himself by the simple action of personally causing the men near him to reduce their sights to proper range as they advanced.* Hohenlohe says that it is even a proof of a certain standard of training in infantry if in a hot fight the men put their rifles to their shoulders before firing. At Königgrätz he found himself within twenty or thirty paces of a half-battalion of Austrian infantry, who in their demoralization (they had just been thrust out of the village

*This incident gained for Sergeant Schultz special commendation in Lüdinghausen's "History of the Second Regiment of Foot Guards," and has been frequently commented upon.

of Chlum) held their rifles almost vertically, and sent a storm of bullets into the air, without, of course, hitting anything. General Walker in his "History of the Second Army Corps," describing the attack of the Confederates late in the day, on the intrenchments on the Brock Road, in the battle of the Wilderness, says: "The attack was a real one, but was not made with great spirit; nor, it must be confessed, was the response from our side as hearty as it was wont to be. The enemy's line advanced to within about one hundred yards, and then halted and commenced firing, to which our troops replied, with noise enough, but keeping too much down behind the log intrenchments and thus discharging their muskets upward." These troops had been fighting nearly all day with great gallantry, and were worn out with "the excitement and the strain, the labors and the losses of the morning." From these instances (which might be supported by many others) it is evident that only the strictest fire discipline and the utmost vigilance on the part of the officers and non-commissioned officers can secure an accurate fire in the heat of action.

Long-Range Fire.—The time of beginning the firing will depend upon many circumstances of terrain, supply of ammunition, *morale* of the troops, and the target offered by the enemy. Long-distance firing is generally to be deprecated, as it might lead to an exhaustion of ammunition before reaching the most effective ranges. It must be remembered that the consumption of ammunition is great, even with experienced soldiers habituated to the best of fire discipline. With raw troops it is enormous. At the battle of Concon, August 21, 1891, some of the troops of the Chilian Congressional army are said to have fired away all their ammunition (from 150 to 200 rounds per man) in three-quarters of an hour. Another objection lies in the fact that unless the enemy offered an exceptionally good target, the fire would, by its lack of effect, encourage rather than demoralize him.

The condition of the troops is a matter that cannot be left out of consideration in deciding whether firing is to be used at long range. If the enemy be in a position to use long-range fire, and his shots take effect, the troops will speedily become demoralized if they be not allowed to return the fire. Even though they should not be able to do any appreciable damage to the enemy by their return fire, they could (in the homely, but expressive, phrase of the British) at least "shoot up their own pluck." Long-range fire may thus be forced upon the assailant; but it should be carefully regulated and not continue longer than considerations of *morale* demand.

Long-range fire will rarely be demanded of the skirmishers. When used, it will generally be by bodies of troops in close order, who may thus, if ammunition be plentiful, inflict severe losses upon the enemy, if his troops be in heavy masses. Special bodies of infantry may be detailed, either alone or in conjunction with the artillery, to silence the enemy's guns, and thus prepare the way for the infantry attack. But this is really imposing upon the infantry an artillery function—"using a mallet for a hammer"—and should be considered justifiable only when a deficiency in artillery renders such employment of infantry a matter of imperative necessity. As a rule, infantry should not be called upon to replace artillery in opposing hostile guns at long range; for the consumption of ammunition will be enormous and the result doubtful at best. Hohenlohe is of the opinion that in war we should "commit a fault leading to a colossal waste of ammunition, by allowing infantry to open fire at from 1,100 to 1,200 yards, if there were by any chance artillery available for the desired duty."* So far as the skirmish line is concerned, the use of long-range fire may be regarded as altogether exceptional.†

*For an account of the experiments by Prince Kraft which led to this conclusion, and for his further comments on the same, see "Letters on Infantry" (Walford's translation), p. 142 *et seq.*

†For a complete discussion of long-range firing, see Mayne's "Fire Tactics," p. 245 *et seq.*, or Batchelor's "Infantry Fire," p. 141 *et seq.*

Time of Opening Fire.—The attacking force should approach as near the enemy's position as possible without firing. It is expecting too much of human nature to suppose that infantry can be urged through a storm of rifle bullets without replying to it; but at the longer ranges it must obtain protection from its own artillery. The fact of attacking presupposes a superiority of force on the part of the assailants; and a superiority of artillery is essential in the preparation for the assault. The hostile artillery must either be silenced, or kept so busy by the batteries of the offensive that it cannot turn its attention to the attacking infantry. A superior force of artillery should be able to do this, and, at the same time, turn such a heavy fire upon the opposing infantry as to keep it under cover and impair the effectiveness of its fire, until the fire of the batteries is necessarily suspended in order to avoid firing on their own advancing infantry.* If possible, the attacking infantry should advance to about 500 yards of the enemy before firing, as it is at this range that its own fire becomes very effective. It is rarely, however, that the infantry can approach nearer than 700 or 800 yards without the necessity for firing becoming imperative. It should be able to reach the latter limit if its *morale* is good and its supporting artillery is strong and skillfully handled, unless the terrain is such as to give the enemy exceptional advantages for long-range fire.

Volley Firing.—As long as possible, the firing should be by volleys. Before the introduction of smokeless powder this was especially desirable, as the smoke from volleys cleared away quickly, while file firing caused a continuous curtain of smoke to hang in front of the men and obstruct their aim. It is still desirable to use volleys, as the men are more easily kept in hand, the expenditure of ammu-

*So dependent upon each other are the several arms that it is impossible to consider the tactics of one without reference to the use of the others. All claims of the "independence" of one arm or another are based simply upon tactical ignorance or a perverted and pernicious sort of *esprit de corps*.

dition is more easily regulated, the objective of the fire can be altered at any moment, the changes in elevation can be made at any time, and it has a more demoralizing effect upon the enemy than a fire at will; for the fall of a number of men at the same instant makes a more powerful impression than the same, or even a greater, number falling separately. Against this it is urged that the leader ordering the volleys cannot be sure that each man has finished aiming, and the quick, sharp, command to fire is calculated to cause an impulsive pull and derange the aim. The fact that independent fire allows more shots to be fired in a given time may or may not be an advantage. At very close ranges, in critical moments of the fight, it is an advantage; at other times it is quite the reverse, as it would lead to an inordinate consumption of ammunition without any compensating gain.

Volley firing is, however, possible only when the men are cool enough to comprehend and obey orders; for volleys, to be effective, must be well delivered. Ill-directed, "ragged," volleys encourage rather than demoralize the enemy, and a few nervous, excitable men may ruin the volley of a squad, a section, or even a battalion. As soon as the immediate commander of the body firing volleys observes that the men are becoming "rattled," he should at once order a fire at will, thus giving the force of an order to a mode of action that cannot be prevented. At close ranges volleys will generally be found impossible. Indeed, Captain May declares that in the whole course of the Austro-Prussian war volleys were unknown; and Boguslawski says that, in the Franco-German war, the few cases in which volleys by the Germans could be well authenticated were when the French were surprised. The only thing that can be recommended is, to use volleys as long as possible, and then make the best of unavoidable conditions.

Individual Fire.—If good results are to be obtained from individual fire, the discipline must be such that the men

will fire only the indicated number of cartridges, and will, if the number be not indicated, cease firing at once upon hearing the signal. Pauses in the fire are valuable, as they enable wild firing to be checked, and tend to economize ammunition.

Rapid fire will, if possible, be postponed until just before the final assault. At this point the bayonets should be fixed, the rear sight laid down, the magazine used, and as intense a fire as possible directed straight to the front. In the pinch of the fight fire discipline will probably disappear; but the officers and non-commissioned officers can at least endeavor to make the men lay down their sights and fire straight to the front instead of blazing away in the air.

Cover.—At the shorter ranges, protection from the enemy's fire must be sought in the use of natural cover. Trees, ditches, shallow depressions, and other features of the terrain afford shelter for the skirmishers; and if no natural cover be at hand, they may gain considerable protection by lying down. The cover chosen must, in every case, be such that the men sheltered by it can see the enemy and have an effective fire upon him. No amount of protection afforded by the cover can compensate for the least impairment of the efficiency of the fire of the men sheltered by it. If shelter alone were considered, the men might as well be left off the battle-field altogether. Another important consideration is, that the cover must not, in any way, interfere with progress to the front nor obstruct a retreat from the position.*

It is not only necessary that the men should be instructed in taking advantage of all cover that may be available, but they should also be taught to leave it at word of command. "When a regiment is deployed as skirmishers," says General Sherman, "and crosses an open field or woods, under heavy fire, if each man runs forward from tree to

*For the manner of properly utilizing cover by the individual soldier see the Infantry Drill Regulations, p. 551 *et seq.*

tree, or stump to stump, and yet preserves a good, general alignment, it gives great confidence to the men themselves, for they always keep their eyes well to the right and left, and watch their comrades; but when some few hold back, stick too close or too long to a comfortable log, it often stops the line and defeats the whole object." Boguslawski, in describing the action of the German infantry in 1870-71, says: "The attacks were generally made with great determination when once in progress, for against the enormous effect of infantry fire, the greatest difficulty does not consist in charging home, but in leaving cover to begin the attack." This tendency on the part of the men to hug cover must be recognized and provided for. When the men show reluctance to leave their shelter, and are deaf to the commands and insensible to the example of their officers, a reinforcement coming up with a cheer will often carry the line forward from its cover and a considerable distance beyond. The successive reinforcements of the firing line should, therefore, be regulated, as far as possible, with a view to this forward impulsion.

Rushes.—When the enemy's fire permits, the advance should be continued without interruption. The moral effect of a steady, unhesitating, unswerving advance is very great, and so long as the onward movement is uninterrupted there is no trouble in regard to getting men to leave cover. During the early stages of the advance, running should be carefully avoided, as it would tend to wind the men and interfere with the efficiency of their fire. But upon arriving within five or six hundred yards of the enemy's position, a fire of such intensity is encountered that the question of passing over the intervening space assumes a new phase. It is desirable to traverse this distance as quickly as possible; but to do so, even at double time, would require several minutes, during which time the attacking infantry would be exposed to an unimpeded fire from the rifles of the enemy, and probably swept out of existence. Even if the

men should succeed in reaching the hostile position, they would be winded and altogether unfit for a hand-to-hand struggle. Such a long charge would, in fact, be justifiable only when it was evident that the enemy had already begun to abandon his position and that the charge would merely accelerate his flight. The space must, therefore, be crossed by a succession of bounds or rushes, each covering a short distance. In 1870-71 the German rushes were generally for a distance of about a hundred paces, though in some cases they were three times that distance.* Generally the rush should be made for a distance varying from thirty to fifty yards. When the rushes are made by alternate companies, the distance to be passed over at each rush is designated by the captain, who also regulates the reinforcing from the support as orders may direct or necessity demand. The distance of the rush is largely regulated by the effectiveness of the enemy's fire and the nature of the ground. Generally some sheltering feature of the terrain is selected as the objective of the rush, and independently of this, when the hostile fire becomes too hot, the lines should be halted, lie down, and open fire, regardless of the question of exceeding or falling short of any specified distance.

The rush may be made by the entire line or by fractions of it. In the former case only the questions of the enemy's fire and bringing the men unexhausted to the hostile position need be considered. But if made by the entire line, the enemy's fire will be entirely undisturbed during the rush, while if made by alternate fractions, the hostile fire can be kept down by the fire of the part of the line remaining stationary. Hohenlohe says that firing should never cease during a rush; but Boguslawski says that the support of rushes by fire action is generally very doubtful, and that it is only possible when favored both by the ground and the position of the firingline.† It seems certain

*See the account of the attack on Le Bourget, p. 100 *ante*.

†"The Progress of Tactics from 1859 to 1890, and the Attack of the Future," translated by Gawne.

that *whenever it is possible*, the rush should be supported by fire action, which means also that it should be made by alternate portions of the line. The fractions of the line alternately rushing should be large; for if the subdivisions be too small, the front of fire will be too restricted, and there will be great danger of the troops in front receiving accidental shots from those in rear. This must be especially guarded against; for the effect of stray shots from their own friends in rear is peculiarly demoralizing. "Whoever," says Von Scherff, "has been in a position to hear bullets whistling past him from behind, even considerably on one side of him, though there could be no doubt of their being friendly bullets, will confess that such music is even less conducive to forward movement than is the rain of hostile shot from the front." If the rush be made by alternate fractions, and these fractions be small, the distance covered by each forward bound should be small, as the angle of free fire for the portions in rear will be reduced according to their distance from the fractions in front. As a rule, the firing line of an attacking force (unless very large) should not be divided into more than two echelons for alternate rushes.

In order that the fire may proceed uninterruptedly during the rushes, it would seem that the best method would generally be to advance the right echelon first, and then bring the left up to the same line. Owing to the manner in which men kneeling or lying down hold their pieces, the chance of stray shots from the rear echelon striking the one in advance would be reduced to a minimum, if the left echelon were in rear; for the accidental shots would be pretty sure to go to the left. The left echelon could, then, fire during the forward rush of the right, and the latter could, of course, cover with its fire the advance of the left fraction of the line.

An advance by rushes should not be begun until circumstances render it necessary; for when this method

of advance has been adopted, it is generally impossible to stop it and change the form of attack.

Composition of the Firing Line.—In the successive reinforcements of the firing line, men of different organizations inevitably get mixed together. There is, apparently, no help for this; but it should be delayed as long as possible and the intermingling reduced to a minimum. This may best be done either by having the firing line and supports taken from the same company, or by having entire companies in the firing line and supporting them with companies of their own battalions. It is desirable that the firing line and supports should never belong to different battalions. Generally, in opening the fight, not more than one-fourth of the men should be in the firing line. The most effective handling of the rifle is obtained when the skirmish line consists of one man to each yard of front.

Great care should be taken to give the proper direction to the firing line when it first moves out to the attack; for a change of direction of the line under a heavy fire is always difficult and often impossible. A change of front to the extent of a half wheel, or one-eighth of a circle, is sometimes practicable before the line becomes seriously engaged; but once actively employed, changes of direction, movements by the flank, or, in fact, any movement except straight ahead or direct to the rear, are impossible.

The firing line is essentially the fighting part of the army; and the other portions of the infantry are merely to repair its losses, protect its flanks, and reinforce it to the density necessary for conducting the combat. It is, as a rule, opposed to a similar line on the side of the enemy; for all recent wars have shown that masses are helpless when opposed to an extended line. It should be able to repulse front attacks, and ordinarily should have no fear of cavalry, unless surprised and taken in flank by it. In the Franco-German war, most of the attacks of the French cavalry were repulsed by the German skirmishers with no other

change of formation than a slight diminution of intervals.

Scouts.—Almost invariably, the ground over which an attack is made is broken, and contains features that may either afford shelter for the assailants or constitute obstacles to their advance. Scouts should, therefore, be sent out to the front to make a rapid reconnaissance of the ground and signal information relative to it to the troops in rear. The scouts should be skilled in judging ground, should be sharpshooters, and in addition to reconnoitering the terrain and the enemy's position, should be charged with the duty of driving back the hostile scouts and picking off their leaders. They take advantage of the ground to conceal themselves as much as possible, and are especially careful to find good cover for the troops in rear and to discover the enemy. Even on open ground they are useful; on broken and diversified ground they are indispensable.

The scouts, in number depending upon the nature of the ground and the duties required of them, are generally sent out as soon as the command arrives within the zone of artillery fire. Several scouts, under a non-commissioned officer, are usually sent out from each company, advancing at a rapid pace and generally preceding the skirmishers by about 150 yards. Their movements may be controlled by whistle signals, and they must be halted to await the firing line, or be recalled to it, before fire is opened. They are usually united with the firing line by the time it arrives within 800 yards of the hostile position.

THE SUPPORT.

Object of the Support.—The object of the support is generally two-fold. If the firing line supported by it is at the flank of the general line, or if gaps or intervals, through which the enemy might penetrate, exist in the line, the support is charged with the duty of protecting the firing line from flank attacks by the enemy, and flank scouts should be constantly employed. This duty is, however,

generally a secondary object, and it devolves upon the reserve as soon as the support begins to merge into the firing line. The paramount function of the support is to reinforce the firing line.

Strength of the Support.—The strength of the support depends mainly upon the degree of cover afforded by the ground over which the attack is to be made. On open ground, where the firing line will probably suffer heavily, the support should be relatively stronger than on ground affording such shelter as to make it reasonably certain that the former will be able to approach near the hostile position before encountering much loss. At the beginning of the attack the strength of the support should be at least one-half that of the firing line, and it is generally equal to it.

Distance from the Firing Line.—At the beginning of the attack the distance of the support from the firing line is generally about 200 yards. The distance is by no means invariable, however, but changes according to the circumstances of terrain and fire. It should be greater on open ground than when cover enables the support to advance closely without loss; and, for reasons already stated, it should be greater when the trajectory of the enemy's rifle is flat than when it is high. It also depends upon the important consideration that the support must be near enough to reinforce the firing line promptly, and far enough back to avoid heavy loss. If the support be so close as to suffer heavily, the men will invariably rush forward and join the firing line; for all men object to being shot at without a chance of firing in return. If the support be too far away, the firing line will suffer for want of timely succor, and the reinforcements will encounter needless loss in traversing too long a distance—especially when both firing line and support are under shelter and the space between them is open. The distance diminishes, of course, from the maximum prescribed for the earlier stages of the attack to the min-

imum reached in the complete union of the support with the firing line.

Formation of the Support.—The formation of the support varies with the nature of the ground and the phases of the action. The use of columns is generally practicable only in the earlier stages of the fight; and even then they must be small in order that they may profit by the shelter afforded by the terrain, and not offer a good target to the enemy's artillery. If no cover exists, a line formation becomes imperative.

Small columns, a line in close order, or a line of sections can generally be used by the support until the firing line approaches near enough to the enemy to open fire, at which time it will generally be necessary to extend the support into a line of squads. The support is generally absorbed by the firing line by the time the latter is within 450 yards of the enemy. Before reaching this point it may be necessary for the support to deploy as skirmishers; but, as a rule, the reinforcement will be made by squads, and the support should not be broken into smaller units unless such a step becomes unavoidable.

It must be observed that no definite time or place can be prescribed for any of the extensions of the support from column or close-order line. Each extension should be made only when it becomes necessary, in order to avoid losses or facilitate the reinforcement of the firing line. It may often occur that one part of the line is exposed, and another sheltered by the nature of the terrain. In such a case, while the exposed part is extended, it may be possible to retain the latter in small columns until the attack is well advanced. Small columns may also often be employed in the support in night attacks, or when the ground favors a surprise of the enemy. The fact that they cannot often be used should not cause them to be neglected when they can be employed. In nothing is the skill of the tactician more evident than in the choice of the time of deployment or the

change from close to extended order. To act too soon, in this respect, is to abandon the control which close order gives and incur the risk of the men getting out of hand; while delayed action results often in ruinous losses and invites defeat.

Reinforcement of the Firing Line.—In reinforcing the firing line from the support it is desirable that, as far as possible, men of the same group be kept together, and it is accordingly best to reinforce by sending squads forward rather than individual men. The firing line is rarely of uniform density. Bits of cover here and there attract groups of men, and the skirmishers instinctively spread out to each side of dangerous ground which is well beaten by a rain of falling bullets. Gaps are often thus made in the line, and it is into these that groups from the support should be inserted. But this method of reinforcing is not always practicable, and though it be desirable to keep men of the same group together, there is often nothing to be done but to send them forward to find places where best they can; for once under a heavy fire, the skirmishers cannot move to a flank nor diminish their intervals.* Moreover, the evils of mixing men of different commands in the firing line has probably been much exaggerated. If the troops be well disciplined, they will obey orders from any officer under whose command they happen to fall; and the officers most conspicuous in the fore-front of battle are those natural leaders whose influence over men is largely independent of official position or personal acquaintance. There is no denying the fact that the *morale* of most men is better when they are with their own comrades than when they are among strangers; but military history is full of instances of gallant and successful attacks made by men of various commands mingled together. The force which

* "Could such a movement to the flank be possible, if the fight were so hot as to necessitate the advance of reinforcements? Would not these skirmishers, who all stand up and move together to a flank, be certainly sacrificed to the enemy's bullets?"—*Hohenlohe*.

carried the great Russian battery at the Alma consisted of a mixture of troops from many regiments. The troops which, under Hancock, made the brilliant assault at "the Bloody Angle" were disordered, and men of different regiments, brigades, and divisions were mingled together. In the attack on the village of Fröschweiler, in the battle of Wörth, soldiers of almost every regiment of the 5th and 11th German corps were crowded together in a general mass; and at Tel-el-Kebir, in 1882, though the Highland Brigade was formed for attack in line, two deep, within three hundred yards of the Egyptian position, it carried the intrenchments in a crowd of men of different battalions, in which all tactical formation had disappeared.

The choice of the time of reinforcing is a matter of the greatest importance. If the reinforcement be delayed too long, the men will rush forward singly and in small groups, and the support will, without orders, melt away into the firing line. On the other hand, the reinforcement should be delayed as long as practicable, as its moral effect on the firing line is much greater in the later than in the earlier stages of the fight.

When the support is halted, it stands, kneels, or lies down according to cover.

THE RESERVE.

The Object of the Reserve.—The objects of the reserve are similar to those of the support; namely, to guard the flanks and reinforce the firing line. It is, in fact, but a continuation of the support—"a second drop to fall upon the same spot as the first."

Formation of the Reserve.—In order that it may fulfill its first object, the reserve should, as a rule, be held in a single body, in rear of the center or of the most exposed flank; though circumstances of terrain, or the exposure of both flanks, may sometimes render it advisable to divide the reserve into two parts. The assailant should, however, while

carefully guarding his flanks, seek more to protect his flanks and rear by occupying the enemy completely with the vigor of his front attack than by detaching defensive bodies to the flank. As long as possible, the reserve should be held in column; but as soon as it comes within effective range of artillery fire, its extension becomes necessary; for the reserve is, even more than the support, a target for the hostile guns.

The Distance of the Reserve from the Bodies in Front.—In the beginning of the attack the distance of the reserve from the firing line varies from 500 to 750 yards. In our drill regulations the former distance is adopted, the reserve being 300 yards in rear of the support. As the attacking force approaches the enemy's position, and the support becomes merged with the firing line, the distance of the reserve from the support is, of course, diminished; for the halts for firing check the progress of the troops in front, while the reserve must continue its advance uninterruptedly. The advance, in fact, from the time the attack formation is adopted should be continued with energy and without interruption; for an advance once checked and brought to a standstill is almost sure to fail.

The distance of the reserve from the firing line must always be less than the distance of the latter from the enemy. Otherwise, the enemy might, by a sudden attack, overwhelm the firing line before it could be reinforced by the reserve. As the crisis of the attack approaches, the reserve must be close to the firing line, in order that it may reinforce it promptly.

Reinforcement by the Reserve.—The reinforcement of the firing line from the reserve is rarely effected by throwing the latter bodily into the former; but, on the contrary, when the firing line is within about 400 yards from the enemy it is generally fed steadily from the reserve, a portion of which is, however, held in hand for reinforcing just before the final assault. Great care must be taken to rein-

force at the right moment. "It is very difficult in this matter," says Boguslawski, "to do the right thing, and to avoid falling into the error of letting the infantry which is already engaged expend itself, and at the same time not to commit the other fault of giving ear to every call for assistance, and of engaging the reserve prematurely in the raging fight, when the commander naturally loses, to a great extent, his hold over them." The words of General Skobelev on the same subject are interesting. "There are," he says, "in every command a small percentage of cowards who will slink away at the first opportunity, a certain number of men of rash bravery who will go too far forward and get killed, and the great majority of men of ordinary courage, but liable to waver as the fight gets hot. The reserves must be sent in at the moment when the reasonably brave men have been long enough engaged and met with enough resistance to begin to feel nervous, but before they have begun to retreat."*

Strength of the Reserve.—Before it begins reinforcing, the reserve is generally equal in strength to the firing line and support combined. It may in some cases be advisable to give it a smaller proportionate strength, but, as a rule, it is equal to all in front of it; and at the opening of the fight it should *never* be less than one-fourth of the entire first line.

THE SECOND LINE.

Object of the Second Line.—The reserve is generally insufficient to give the firing line the impetus necessary to carry it to the enemy's position. It is usually absorbed in the firing line at the crisis of the fight, and its entire energy taken up in fire action. Whenever stubborn resistance seems likely to be encountered, a second line must accordingly be provided for shock action; and it must carry the

*Greene's "Russian Campaigns in Turkey," p. 450. Though Skobelev had reference, in the above remarks, to the divisional reserves, the words are no less true when applied to the reserve of a battalion.

first* line with it in the final assault; for the passage of lines in action may now be regarded as practically impossible. In addition to its function of giving the first line the physical and moral reinforcement necessary to carry it to the enemy's position, the second line is charged with the duty of guarding the flanks of the first, with reinforcing or extending that line when necessary, and with renewing the fight in case of the repulse of the first line.

Strength of Second Line.—The strength of the second line varies from one-third of that of the first to an equality with it. No invariable rule can be given. It may even be necessary, in some cases, to have the second line stronger than the first; but, as a rule, if the lines are not equal, the greater strength should be put in the first.

Distance from First Line.—At the beginning of the attack the second line is generally about 600 yards in rear of the first, the distance steadily diminishing as the hostile position is approached.

Command.—The second line should be under the command of the officer who has charge of the first; so that the same mind that directs the attack may control the reinforcement at the critical moment.

THE THIRD LINE.

Object of the Third Line.—The final assault must, of course, result either in success or failure. In the former case, the troops, excited by the charge and disorganized by the intermingling of different tactical units, are in no condition to sustain a counter-charge by the enemy's reserves, and, unless promptly supported, they may be driven from the position they have gained before order can be restored. Our own history furnishes many examples of a position gallantly won, and then lost for want of timely support of the attacking troops. In the Wilderness, Jenkins' Con-

*It must be remembered that the first line consists of the firing line, the support, and the reserve.

federate brigade, which had penetrated the Union position, was driven out by a charge by Carroll's brigade, which had been held in reserve. At Franklin, the Confederates were, in the very moment of success, defeated and thrust out of the Union works by a charge by Opdycke's brigade. At Spottsylvania, Upton's fine assault failed of permanent results because unsupported. Many other instances might be cited from the same war.

It is necessary, therefore, to have in hand a body of formed troops with which to meet the enemy's counter-attacks, to hold the captured position, or to conduct a pursuit. The attack must not be regarded as completed until the enemy has been pushed entirely out of the position, and deprived of the power of making a counter-attack. Under cover of the third line, the troops of the first and second lines are re-formed as quickly as possible. In case of the repulse of the attack, a body of formed troops is likewise necessary to cover the retreat of the attacking troops shattered and demoralized by defeat.

The duties of securing a captured position or covering a retreat may be performed by the second line unless it has been merged with the first line in the course of the fight. As such will generally be the case, a third line is usually necessary. Bearing in mind that the object of the second line is to reinforce for the final assault, for which the reserves of the first line may, perhaps, be sufficient, while that of the third is to clinch a victory or neutralize a defeat, we can appreciate Von Scherff's quaint statement that, while a second line of battle is necessary only under certain conditions, a third line can never well be dispensed with.

The third line is sometimes termed the "maneuvering line," and has more independence of action than the second. The troops for flank attacks are generally taken from the third line, which is also charged with the repulse of flank attacks made by the enemy. When counter-

attacks are necessary, they are usually carried out by the third line, which is also sometimes employed in fortifying a line of defense in rear, by means of which it may, in case of the repulse of the attack, check the enemy, and from which it may renew the assault.

Command.—The third line is not necessarily under the command of the officer commanding the first two, as it is charged with quite different functions. It is generally under the immediate control of the commanding officer of the entire force composing the three lines.

Distance from Second Line.—The distance of the third line from the second is, at the beginning of the attack, about six hundred yards.

Strength.—The third line is generally larger than the second, and is often equal in strength to the first. In a regimental formation for attack the first, second, and third lines may each consist of a battalion.

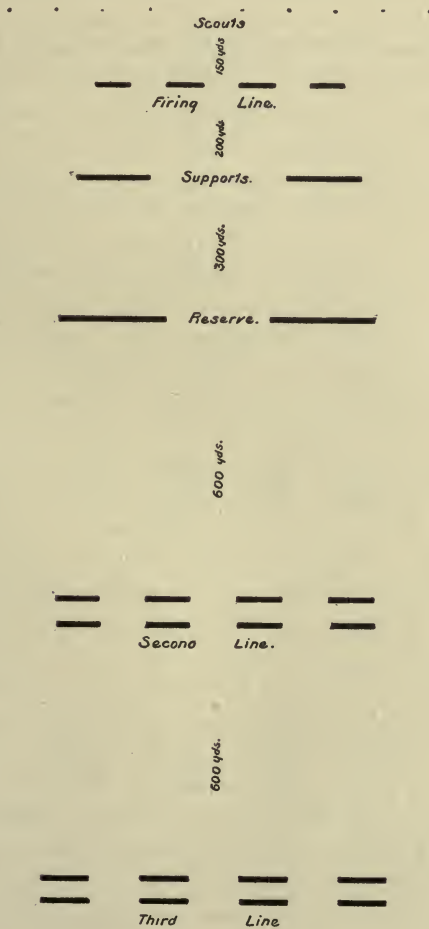
THE REGIMENT OF INFANTRY IN ATTACK.*

The regiment may be formed in two or three lines, according to the nature of the attack and the front to be occupied. The maximum front should not exceed that of the regiment formed in one line in close order, increased by half the interval between it and the adjacent regiment. The minimum front is that of a battalion in line in close order. If formed in two lines, the first line consists of two battalions, and the second line of one. If formed in three lines, each consists of a battalion. In either case the distance between the lines is about 600 yards. The formation in three lines is the one generally adopted when the regiment is acting alone, or when a powerful attack is intended, and will accordingly be the one here considered. This is a

*The method of attack by company and battalion, either alone or as a part of a larger body, is given in detail in the Infantry Drill Regulations, with which all officers are presumed to be familiar; and a description here of the company or battalion in attack would be merely a matter of supererogation. To make a special application of the foregoing principles, it is thought best, therefore, to take the case of a larger body than those considered in detail in the drill book.

favorite formation with the Germans and French, and is the one almost invariably used by the latter when the regiment is acting alone.

Figure 24.
Attack Formation of a Regiment of Infantry
Firing Line about 3000 yds. from Hostile Position.

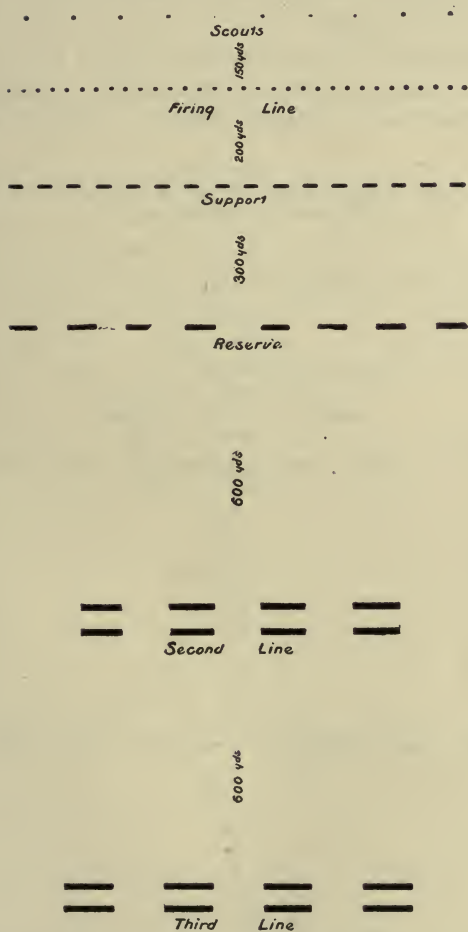


Just before entering the first zone of artillery fire, the regiment (being in route formation) is formed front into line in three lines. The colonel directs the major commanding the first battalion to form for attack, and indicates the direction and object of the assault. The major at once designates the second and third companies for the fighting line and the first and fourth for the reserve, and orders the attack formation to be taken. The captains of the companies designated for the fighting line each send forward a few scouts, under a non-commissioned officer, who is first instructed as to the direction and object of the movement. They also each designate two sections for the firing line and two for the support, and when the scouts have advanced sufficiently, the companies are formed for attack, the firing line, in close order, following the scouts at a distance of about 150 yards, the four sections of the support, each in line in close order, following the firing line at 200 yards distance, and the two companies of the reserve, in similar formation, following at a further distance of 300 yards. The support and the reserve are both so disposed as to protect the flanks of the firing line. The second line, in line of platoon columns with full intervals, follows the first at a distance of 600 yards, and the third line, in similar formation, follows the second at the same distance. (See Fig. 24.)

At about 1,400 yards from the hostile position, the firing line forms line of sections, the support taking the same formation. At about 1,200 yards, the firing line forms line of squads, the support remaining in line of sections. At about 900 yards, the firing line deploys as skirmishers, the support forms line of squads, and the reserve extends into line of sections. (See Fig. 25.) The scouts open fire and remain halted, awaiting the arrival of the firing line. At about 800 yards, the firing line opens fire, by direction of its captains, who decide the time and manner of firing. At this stage the firing will generally be by volleys, regulated by the section commanders, who will have received instruc-

ORGANIZATION AND TACTICS.

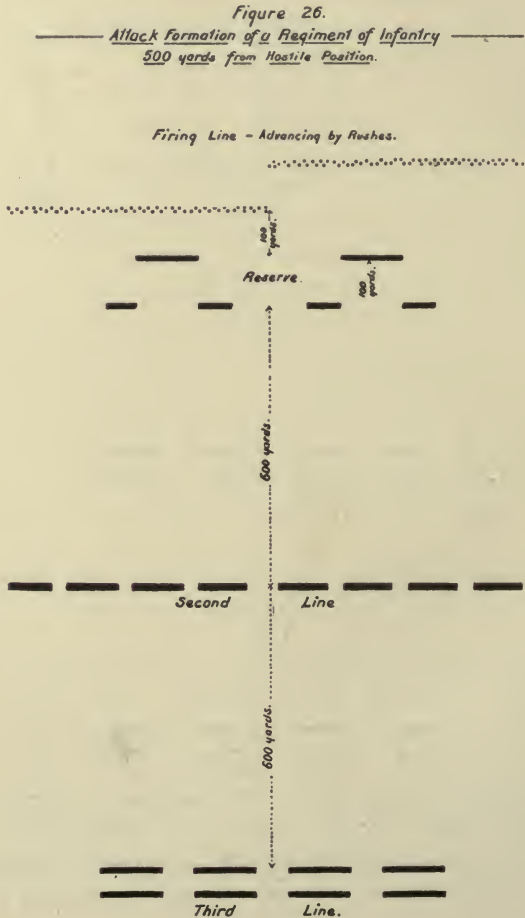
Figure 25.
Attack Formation of a Regiment of Infantry.
900 yards from Hostile Position



tions from their captains as to the number of rounds to be fired at each halt. Each section of the firing line resumes its advance as soon as it has fired the designated number of volleys; the sections, as nearly as possible, halting and ad-

vancing together. Owing to the halts for firing, the support, which continues its march, closes upon the firing line. As it draws nearer, it deploys as skirmishers and begins to reinforce the firing line.

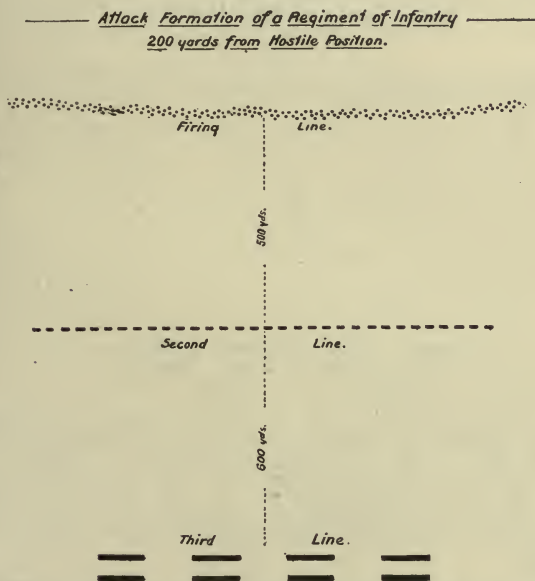
At about 500 yards from the enemy, the firing line finds it necessary to advance by alternate rushes, and between 500 and 450 yards the support is entirely absorbed,



its place being supplied from the reserve, the companies of which now take the battle formation.* The fighting has now become severe, and the progress of the firing line has been so reduced that the first echelon of the reserves is only 100 yards in rear of it, the second echelon following 100 yards farther in rear. The second line has now formed line of platoons, and the formation of the third line remains unchanged. (See Fig. 26.)

The losses in the firing line are now heavy. It clings to cover, and, while holding its own, seems unable to advance. The battalion commander selects favorable ground from which to assail the enemy's position, and throws the reserve forward into the firing line.† The impetus thus

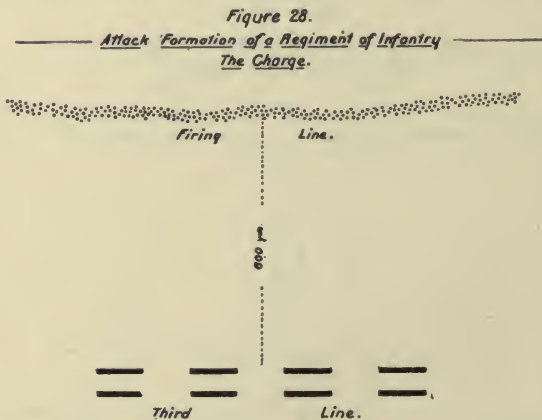
Figure 27.



* "In battle formation, when part of a battalion, the company is in two echelons, a firing line and a support."—*U. S. Inf. Drill Regulations*.

† When the major thinks necessary, he may place one or more platoons of the reserve in the firing line before reaching the position from which the final rush is to be made; the rest of the reserve being held in rear of the point at which the main effort is to be made, ready to reinforce the firing line. (*Ibid.* par. 609.)

given again carries the firing line forward by rushes, and it succeeds in reaching the selected position, about 200 yards from the enemy, where it kneels or lies down and opens rapid fire. The best fire is generally obtained from the line lying down; but it is easier to get the line forward from a kneeling position. (See Fig. 27.) As soon as the rapid fire is begun, the second line, which upon arriving within 800 yards of the enemy has extended into line of squads, fixes bayonets and moves forward at double time. At a signal from the colonel, given as the two lines unite, the trumpets sound the charge, and the men rush forward, with a hurrah, upon the enemy's position. (See Fig. 28.) The



third line hastens forward, occupies the captured position, pursues or fires upon the retreating enemy, or defends the position from a counter-charge by the enemy's reserves. The battalions of the first and second lines are now quickly assembled.

The formation and methods described above must be regarded merely as an illustration of general principles. It is not only impossible to prescribe a method which would suit every case, but it would probably be difficult to find

any given method that would answer, without modification, more than one case in fifty. The nature of the terrain, the strength, *morale*, and arms of the enemy, and many other considerations will regulate the distances between the different echelons, the formation of each part of the attacking force, and the number of lines employed. The regiment should be formed in two lines when the extent of front is too great to be covered by the three-line formation, and the first line seems sufficient to carry the enemy's position. In such a case the functions belonging usually to the third line would devolve upon the second. Such a formation would be especially applicable to an attack upon a position which could be overlapped, thus rendering possible a combination of front and flank attack; for in such a case the front attack would not meet with such stubborn resistance as when dependent only upon its own direct efforts.

The extension of the various portions of the attacking force in the case chosen above for illustration indicates that the regiment is under a heavy fire of both artillery and infantry. It cannot be too often repeated, nor too strongly emphasized, that columns should be retained until the last practicable moment. Thus, if possible, the battalion in the third line would be kept in close column until the very moment of occupying the enemy's position. The same may be said of the battalion in the second line, until it becomes necessary to deploy for the final assault. Similarly, the companies forming the reserve in the first line should be kept in column, or in line in close order, until extension becomes imperative for reinforcement or the avoidance of heavy losses. In the illustration given, the second and third lines are both represented as in rear of the center of the first. This would often be the case; but they might both be in rear of one flank, or one in rear of the right and one in rear of the left flank. It is also to be noted that, owing to the increased range of infantry rifles, the distances between echelons as given above are all too small rather

than the reverse; and that the advance by rushes will probably begin at a greater distance than 500 yards. At the battle of La Placilla, in the recent Chilian civil war, the section volleys and rapid fire of the defenders brought the advance of the Congressional army to a standstill at a distance of more than a thousand yards; and fire directed against an extended line at more than 600 yards inflicted heavy losses upon the reserves in rear. It is probable that the rapid fire will begin at a greater distance than 200 yards; that the firing line will be quickly increased to a density equal to that of a single rank in close order, to obtain the fullest effect from the new rifle; that the support will necessarily be held so far back as to constitute with the reserve a single body; and that, owing to the increased distance from the firing line to the first body in its rear, the reinforcements must invariably be made at double time, or, if over very open ground, at a run.*

THE BRIGADE OF INFANTRY IN ATTACK.

The brigade may be formed in one, two, or three lines. In the first case, the fighting line consists of two battalions of each regiment, the third battalion of each being held as a regimental reserve. This formation practically gives a strong fighting line, a weak second line, and no third. Its adoption implies an expectation that the fighting line will be sufficient to carry the position, the regimental reserves performing the functions usually pertaining to a third line. In this formation, a third line may be composed of troops belonging to another brigade.

When the brigade is formed in two lines, two regiments are in the first line and one in the second. The regiments in the first line are each formed with two battalions in the fighting line and one as a regimental reserve. The rear regiment may be held in column of masses, line of masses, in line of platoon columns, in battle formation,

*For the recent changes in European infantry tactics, see Appendix III.

in line, or any formation that may be best suited to the nature of the terrain or the circumstances of the action. Its distance from the first line is about 600 yards. This formation really gives us three lines; the first, consisting of four battalions, the second line (regimental reserves) of two battalions, and the third line (the rear regiment) of three battalions.

The best formation for a strong attack is undoubtedly the formation of regiments side by side, each in three lines. This enables a separate objective to be assigned to each regiment, and limits the intermingling of troops to men of different battalions of the same regiment.* This formation gives three battalions to each line.

In an unpremeditated engagement (for instance, one brought on unexpectedly by an advance guard) prompt formation is generally the paramount consideration. In this case the leading regiments may be ordered on the fighting line, without regimental reserves, a battalion from the rear regiment being assigned as a reserve to each. This formation places six battalions in the first line, two in the second line, and one in the third. In this case, the intermingling of men of different regiments is certain; the immediate reserve of each regiment is not under its own regimental commander; and the colonel of the third regiment is practically deprived of his command. The need of prompt formation for attack must be great to overcome these grave objections. If reconnaissance has been properly performed, there is no excuse for this formation. Its adoption implies that the force has been surprised and forced into the assumption of a faulty formation.

The question of infantry tactics, pure and simple, ends with the brigade. The tactical handling of larger bodies belongs to the subject of combined tactics.

*Compare the advantages possessed by "linked brigades," p. 78. *ante*.

GENERAL RULES.

The following general rules should always be observed in conducting an attack.

1. Do not have a heavy firing line before you come within effective rifle range of the enemy; then employ in that line as many men as can use their rifles with the best effect.
2. Regulate the fire from the beginning so that it may steadily increase in power up to the stage just preceding the final charge, when it should reach its maximum intensity.
3. Guard carefully against an exhaustion of ammunition.
4. Avoid a premature reinforcement of the firing line, in order that you may have men at hand to sustain it when the moral effect of reinforcement is greatest.
5. Endeavor to prevent your men from being influenced by any panic or demoralization that may seize upon troops supported by them.
6. Keep all your troops, except the firing line, in column, until considerations of fire action, or protection from the enemy's fire, demand deployment.
7. Always endeavor to hold in reserve a small body of formed troops for the moment when your attacking force is disordered by its own success or driven back in defeat; but do not keep large bodies out of action for this purpose.

RÉSUMÉ.

The attack consists of three distinct phases; namely,

1. The preparation, which consists of the reconnaissance of the terrain and the hostile position, and the use of artillery and long-range infantry fire to shake the enemy and prepare the way for the assault.
2. The assault proper, which begins with the arrival of the infantry at effective ranges, and ends with the final charge on the enemy's position.

3. The completion, which includes the occupation of the position by a formed body of troops (generally of the third line) and the re-formation of the victorious troops disordered by the assault. In case the assault fails, the third phase consists of the withdrawal of the attacking troops.

FLANK ATTACKS.

With the increased range and power of firearms front attacks have become more and more difficult and costly. So true is this that, unless the assailant has a great superiority in numbers or *morale*, a front attack is almost sure to fail. In a direct front attack of the Prussian 5th corps at Wörth, although the defenders were in greatly inferior numbers, the 10th division lost a third of its men, killed and wounded, and the attack was finally successful only when the 11th corps assailed the position on the flank. Spicheren and St. Privat also furnish striking instances of bloody front attacks and successful assaults upon the flank by the victorious Germans.

With a flank attack the case is different. If the attack be a surprise, the moral effect of the flank fire is very great, and a small force may drive a much larger one from a position impregnable to assaults from the front. At St. Privat the sudden flank fire of a single German company caused nine French battalions to fall back from a position which they had held securely against a heavy fire from the front.

A combination of front and flank attacks is necessary; for if a front attack alone be made, it is likely to fail, while if a flank attack alone be depended upon, the enemy can meet it by a change of front. A front attack is, therefore, necessary to hold the enemy, and it must be energetically pushed, in order that he may not oppose it with a small portion of his force and throw his weight against the flank attack. This combination of front and flank attacks was a marked feature of all the battles of the Franco-German

war; and, indeed, there is no tactical combination that promises greater success; for it encloses the enemy between two convergent fires, and causes a divergence of his efforts, while the attacking force works concentrically and in harmony.

The Germans generally made their flank attacks with only a small portion of their force; but the size of the turning force must be much larger in future, for the general use of intrenchments on the defensive, and the increase in the range and power of firearms, render it much easier to check a front attack, and consequently leave more troops available to guard the flanks. In all its tactical details, a flank attack is the same as one directed against the hostile front; for the enemy will, under almost all circumstances, make more or less of a change of front, and the assault upon the flank will thus become locally a front attack.

A flank attack may be made either by extending the front so as to overlap the enemy's line on one flank, and then wheeling in upon the flank to be attacked, or by making a turning movement.

A turning movement is made by detaching a force to make a detour and fall upon the enemy's flank. In order that it may be successful, it must be made out of the sight and beyond the range of the enemy. Otherwise he can make dispositions for meeting it, and may even be able to turn the tables by taking the turning force itself in flank. An attempt to turn a flank by making a flank march in sight and under fire of the enemy is sure to fail. Flank attacks attempted with the line of infantry already deployed are rarely successful, and cause a dangerous extension of the troops.

It is not often possible before the battle begins to concentrate the troops before the flank which is to be attacked. This must generally be done after the enemy's attention is taken up with the front attack. The more earnestly the latter is pressed, the more likelihood there is of absorbing

the enemy's attention with it. If it cannot be pushed home successfully, the assailants must intrench within effective range, and thus hold the enemy until the turning force strikes him, the flank attack being thus the real one, and the other a feint. It may even happen that the enemy's attention will be so taken up with the attack upon his flank that the front attack can, after all, give the decisive blow. This was actually the case at the battle of Spicheren.

The distance to be passed over by the turning force increases, of course, with the increased range of modern weapons; and the difficulty of making a successful turning movement is, consequently, much greater than it was formerly. The turning force now necessarily gets beyond the control of the commander of the main body, and the difficulty of making the front and flank attacks simultaneously is thus greatly heightened. If the front attack be made too soon, it is likely to be repulsed. If it be made too late, the turning force will probably be shattered in its unaided conflict with the enemy. The commander should endeavor to maintain prompt communication with the turning force by stationing himself on the flank nearest that force, and having mounted staff officers so stationed that they may notify him when the turning column has reached a certain point. He must then judge the time of attack so that the enemy will be strongly engaged in front at the moment when the turning force strikes the hostile flank. Attempts to concert attacks by means of some prearranged sound signal generally fail miserably. At the battle of Fair Oaks, General Johnson directed Longstreet to attack as soon as he heard the noise of musketry firing from Hill. Owing to the force and direction of the wind, only the noise of cannonading was heard, and Hill was engaged several hours before Longstreet attacked. At Malvern Hill it was arranged that the signal for attack should be a yell from Armistead's brigade as it took the lead. But the noise of

the heavy cannonade drowned the shout, and the attack was consequently badly timed and disjointed.

It must not be supposed that the flanks of the enemy's general line are the sole objects of flank attacks. Such attacks should also be made upon advanced posts, woods, or any part of a position which extends to the front of the general line and is not strongly defended in flank.

THE DEFENSIVE.

The object of the force on the defensive is to shatter the assailant with its fire, and inflict upon him such losses that he will either be unable to reach the position at all, or will attain it in such a crippled condition that he may be easily overthrown by a counter-attack. An effective fire upon the assailant and shelter from the fire of the enemy are, therefore, essential to a good defense. These conditions are best fulfilled by utilizing natural, or constructing artificial, cover, and having a firing line at such density as to admit of the most effective use of the rifle by each man.

Formerly the fire was delivered by two or more ranks in close order; but the firing was then effective only at short ranges, and volume rather than great accuracy of fire being required, the men could all use their muskets with effect. But with the arms of precision now in use, accurate shooting is the first consideration at the longer ranges, and it is only at close quarters that mass firing can be effectively employed.* Experience having demonstrated that the most effective fire is obtained from a single rank consisting of about one man to a yard, that should ordinarily be the density of the firing line. From the time the enemy arrives within effective range, the firing must be maintained at its maximum effect, and troops must, therefore, be at hand to replace the losses in the firing line and prevent its fire from slackening. A support similar to that used in the attack is consequently necessary; but as it is stationary and gener-

*Except, of course, when volleys can be fired at long range at masses of troops, a camp, or some other large target.

ally under cover, its distance from the firing line is usually much less than in the case of the assailant.

The general characteristics of the defense are the same as those of the attack. As the assailant draws near and the losses of the defenders increase, the support is gradually fed into the firing line, and is usually absorbed about the same time as the support of the attacking force. Similarly, as soon as the distance between the contending forces admits of short-range fire, the reserve (either wholly or in part) is pushed forward into the firing line to meet the increased fire of the assailants with a corresponding intensification of fire. If the fire of the defenders is the more effective, the assailants will be driven back. If the reverse is the case, the first line of the defenders will be so shattered and demoralized as to be unable, without prompt assistance, to oppose the shock of the enemy. A second line, consisting of troops well in hand, is, therefore, necessary for the physical and moral reinforcement of the first line at this juncture, and to meet the assailants in counter-shock with the bayonet.

A purely defensive action rarely results in success; nor should it ever be assumed, except by a commander whose troops are so raw or so demoralized that they cannot be trusted to fight well in the open. A counter-stroke is an essential part of a good defensive plan; without it an enemy may be balked, but not defeated. In order that the counter-stroke may be promptly delivered at the right time and place, a body of troops must be held in hand at the most favorable point, for offensive purposes. In the event of defeat, it covers the retreat of the rest of the force. The body thus held in hand constitutes the third line. The component parts of the defense formation are, therefore, the same throughout as those of the attack. Each part will now be considered more in detail.

THE FIRING LINE.

Preliminary Dispositions.—The effect of the attack depends so greatly upon the correctness of the assailant's

dispositions, and these in turn depend so largely upon his knowledge of the position of the defender, that the latter should endeavor to conceal the disposition of his forces until compelled by the exigencies of battle to disclose them. For this reason, the firing line should not at once be placed in full force upon the selected position, which should rather be held by a thin line of scouts, the firing line proper being held back, under shelter of some features of the terrain, until it can be effectively used. It must be remembered, however, that a weak defense in the beginning is a great mistake, and the position must be fully occupied as soon as the troops can be effectively used. How soon this will be will depend upon the terrain, the nature of the attack, and the target offered by the enemy's troops. Usually, the firing line is moved into position by the time the enemy has arrived within 2,000 yards. For the protection of the artillery, infantry may sometimes have to be pushed forward at the outset; but it is generally possible to keep the first line practically out of fire until the enemy's infantry develops the attack.

The line will not, ordinarily, be of uniform strength. At the probable points of attack there should be as many men as can use their rifles with effect, while at points where obstacles break up and hinder the attack the force may be much smaller. As casualties occur, the men of each company close in on the center, the reinforcements from the support being placed on either flank. Owing to the firing line being stationary, this is more practicable than in the case of the attack.

Long-Range Fire.—When the enemy has arrived within 2,000 yards of the position, long-range volleys by company or platoon may be opened upon him if a favorable target be presented. Long-range fire is generally more effectively used by the defenders than by the assailants, as the ranges are more accurately known, the distance to certain fixed objects in front of the position being easily ascer-

tained beforehand. Moreover, the greater facility of supplying ammunition to the stationary troops renders it practicable to expend an amount of cartridges in long-range fire that would be difficult or impossible in the attack. If ammunition be plentiful, heavy losses may be inflicted upon the assailant at very great ranges. The terrible losses of the Prussian Guard at St. Privat were mostly inflicted at a range of 2,000 to 800 yards; and it is stated, on the authority of General Todleben, that at Plevna the number of Turkish bullets that fell among the Russians at a distance of 2,000 yards was such that divisions which at the outset numbered 10,000 or 12,000 men were speedily reduced to 4,000 or 5,000.* It is well known that the Russian attacks were frequently stopped by the Turkish long-range fire, the chief characteristics of which were the employment of two firing lines (one above and firing over the other) and an enormous consumption of ammunition, the Turks expending in some battles from 200 to 500 rounds per man. It may be said that, in the instances mentioned, the attacks were unskillfully made by the Germans and the Russians; but, on the other hand, it may be asserted with equal truth that long-range fire was unskillfully employed by the French and the Turks. In future wars, better tactical dispositions will doubtless be met with more effective long-range fire. If the target presented by the enemy be good, if the supply of ammunition be abundant, and the troops be kept well in hand, it may be safely said that the defender should not fail to employ long-range fire to the fullest extent.

The Objective of the Fire.—The firing line will probably devote its entire attention to the nearest groups and echelons of the enemy without any special caution to that effect;

*Mayne's "Infantry Fire Tactics," p. 250. A considerable portion of this enormous diminution in the strength of the divisions must, however, have been due to other causes than actual casualties, or the loss must have been confined to a few divisions; for the Russian official reports of their great losses at Plevna do not show such a percentage of killed and wounded as the remarks of Todleben would imply.

but it is well that, on the defensive, it should be directed habitually to do so, as the enemy's troops should be impressed with the idea that their own firing line is the most dangerous place in which they can put themselves. When the enemy's advanced troops are well mauled by our own firing line, his troops farther in the rear may be safely left to the fire of the artillery and special bodies of infantry. In the instructions issued by General Skobelev to his troops in the campaign against the Tekke Turkomans, he said: "It is not really the mass of individuals present on the ground that decides the victory, but the progress which, thanks to different circumstances, a few brave men may make advancing in isolated groups. Consequently, every attention must be paid to the appearance of groups of this nature, and the full power of your fire must be directed upon them by means of volleys; for if you neglect to inflict great losses on them, these groups will increase in size in a wonderful way and decide the affair in their favor. I counsel the leaders of all fractions to keep a watchful eye on these advanced groups; there is no doubt that in annihilating them, we destroy, in the germ, all the initiative force of the rest of the mass." Skobelev doubtless had also in view his experience at Plevna. In his attack on the Turkish redoubts on the Lovtcha Road, he found when he reached the enemy's position that there were no troops behind his line of skirmishers, his reserves having melted away under the storm of bullets rained down by the Turkish unaimed fire; but, the position once reached, those who remained in the skirmish line were sufficient to drive out the Turks.

If possible, the fire of several groups should be consolidated on some group of the enemy which seems to be making special progress. From the very beginning of the action, all hostile scouts should be fired upon as soon as they show themselves, sharpshooters being detailed for that purpose.

The use of smokeless powder will render the supports and reserves more plainly visible than was formerly the case, and they can now be the objective of the fire of the artillery, and often also of bodies of infantry posted as a second firing line and firing over the heads of the first. Such second firing line may often be formed of the reserve of the first. It is, of course, necessary that the slope of the ground should be such as to enable the second line to be posted above the first; and it should use volleys only.

When the enemy is advancing by alternate rushes, the portion of his force exposed in the forward rush should be the objective of the fire. If the men are under sufficient control, volleys should be used in this case, so that each rifle may be turned upon the enemy as he rises.

THE SUPPORT.

The general nature and objects of the support are the same on the defensive as in the attack; but until it is absorbed in the firing line it is held under such shelter as the ground may afford. The position of the support is so dependent upon the terrain that its distance from the firing line cannot be definitely prescribed; but, as a rule, it should be as near as possible without undue exposure, and its distance would not usually exceed 75 or 100 yards. The reinforcement of the firing line is made as the circumstances of the action demand. When the enemy arrives within 800 yards—the point at which he may be expected to open fire—all important points of the position should be fully manned, and this will probably call for the first reinforcements from the support. When the assailant arrives within about 500 yards of the position, the support will generally be entirely absorbed. The strength of the support relatively to the firing line will often be the same as in the attack; though, not being exposed to so much danger as the assailant, who advances uncovered over ground generally swept with a heavy fire, the defender can from the first give more density

to the firing line than would be prudent in the attack, keeping only a small echelon in rear as a support. The support, either wholly or in part, may, indeed, often be placed in the firing line at the beginning of the fight, in order to secure superiority of fire and a front at least equal to that of the attack.*

THE RESERVE.

The reserve is usually posted at a distance of about 300 yards from the support, centrally located, and under sheltering features of the terrain. The requirement of central location should be sacrificed, if necessary, to the more important consideration of shelter; for if the reserve be exposed to a severe fire, it will probably push forward and cause a premature reinforcement of the firing line. The distance from the support, like that of the support from the firing line, varies according to the terrain, but will, in general terms, be as short as may be consistent with the two requirements of shelter and prompt reinforcement of every part of the line. The relative strength of the reserve is usually the same as in the attack; but, like the support, its strength varies, and if the firing line be very strongly posted and well sheltered, the reserve may be weak. When the enemy reinforces with his reserve, the increased strength of his firing line must be met by the defender with a corresponding reinforcement from the reserve. Part of the reserve may be held in hand to assist in the counter-attack, but, except in the case of purely local counter-strokes, this duty generally falls on troops of the second or third lines.

THE SECOND LINE.

The functions of the second line are, to support the more exposed portions of the first line, which it reinforces to meet the enemy's shock; to aid in local counter-attacks, and to provide for the protection of the flanks. It is generally centrally located, or posted behind the points most

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likely to be penetrated by the enemy. It should always be sheltered from the enemy's fire, and its distance from the first line will accordingly depend upon the terrain. This distance should not ordinarily exceed 600 yards, and will generally be considerably less. When the enemy makes his charge on the position, the second line fixes bayonets and charges to meet him. As the assailant makes his charge from a distance of about 200 yards, the second line should not be at a greater distance from the firing line at the crisis of the fight, in order that the latter may receive immediate assistance when it is struck by the enemy. The second line should, therefore, be moved forward as the attack reaches its final stage and it becomes evident where the enemy's shock will fall.

THE THIRD LINE.

Counter-Attacks.—As in the case of the attacking force, the third line is essentially the maneuvering line, and its chief function is to clinch the advantage gained by the fire of the defenders by a vigorous assumption of the offensive, or to assist the firing line in the final stages of the fight, by combining a flank attack with the heavy fire which the enemy receives in front. Local counter-attacks may be made by the reserves of the first line, to recover lost ground or gain some local advantage; but decisive counter-attacks can be made only by large bodies of troops. They may be made either just before or just after the enemy charges upon the position. In the former case, they are made upon the enemy's flank by the third line maneuvered to a suitable position for that purpose. In the latter case, if the enemy be repulsed, the counter-attack is made in the same manner. If, however, he penetrate the position, they are made by the second line, assisted by the third, if the latter be in a position to do so. If the enemy be well punished by the fire in front, a counter-attack upon his flank just before he undertakes the charge is, by all means, the best;

for a flank attack is generally more decisive than a frontal one, its direction is such that it does not mask the fire from the position, and the time of its delivery is such that the enemy is not inspirited by success, as he is when he has penetrated the position. A counter-attack is rarely made by the first line, whose chief duty is to pelt the enemy relentlessly with its fire in retreat as well as when he is advancing. There are, however, noted instances of counter-charges by the first line. At Waterloo the Foot Guards, under Wellington's own orders, after pouring a heavy fire into the French, made a successful local counter-charge, and the counter-charge of the 53d, 71st, and 95th British regiments against the left column of the Imperial Guard was the most decisive tactical movement of the day. At Gettysburg, as Pickett's column penetrated the Union position, it was struck in flank by the brigades of Stannard, Harrow, and Hall, the troops composing which (both in first and second line) wheeled toward the assailing column, which was opposed in front by Webb's brigade.

The Main Reserve.—The third line constitutes the main reserve, and should be used to make or repel flank attacks, instead of being merely held in hand to cover a retreat. It should, consequently, be stationed near the point where the counter-attack is to be made, and this would generally place it near a flank. The larger the body of troops on the defensive, the nearer the flank should the main reserve be, in order that it might promptly reach the position from which the assault is to be made.

Guarding the Flanks.—The costly nature of a frontal attack has already been commented upon, and it may be said generally that the assailant will shun the front, if there be a reasonable opportunity of making a flank attack. "The flanks are the Achilles' heel of the defender," and they must be carefully protected. This duty falls upon the third line, or main reserve, as the troops on the attacked flank can rarely execute a change of front to meet the as-

sailant, unless the flank attack is made so openly and unskillfully that it can be deliberately prepared for by the defender. The instances of flank attacks, both successful and unsuccessful, afforded by military history are legion, but the same lesson is taught by all; namely, the line taken in flank can rarely be saved by its own efforts, and if there be no reserve at hand, disaster is almost certain. When Stonewall Jackson struck the right flank of the Eleventh Corps at Chancellorsville, only Bushbeck's brigade, which stood at the extreme left of the corps, was able to offer any resistance worth considering, and it was not until fresh troops were brought up from the Third Corps that the Confederate advance was definitively checked. *Sickles III corps.*

Strength of the Three Lines.—No rule can be given for even the approximate strength of the three lines. The second line will usually be considerably weaker than the first, and will generally be so distributed as to support the most exposed parts of the position. The strength of the third line will depend entirely upon the plan of the commander of the defensive force. If his plan contemplate only the assistance of the firing line with partial counter-strokes, the third line will be small. If, however, it be his intention to assume the offensive vigorously as soon as the assailant has suffered severely from fire, the third line must be large. It is as impossible to prescribe the formation of the third line as it is to specify its relative size. It is kept well in hand, and concealed from observation and fire by features of the terrain. In the case of a regiment, the first line might, perhaps, consist of six companies; the second, of four; and the third, of two. If a purely defensive action were contemplated, the first line might consist of two battalions; and the second, of one; the third being entirely omitted. If a vigorous counter-offensive were intended, the first line might consist of six companies; the second, of two; and the third, of a battalion. No rule can be given, however, and the commander must dispose his force according to the demands of circumstances.

THE SELECTION AND OCCUPATION OF THE POSITION.

In discussing the question of the defensive, two cases must be considered: 1. The deliberate occupation of a position with a view to awaiting the enemy's attack; 2. The occupation of a position when the enemy is encountered, and, in the course of reinforcing the advance guard, the defensive is assumed either by choice or from necessity.

The requirements of a good defensive position are considered in detail in the chapter on "The Three Arms Combined." It will be sufficient here to state that the first, and by far the most important, requisite of an infantry position is a clear field of fire to the front and flanks for a distance equal to the effective range of the rifle. Next in importance is the question of cover, such as sunken roads, railroad embankments and cuts, ditches, gravel-pits, stone-quarries, etc., for the fighting line, and the reverse slopes of hills for the shelter of the reserves.* An especially desirable position is one on open ground sloping gently toward the enemy in such a manner as to give a free sweep of fire to the front. If this position be, moreover, on the side of a valley such that the enemy must, in attacking, move down a slope, and thus expose his different echelons simultaneously to the fire of the defenders, the position will be par-

*Each of these features has been used to advantage in battle. At Fredericksburg, 2,500 men of McLaws' division were posted in a sunken road, lying at the base of Marye's Heights, the side of the road toward the assailants having a stone retaining wall breast high. Six successive charges of the United States troops, made with the greatest gallantry, were hopelessly shattered against this position, with enormous loss.

At the battle of Essling, Lannes, posting his infantry in a shallow draining ditch which extended between the villages of Aspern and Essling, successfully resisted the determined attacks of greatly superior forces of Austrians.

At the second battle of Bull Run, Stonewall Jackson took up a position behind an old railroad embankment which extended along his entire front, and was thus able to repulse the Union attacks, and hold his ground until the arrival of Longstreet placed matters on a more equal footing.

At Gravelotte, Gen. Frossard so utilized a number of shallow stone-quarries (connected with slight intrenchments) as shelter for his men, that his corps not only held its position against the German attacks, but did so with comparatively insignificant loss.

At Waterloo, the reverse slope of the ridge was used by Wellington to screen his second line from observation and to a considerable degree from fire

ticularly advantageous. A position on a steep hillside is not desirable; for, while it would doubtless add to the fatigue of the assailant to climb the hill, the fire of the defenders would not be so effective as it would be on a gentle slope or level ground.

If the position be on a hill, the firing line should be posted along the "military crest," which is the ridge from which all the ground in front can be clearly swept by fire. The military crest may coincide with the actual crest, but is usually somewhat below it* If dependent upon natural cover, the firing line should be posted just behind the military crest, the support being far enough in rear to be concealed, but near enough to reinforce the firing line quickly. The reserve should be farther in rear; on the reverse slope of the hill, if not too distant. If intrenched, the firing line should be just below the crest, the support being moved up to the line that would otherwise be occupied by the firing line, and being also sheltered with intrenchments. If it can be avoided, troops should never be posted exactly at the crest, as they would, while outlined against the sky, present a peculiarly good target to the enemy's fire. An instance of this occurred at the battle of Franklin, where the attacking Confederate troops opposed to Ruger's division halted on a slight elevation in front of the Union line, where, being clearly defined on the sky-line, they were completely shattered by the fire of their opponents.†

The position must be suited in extent to the size of the force by which it is to be occupied, and everything possible should be done to strengthen it. Entanglements and other obstacles should be constructed in front of it, all objects that

*For a description of the military crest, see Beach's "Manual of Military Field Engineering," p. 99.

†"On the slight elevation in front of the line before referred to the enemy's line was brought up by our fire, and from its elevated position it was clearly defined against the sky to the view of our men, and I distinctly observed it gradually waste and disappear under our fire."—*Official Report of Brig. Gen. Thomas H. Ruger, U. S. A., commanding Second Division, 23d Army Corps.*

would shelter the enemy or conceal him from view should be removed or demolished, the range of every prominent object in the line of the enemy's advance should be ascertained and carefully noted, and, above all, intrenchments should be constructed.*

In the second case, these deliberate preparations are impossible. The advance guard encounters the advance guard of the enemy, and the troops in rear are moved into position as the ground may favor or the exigencies of the fight demand. As each regiment moves to its position, the colonel designates the battalions or companies for the different lines, and causes a reconnaissance to be made, scouts being sent forward by the captain of each company in the fighting line. The scouts connect with those of adjacent companies, seek to discover the enemy's position and movements, and endeavor to keep back his scouts and patrols. Each captain indicates to each subdivision of his company the position it is to occupy, and the steps it is to take in preparing cover, in accordance with general instructions from the battalion commander; and during the first phases of the fight he endeavors to find the range of all conspicuous objects in the line of the enemy's advance. The colonel assures himself that each battalion and company is in the best possible position in regard to cover and effective fire.

HASTY INTRENCHMENTS FOR INFANTRY.

It has been already stated that the essentials of a good defensive position are a clear field of fire and cover from the observation and bullets of the assailant. It often happens that the first essential is fulfilled while the second is lacking, and natural cover must, therefore, be replaced with artificial shelter. The growth of the art of intrenching has been alluded to in a former chapter; and so great has become its importance under the conditions of modern rifle-firing

*Further on the subject of occupying and strengthening a position, see the chapter on "The Three Arms Combined."

that no army now contemplates the occupation of a defensive position without resorting to the powerful aid of intrenchments.

Except in the case of marked numerical or moral inferiority, a pure defensive should never be contemplated. The intrenchments must not, therefore, be so constructed as to interfere with a prompt assumption of the offensive. They must be regarded as a mere aid to the general plan, and must not be allowed to modify it. The shelter-trenches should be so traced as to give the most effective fire straight to the front, and, at the same time, not be exposed to enfilade. It should be remembered that they are hastily constructed, and that provisions for flank fire and defilade are accordingly quite out of the question. If, therefore, there are any reëntering angles in the position, the line of trenches should be carried straight across them; or continued into them only a short distance, when it is necessary to do so to bring fire to bear upon adjacent ground which would otherwise shelter the assailants. If the reëntering angle presents too wide a gap, a trench may be constructed, farther in rear, across its head. Provision should always be made for the supply and protection of ammunition. In 1877 the Turks kept boxes of ammunition in receptacles hollowed out in the intrenchments, thus insuring a liberal supply constantly on hand.

In order that the shelter-trenches may not betray the position, all sharp edges should be avoided, and the newly-turned earth should, when practicable, be so covered with sods, brushwood, weeds, stubble, or snow as to resemble the surrounding ground. As effectiveness of fire is the first consideration, and shelter only the second, intrenchment may in some cases be of less importance than the removal of hedges or the cutting away of slight crests that might afford concealment or shelter to the enemy.

As it is not to be assumed that the enemy will assault a deliberately prepared position if he can find means of

turning it, it is well to delay intrenching the infantry until some intelligent idea can be formed of the probable nature and direction of the enemy's attack. As the shelter-trenches, under the present conditions of rifle-fire, must have an earth embankment from 30 to 60 inches in thickness, according to the nature of the soil, the possession of a good intrenching tool and skill in its use are matters of vital importance to the infantry on the defensive. If it seems probable that the attack of the enemy will come before the intrenchment can be completed, the trench must, from the first, be continuous and not consist of isolated holes, so that, as far as finished, it may be at least utilized as a rest for the rifles and concealment from the enemy's observation. When the defenders hold a position which, from its strategical location, the enemy *must* attack, the fortification may be undertaken with more deliberation and conducted with less regard to concealment.*

* Hasty intrenchments may often be used with profit on the offensive. In the War of Secession, in which the operations were frequently in a densely wooded theater, which afforded a veil to the enemy's counter-offensive, it was the rule to intrench whenever the army halted; and, especially in the Atlanta campaign, one portion of the army often intrenched in the enemy's front, while another portion operated against the hostile flank. Such use of intrenchments will doubtless be frequent in future. Another use of intrenchments on the offensive is in securing a captured position. Thus the Prussians, as soon as they had captured the position at St. Privat, at once secured it against a French counter-attack by intrenching; and, at Lovtcha, Skobelev intrenched each position as he wrested it from the Turks. Intrenchments will, in fact, probably be used on the offensive in future wars to a degree yet unknown. Von der

*The Turkish position at Plevna affords a case in point. Here the intrenched position of Osman Pacha on the flank of the Russian advance paralyzed the onward movement of the Russians, and rendered its capture an imperative preliminary to further operations.

Goltz says of the attack: "In order to penetrate [the position], many and good troops are indispensable, as well as an iron will which does not shrink from great bloodshed. It will not in the future resemble an attack, but more a gradual working through the enemy's lines, interrupted by pauses, and then again undertaken by fresh troops. In this operation, every step gained must be secured during the pauses by earthworks, so that position advances equally against position. Great front-actions will in the future all be of a similar character, and last several days."*

Great as the use of intrenchments will be in future, they must not be invariably relied upon. The *morale* of the men will inevitably suffer if they be allowed to intrench at every step and under all circumstances, and intrenchment may thus prove a curse rather than a blessing. Gen. Sherman says: "The habit of intrenching certainly does have the effect of making new troops timid. When a line of battle is once covered by a good parapet, made by the engineers or by the labor of the men themselves, it does require an effort to make them leave it in the face of danger; but when the enemy is intrenched, it becomes absolutely necessary to permit each brigade and division of the troops immediately opposed to throw up a corresponding trench for their own protection in case of a sudden sally. We invariably did this in all our recent campaigns, and it had no ill effect, though sometimes our troops were a little too slow in leaving their well-covered lines to assail the enemy in position or on retreat. . . . On the 'defensive' there is no doubt of the propriety of fortifying; but in the assailing army the general must watch closely to see that his men do not neglect an opportunity to drop his precautionary defenses, and act promptly on the 'offensive' at every chance."† The skill of a commander will largely con-

*"The Nation in Arms" (tr. by Ashworth), p. 298.

†"Memoirs," Vol. II., p. 396. General Sherman's opponent, General Hood, bears similar testimony as to the demoralizing influence of intrenchments on soldiers habitually using them. Speaking of the condition of his troops in the

sist in knowing when to use and when to dispense with intrenchments.

RELATIVE ADVANTAGES OF THE OFFENSIVE AND DEFENSIVE.

The Defensive.—The commander acting on the defensive chooses his own ground, and may select a position which will afford him shelter and compel the assailant to cross open ground swept with a heavy fire. The position can also be fortified, the range of different objects in the line of the enemy's advance can be ascertained, and the supply of ammunition can be easily made. Moreover, the troops being stationary, fire discipline is more easily maintained than in the case of the assailant, whose troops are moving and more or less disordered by the inequalities of the ground. The assailant is firing at a target which is at least partially covered, while the mark presented to the fire of the defenders is unsheltered, except by chance features of the terrain. The assailants, especially at the shorter ranges, are panting and breathless when they fire, while the defenders, remaining quiet, can take more accurate aim.

The Offensive.—The commander acting on the offensive can choose his own line of action. He has from the first a definite plan, and can make feigned attacks against different parts of the enemy's position, while massing a preponderating force against a single point. On the other hand, the defender, in the dark as to his adversary's designs and uncertain as to the point of attack, must disseminate his force so as to be strong at every point where a heavy assault may fall.

The offensive implies numerical or moral superiority, or both, and is an indication of confidence on the part of

invasion of Tennessee, he says: "The discovery that the army, after a forward march of one hundred and eighty miles, was still, seemingly, unwilling to accept battle unless under the protection of breastworks, caused me to experience grave concern. In my inmost heart I questioned whether or not I would ever succeed in eradicating this evil."—"Advance and Retreat," quoted in "Battles and Leaders of the Civil War," Vol. IV., p. 432.

unfair;
anklin

the commander which tends to raise the *morale* of the troops. This is heightened by the forward impulsion, and the turmoil and excitement of the attack; and the assailants are comparatively unaffected by the sight of their own dead and wounded, whom they leave behind, while the defenders' killed encumber the position. The *morale* of the defenders is further shaken by the spectacle of an unflinching advance which their fire does not stop. Finally, though the line of defense be chosen with care and prepared with skill; though its general features be admirable, and it seem almost perfect; there may yet be a weak point through which the enemy may penetrate, and thus, by taking the rest of the line in flank, cause the abandonment of the entire position. The defender gains a victory only when he succeeds at all points; but the assailant wins when he is successful at a single part of the line.*

WITHDRAWAL FROM ACTION.

In case of failure to carry the position, the withdrawal of the attacking troops is a matter of much difficulty, which increases in proportion to the extent to which the attack has been carried, and the energy and earnestness with which it has been conducted.

In case the support has not yet reinforced the firing line, the latter should fall back upon it, forming on its flanks or in the intervals, so as to form entire companies. The subdivisions of the support open fire as soon as their front is uncovered, and the re-formed companies then withdraw by alternate platoons, the retiring platoon being covered by the fire of the other. In case the enemy shows no disposition to attack vigorously, the reserve retires without waiting for the firing line and support. Otherwise, the united support and firing line fall back upon the reserve, thus forming battalion, and the withdrawal is conducted by alternate companies or half-battalions.

*Further on this subject, see the chapter on "The Three Arms Combined."

If the support has reinforced the firing line, but the reserve still remains intact, the latter may be disposed near one of the flanks, in such a position as to hold the enemy in check while the firing line re-forms in its rear. The reserve is next withdrawn to the rear of the firing line, under cover of the fire of the latter, and the two lines thus withdraw alternately.

This methodical withdrawal from action can be possible only in the earlier stages of the attack, when the assailants have not yet suffered severely and have not been disordered by successive reinforcements from the echelons in rear; but later, especially when the first line has been entirely absorbed in the firing line, and the fight has reached the intensity of a modern infantry combat at short range, an orderly withdrawal may be regarded as altogether out of the question. With their energy exhausted by the attack, with their courage expended in a bloody struggle which they have been unable to maintain, and with the enemy's fire pelting them in the back as they withdraw, nothing more can be expected of the men than that they will rally when they reach shelter. The third line (and the second also, if not committed to the assault) may move to a flank, and take up a position whence it can take the enemy in flank in case of pursuit, or open with volleys or rapid fire on the hostile position, and thus diminish the effect of the enemy's fire. When the attack is repulsed at close range, the defender should not, as a rule, make a direct pursuit from his position, as he can, with the weapons now in use, do vastly more damage to the retreating force by continuing his fire from the position. The retreating men no longer keep down the defender's fire with their own, they can no longer profit by the sheltering features of the ground, and they generally present a target consisting of a confused mass of demoralized and helpless humanity. When the assailants reach a point from which they can make no further progress, they should, therefore, intrench

and remain where they are; for no losses incurred in intrenching under a hot fire can equal those that would result from a retreat across a fire-swept zone. If matters do not change for the better with the assailants, they may, by waiting until night, be able to withdraw in comparative safety under cover of the darkness.*

The withdrawal of the defender is in every way similar to that of the assailant. In retreating he encounters the same destructive losses, and it is always better for him to wait and receive the enemy's shock with the bayonet than to retreat just before the assailant reaches the position. Under the conditions of modern infantry fire, retreat generally means annihilation, and a body of infantry once committed to an energetic attack or defense should be fully impressed with the fact that its safety lies only in victory.

THE SUPPLY OF AMMUNITION ON THE FIELD.

The supply of ammunition on the field of battle is a matter of vital importance; for infantry without ammunition is a Samson shorn of his strength. Unfortunately, there is, as yet, no form of ammunition wagon or cart prescribed for the United States army, and nothing has yet been done to establish a regular system of ammunition supply in our service. It is probable, however, that the following general rules will be recognized without material modification in any system that may be adopted, as they

*Describing the unsuccessful assault of Davis' division against the Confederate position at Kenesaw Mountain, General Cox says: "Both brigades had a heavy list of casualties among field and company officers as well as private soldiers. They reached the trench in front of their objective point, but the narrow front of the column now stood revealed to the enemy, who were able to concentrate upon them also a storm of rifle balls and canister which made farther advance impossible. Lying upon the ground within the range of musket-fire from the works, they covered themselves as they could, and finally, by General Thomas' consent, intrenched themselves under a terrible fire, the open ground over which they must retreat making it safer to stay than to return. The cover they were able to make enabled them to hold on till night, and then their works were so strengthened that they were permanently held, though for several days and nights the troops could rest only by sleeping on their arms."—*Atlanta* ("Scribner's Series"), p. 125.

are based on the experience of armies in which much attention has been bestowed upon the subject.

An officer should be detailed in charge of the ammunition wagons of each regiment. He should be mounted, and assisted by a non-commissioned officer and such men detailed from the regiment as may be necessary. The wagons should habitually be kept in a regimental park, but should be assigned to the battalions whenever such assignment seems likely to facilitate or expedite the supply of ammunition. The regimental park should not be more than 1,100 yards in rear of the firing line, and should be kept under shelter of the ground, the position being suitably marked.* The driver of the battalion ammunition wagon should himself be a member of the battalion. The ammunition wagons should always be kept as far to the front as they can be pushed without undue exposure. As soon as a wagon has been emptied of its ammunition, it should be sent back to the nearest ammunition column and its place taken by a full wagon without delay.

Just before going into action, each man should be supplied with one or more packages of ammunition in addition to that which he has been carrying on his person—enough, in fact, to fill all his belts and pockets—and advantage should be taken of every pause in the attack and every lull in the enemy's fire to replenish the belts of the men. No man should be allowed to leave the ranks for the purpose of going after cartridges; but a non-commissioned officer and two or three men should be detailed from each company to distribute ammunition, each of the company ammunition-carriers being provided with a leather haversack to hold the ammunition. One of the carriers should be charged with the duty of collecting and distributing the cartridges of the killed and wounded. A small reserve of

*In the French service the position of the ammunition park is marked by a yellow flag by day and a yellow light by night; care being taken to avoid indicating the position to the enemy.

ammunition for emergencies should be provided by having each company officer and field musician wear on his person, on going into action, at least one full cartridge belt.*

ACTION OF INFANTRY AGAINST CAVALRY.

Good intact infantry, with plenty of ammunition, should, unless taken completely by surprise, have no fear of cavalry. If in battle formation when attacked by cavalry, the firing line, if equal in density to a single-rank line in close order, should merely halt and open fire. If in a skirmish line with small intervals, it should rally by squads. If in a thin skirmish line, it would be better for the men to remain in their places or simply group together by files. The support and reserve form line if they happen to be in column, the support being placed in a position to guard the flanks of the firing line. The cavalry will invariably penetrate through the intervals in the firing line, rather than run against the skirmishers or rallied squads, which should face about and continue their fire upon the cavalry after it passes through, unless they have to encounter succeeding echelons of charging horsemen. The chance of hitting a surging crowd of troopers will be much greater than any risk of injuring their own comrades in rear, and in the *mêlée* it is no time for men to stand idle. When the cavalry has been repulsed, the fire should be continued until the retreating horsemen are out of range. If attacked in flank, the bodies constituting the support and reserve should form front toward the threatened flank, and the firing line should rally by groups or sections. If, in any case, the cavalry attack in several echelons, the fire must not be directed upon a fraction already repulsed, but upon the leading echelon which continues the charge.

If in line when attacked in front by cavalry, no change in the formation of the infantry should be necessary. As soon as the hostile cavalry shows itself, it should be

*For the details of the methods of supplying ammunition on the field in different armies, see Batchelor's "Infantry Fire," p. 191 *et seq.*

kept at a distance by fire, preferably by volleys. Even though the cavalry be repulsed with heavy loss, the infantry must be regarded as worsted when it has been so injured and demoralized by the cavalry charge as to be compelled to suspend its advance. The German infantry is taught that it should be able to advance on open ground against cavalry, unless the latter be aided by superior infantry or artillery fire, or be so superior in numbers that it can attack at the same time in several different directions. The cavalry must be conceded to have gained a great advantage if it can compel the infantry to halt or take up a formation unfavorable to the greatest development of its fire.

When the infantry is short of ammunition, when its *morale* is shaken by heavy losses, or when it is retreating over open ground, it will generally be advisable to rally by platoons to receive the charging cavalry.

The ease with which a cavalry frontal attack can be repulsed by good, unshaken, infantry, well supplied with ammunition, is shown by the result of De Contenson's charge at the battle of Beaumont. In this case, a regiment of cuirassiers, under Colonel de Contenson, charged upon the 11th company of the Prussian 27th Infantry. Captain von Helmuth, commanding the company, which happened to be formed at the time in a crotchet with the opening towards the enemy, ordered his men to stand fast, and forbade them either to rally by groups or to open fire without command. The whole force of charging cavalry rushed into the crotchet, and was received with a file fire at close range, the effect of which was murderous. Many saddles were emptied, and the French commander and his horse both fell mortally wounded within fifteen paces of the skirmishers. The cavalry rushed in among the infantry, and Captain von Helmuth was himself engaged in a hand-to-hand struggle with a French non-commissioned officer until the latter was shot down. The cuirassiers were, however, easily repulsed, without the loss of a single man on

the part of the German company. Some men who had been thrown down and run over had received severe contusions, but their hurts were not sufficiently serious to relieve them from duty with their battalion. "On the other hand, the loss of the French regiment of cuirassiers in the charge amounted to eleven officers, upwards of 100 men, and a still larger number of horses. The regiment hurried in wild disorder back to the Meuse; the bridges and fords, however, were already so blocked with guns and wagons, that the cuirassiers endeavored to gain the opposite bank by swimming, whereby many more men and horses lost their lives."*

There is, however, nothing radically new in the relations of cavalry and infantry. Improvements in fire-arms have, it is true, added enormously to the defensive power of the latter; but it may well be denied that good, unshaken, infantry, well supplied with ammunition, and not taken by surprise, could be overthrown by a cavalry charge, even when the weapon of the foot troops was merely the old muzzle-loading, smooth-bore musket.†

*German Official History (tr. by Hozier and Wright), Part I., Vol. II., p. 276.

†The following graphic description, by Major Macready of the 30th Foot, of the charge of the French cuirassiers upon the British squares at Waterloo, shows that the power of the infantry is not altogether due to the new weapons:

"In a few minutes after, the enemy's cavalry galloped up and crowned the crest of our position. Our guns were abandoned, and they (the cuirassiers) formed between the two brigades, about 200 paces in our front.

"The first charge was magnificent. As soon as they quickened their trot into a gallop, the cuirassiers bent their heads, so that the peaks of the helmets looked like visors, and they seemed cased in armor from the plume to the saddle. Not a shot was fired until they were within thirty yards, when the word was given, and our men fired away at them. The effect was magical. Through the smoke we could see helmets falling, cavaliers starting from their seats with convulsive springs as they received our balls, horses plunging and rearing in the agonies of fright and pain, and crowds of the soldiery dismounted; part of the squadrons in retreat, but the more daring backing their horses to force them on the bayonets. Our fire soon disposed of these gentlemen.

"The main body re-formed in our front, and rapidly and gallantly renewed their attacks; in fact, from this time (about four o'clock) until near six we had a constant repetition of these brave but unavailing charges. There was no difficulty in repulsing them, but our ammunition decreased alarmingly. At length

It would be absurd, however, to attempt to rule cavalry off the battle-field, or to suppose that it can never again work serious injury, or perhaps absolute ruin, to infantry in action. It should be constantly borne in mind that the superiority of the infantry demands that it should be *good, unshaken, well supplied with ammunition, and not taken by surprise*. The first duties of an infantry commander opposed to cavalry are, therefore, to exercise the utmost vigilance in watching the enemy, and to guard with extreme care against an exhaustion of ammunition.

THE EFFECT OF SMOKELESS POWDER ON INFANTRY TACTICS.

The tactical effect of the use of smokeless powder is, as yet, scarcely more than purely speculative; for this new ammunition, though used in the great autumn maneuvers of European armies, has not yet undergone the test of actual war. It seems certain, however, that smokeless powder will materially affect the accuracy of fire, and consequently modify tactical formations; and it may also have a decided influence on the *morale* of the troops.

The men formerly fired at puffs or banks of smoke, and the smoke of their own rifles obscured, to a great degree, their own view and prevented accurate aiming. Now they will fire at individual men or bodies of troops, and, their own smoke no longer being in the way, they will not be likely to fire at random. Their fire should accordingly be more accurate; but this advantage may be neutralized by the fact that their losses will doubtless be much heavier than formerly, owing to the increased accuracy of the enemy's fire. The fact has already been noted that the skirmishers, when struck by a heavy fire, instinctively spread out to each side of the danger-

an artillery wagon galloped up, emptied two or three casks of cartridges into the square, and we were all comfortable.

"The best cavalry is contemptible to a steady and well-supplied infantry regiment; even our men saw this, and began to pity the useless perseverance of their assailants, and as they advanced, would growl out, 'Here come these fools again.' Their devotion was invincible."

ous ground, thus forming groups or small crowds. These groups will now be plainly visible, and the fire of the enemy can be turned upon them. The supports and reserves will likewise offer a clear target, and must therefore deploy early, thus giving the attacking force a formation in successive deployed lines from an early stage of the fight. This deployment will be a less serious matter than it would have been formerly, for the men will constantly be within the view of their commanders.

The advantages of smokeless powder will probably rest with the defensive rather than the offensive. The position of the defenders was formerly outlined with smoke; and the commander acting on the offensive could thus give the assailing troops a proper direction from the beginning of the fight. This will now be much more difficult, and as a change of direction is hard to execute with troops under fire—as it is likely to cause a crowding in one place and an opening out in another part of the assailant's line, and a separation of reserves from their proper front—more time must be taken in reconnoitering the position. This, combined with the fact that the assailant, both in reconnaissance and attack, is in full view of the defender, who can also clearly see the various objects in the assailant's path to which he has ascertained the range, manifestly gives a great advantage to the defensive. This advantage is increased by the fact that the firing line of the defender, lying down, scarcely offers a perceptible target to the assailant, while the firing line of the latter, though also comparatively invisible when under cover, affords a full target when it moves forward. The firing line of the defender must, for reasons already stated, devote its attention to the firing line of the assailants; but a second firing line, when the nature of the position admits of employing one, may open with volleys or magazine fire on the plainly-visible supports and reserves, and, by shattering them, bring the enemy's firing line to a standstill for want of the physical

and moral reinforcement necessary for its forward impulsion. The effect of smokeless powder on the *morale* of the troops is as yet an unanswered question. The killed and wounded, formerly concealed to a great degree by a merciful curtain of smoke, will now be exposed to full view, and the horrors of the battle-field may affect the nerves of the soldiers to a degree formerly unknown. It is more likely, however, that this will not materially affect the troops. Men never despise danger, but their pride, combativeness, and excitement neutralize the instinct of self-preservation. The bewilderment produced by the atmosphere of smoke, and the sense of danger caused by losses coming from beyond a veil concealing the enemy, will no longer exist; and the men, seeing clearly, will doubtless be in less perplexity and in better heart than under the old conditions. This, combined with the fact that the men will be continually within the view of their officers, will probably render fire discipline an easier matter than it was formerly. It seems probable, on the whole, that the introduction of smokeless powder will make the tactical handling of troops easier than it was under the old conditions; though the commander of a large force will seriously miss the indications of the progress of the combat formerly afforded by the smoke which marked the lines.

CHAPTER VI.

HISTORICAL SKETCH OF MODERN CAVALRY.

"History proves that cavalry is in every respect an indispensable arm of the service."—*Prejentsoff*.

At the time of the invention of fire-arms the cavalry consisted of men-at-arms, armed with the lance, sword, and

dagger, to which weapons were generally added the battle-axe, battle-hammer, or mace. Literally iron-clad himself, and with his horse further weighted down with defensive armor, the cavalier of this epoch had reduced mobility to a minimum, and, in seeking protection from the weapons of his foes, had well-nigh deprived himself of the power of injuring his enemies in return. Invincible when opposed to the miserable, unarmored, foot troops of his time, he was unable to penetrate the armor of an opposing cavalier, and warfare between men-at-arms had become almost bloodless. At the battle of Zagonari, in Italy, in 1423, the only men who lost their lives were three knights, who, having fallen from their horses, were drowned in a morass. At Agincourt some of the French knights, being unhorsed, were unable to rise from the mud, and were ridden over and miserably suffocated. The charge could be made only at a slow trot, and altogether the cavalry was at the lowest ebb of military efficiency.

The introduction of gunpowder as a military factor was at once felt by the cavalry. Already overweighted with iron,* the cavaliers made a vain attempt to neutralize the new force by adding to the thickness of the armor, and it was next sought to adapt fire-arms to the use of the cavalry. To this end, the petronel was introduced. This weapon consisted of a simple iron or brass tube, with a touch-hole on top, fixed on a straight wooden handle, which was rested against the breast in firing. The muzzle was generally steadied by a rest with a fork, which stood up from the pommel. This weapon was subsequently much improved and developed into the arquebus, which was fired from the shoulder, and furnished first with the match-lock and afterwards with the wheel-lock. The proportion of arquebuses to lances was one to four. Too slow and unwieldy to deliver effective shock, and with fire action incomparably inferior to that of the rude, but improving, infantry which

*The armor of a knight is said to have frequently weighed 200 pounds.

it now encountered, the cavalry of this period was all that cavalry should not be; and Machiavelli, writing about 1515, declared that "well-organized infantry could hardly be beaten except by infantry."

The pistol, invented in 1521, and soon introduced as a military weapon, added considerably to the power of the trooper, though the tactics adopted shows how far the mounted arm still fell short of its proper function. The German cavalry was now formed in deep bodies, habitually in seventeen ranks. It made no attempt to use shock action, but rode up to the enemy without charging, and when at close range the front rank discharged its pistols and wheeled to the right and left at a trot, unmasking the second line and re-forming in rear to load. Each rank repeated this maneuver in turn. For a time this tactics seems to have worked well; but the French cavalry finally adopted the tactics of charging with impetuosity while the Germans were firing, and almost invariably overthrew them.

Great improvements in the German cavalry were made by Charles V. In imitation of the French organization, the cavalry had been formed into unwieldy companies of some 600 combatants; Charles now organized it in squadrons of 400 troopers each, and reduced the number of ranks—first to ten and afterwards to eight. Henry IV. of France introduced a still shallower formation of six ranks.

The tactics of this period shows a peculiar intermingling of cavalry and infantry. In many cases musketeers on foot were interspersed among the troopers, and, as the latter charged at a slow trot, were able to keep up with them. By their fire they aided in breaking the enemy's ranks, which were then overthrown by the cavalry. The intermingling of individual musketeers and troopers seems not to have given satisfactory results, though the combination of bodies of infantry with those of cavalry was happily used by Henry IV. at the battle of Coutras, in 1587. In that battle the infantry was placed on the flanks and the cavalry

in the center. Between the different squadrons were placed small bodies of select musketéers, twenty men in each, formed in four ranks, the first lying down, the second kneeling, the third stooping, and the fourth standing erect, so that all could fire simultaneously. The attack of the Royalist cavalry was awaited until it arrived within twenty paces, when the infantry fired a volley, and the Huguenot cavalry, immediately making a counter-charge, drove the Royalists from the field.

The lance gradually disappeared, and the armor of the cavalry was lightened, as its inability, even at its heaviest weight, to resist musket shots became more and more manifest. In the time of Maurice of Nassau (1584-1609) the cavalry was provided with cuirass and helmet, and armed with pistol and sword. Like the infantry, the Dutch mounted troops were brought to a much higher state of efficiency than their adversaries. When charged by the Spanish cavalry, they fired a volley, then opened out quickly from the center, and, sword in hand, charged their opponents on the flanks.

About this time squadrons were formed into regiments, and the number of ranks was reduced to three. Dragoons now constituted a portion of the cavalry of each army. They were first employed by Marshal de Brissac in 1550, and were originally mounted infantry, fighting on foot, using their horses merely for transportation; but they assumed more and more the characteristics of cavalymen, and finally became a body of troops trained to fight either on foot or on horseback.

The Thirty Years' War.—The genius of Gustavus Adolphus was manifested in every branch of the military art, and especially in organization and tactics. The reforms in the composition and employment of mounted troops made by that great commander were scarcely less than those made by him in his infantry. He organized his cavalry in troops of seventy men each, grouped them into regiments consist-

ing of eight troops, and reduced the number of ranks to three. The cavalry was divided into heavy and light; the former being provided with cuirass and helmet, and the latter having no armor. The cavalry had been accustomed to caracoling; but this was now forbidden, and it was directed to charge straight on the enemy. The men of the first rank fired their pistols, drew swords, and closed with the enemy; the second and third ranks supported the first, and generally reserved their fire until the hostile line was broken. The action of the cavalry was essentially by shock, though the charge was still made at a trot. Gustavus is said to have attached small pieces of artillery to his cavalry, thus really originating horse artillery; but this is doubtful, and there is no authentic account of such use of artillery until the time of Frederick the Great.

The Imperialists opposed to Gustavus a heavy cavalry composed of cuirassiers, carbineers, dragoons, and a light cavalry of Croats and hussars. The light cavalry was chiefly used in the minor operations of war, the main reliance being placed upon the heavy cavalry for the work of the battlefield. The latter was formed by Tilly in ten ranks, and by Wallenstein in eight. The cuirassiers were heavily armored, and were lacking in the essential quality of mobility; and all the heavy cavalry depended principally on fire action. The carbineers fired by successive ranks, retiring to load. The cavalry of the Imperialists was inferior in composition, arms, and tactics to that of Gustavus, and the Swedish cavalry largely contributed to the two great victories of Leipsic and Lützen.

The Wars of Louis XIV.—It is remarkable that the long wars of Louis XIV. produced no material change either in the organization or tactics of cavalry. Marlborough used cavalry with telling effect, and his great victories of Blenheim, Ramillies, and Malplaquet were largely due to the decisive use made of this arm; but the cavalry still relied on mounted fire action, and the charge was made at a slow pace.

Marlborough used his cavalry in large masses, and to this, and the fact that the French cavalry was, in arms and training, in nowise superior to his own, was his success due.

Contemporaneously with the later campaigns of the Spanish Succession were waged the wars of Charles XII. of Sweden with the Danes, Saxons, and Russians. Charles abolished all defensive armor, armed his cavalry with the long, straight sword, especially adapted to thrusting, prohibited the use of fire-arms on horseback, and taught the cavalry to charge at full speed. The true *rôle* of cavalry was now beginning to be understood. In the reign of Louis XV. the lance was revived in the French cavalry, and the cuirass and helmet were replaced with the buff-leather vest and saber-proof cap. Marshal Saxe recognized shock action as the paramount function of cavalry, and declared that "cavalry that could not charge 2,000 paces at full speed without breaking was unfit for service." His ideas, based upon his own experience and that of Charles XII., foreshadowed the brilliant use of cavalry soon to be seen on European battle-fields.

The Wars of Frederick the Great.—When Frederick the Great ascended the throne of Prussia he found the cavalry trained to charge at a slow trot, and place its reliance on mounted fire action. In his first battle, Mollwitz, the inefficiency of the cavalry was very manifest, and he resolved to make radical changes in the nature and use of that arm. As soon as the peace of Breslau gave him leisure for a careful overhauling of his army, he prohibited mounted fire action, and trained the cavalry to charge in good order at full speed, relying solely upon the shock. The greatest care was taken in the instruction of the recruits and the training of the horses, and the cavalry was brought to such a state of perfection that it is said that 8,000 or 10,000 horsemen could charge together, boot to boot, for many hundred yards, halt in perfect order, and immediately begin a new charge. Frederick also introduced the formation from col- ★

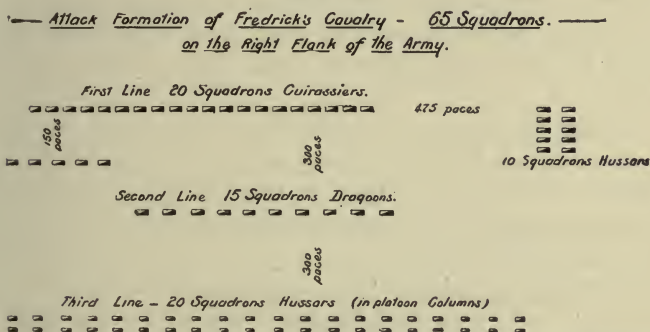
* (umn front into line, in place of the former method of changing direction and then wheeling into line.

* { Frederick's cavalry consisted of cuirassiers, dragoons, and hussars. The first had cuirasses and helmets; the others were without defensive armor. The cuirassiers and dragoons were formed into companies or troops of seventy men each, two troops forming a squadron, and five squadrons composing a regiment. Each hussar regiment consisted of ten squadrons, each numbering 144 sabers. The hussars were mainly relied upon for detached action, but they were also used in battle; all the cavalry being, in fact, used as circumstances demanded, for any duty that might properly be assigned to mounted troops. Frederick's cavalry was at first formed in three ranks, but it was found that in two ranks the maneuvers were more precise and rapid, and the third rank was accordingly discontinued.

The cavalry was habitually formed in three lines; the first composed of cuirassiers, with intervals of only ten paces between squadrons, and the second composed of dragoons, with intervals of sixty paces between squadrons, through which the first line could retire in case it was repulsed. The hussars, generally in platoon columns, formed a third, or reserve, line, which was especially entrusted with the protection of the flanks. The cavalry, in masses of from twenty to sixty squadrons, was formed on the flanks of the army, and its own outward flank was generally protected by a hussar regiment in double column of squadrons. Three or four squadrons of dragoons were generally advanced about 150 paces ahead of the second line, in such a position that they could at once take in flank any reserve of the opposing cavalry that might fall upon the flank of the first line. This may be regarded as the normal formation, though it was often altered to a greater or less degree to suit the circumstances of the action. It was finally changed, so that the second line, instead of being directly behind the first, projected beyond one or both flanks,

and the third line similarly projected beyond the flanks of the second. The flanks being thus guarded, the hussar regiment was no longer employed as a special guard for the outer flank. (See Fig. 29.)

Figure 29.



In attacking, the lines moved forward simultaneously, beginning at a walk, then passing to a trot, and covering the last 200 yards at a run. The men charged with a yell, to heighten the moral effect. As soon as the opposing force was broken, the pursuit was taken up, and no respite was allowed the defeated enemy until he was driven completely from the field. In case it became necessary to re-form the disordered lines, the cavalry always rallied to the front instead of to the rear. Frederick's cavalry leaders were instructed always to seize the initiative, and forestall any attack of the enemy.

Although the cavalry was forbidden to fire in action, the use of mounted firing was permitted in the pursuit, and the troopers were carefully trained in the use of fire-arms, in order that they might be able to meet the exigencies of detached action. The dragoons were able to fight well on foot, though that kind of fighting was never adopted when shock action was possible. The day after the battle of Rossbach the Prussian dragoons, finding the rear guard of the enemy posted in a chateau and enclosed gardens, dis-

mounted, and, attacking on foot, drove the French from their cover.

To compensate for the loss of fire action on its part, and not leave it exposed helplessly to the fire of the opposing infantry and artillery before coming within saber-reach, Frederick invented horse artillery, consisting of light guns, attached to the cavalry, which were used to pave the way for the charge, and to continue firing until masked by the cavalry.

When Frederick ascended the throne, the Prussian cavalry numbered 13,000 sabers, and its proportion to the infantry was about one-fifth; at the close of his reign the cavalry numbered 30,000 sabers, and was equal to one-fourth of the numerical strength of the infantry. No other general of ancient or modern times understood so well as Frederick how to make a decisive use of cavalry on the field of battle, and no other commander ever had such a perfect cavalry fighting force, or such able cavalry leaders; the name of Seidlitz or Ziethen being a synonym for all that a cavalry general should be. The victories of Prague and Leuthen were due, in a great measure, to the judicious and energetic use of cavalry; and at Rossbach the Prussian cavalry, 4,000 strong, almost unaided, defeated the army of the Allies, which lost 3,000 killed and wounded, 5,000 prisoners, and seventy guns. It is claimed* that out of twenty-two pitched battles fought by Frederick, his cavalry played a decisive part in at least fifteen of them, and history seems to bear out the claim.

But, perfect as Frederick's cavalry was on the field of battle, it was distinctly inferior to that of the Austrians in all the details of the service of security and information. The Austrian light cavalry, and especially the irregular cavalry, composed of Pandours and Croats, formed a perfect screen around their army, which they kept posted with regard to every movement of Frederick, while keeping the

*Nolan's "Cavalry, Its History and Tactics," p. 35.

Prussian monarch completely in the dark with regard to the movements of his adversary. Unable to cope in action with Frederick's horsemen, they were, nevertheless, able to elude them, and far surpassed them in everything pertaining to the strategic service of cavalry. Frederick's convoys, messengers, and mail-bags were captured; for nearly a month, on one occasion, he was shut out completely from the rest of the world, and his knowledge of passing events limited to his own camp; a force of 4,000 Austrian light cavalry made a raid and captured Berlin; and at Sohr and Hochkirch he was surprised by the enemy, and was saved from disaster only by his own military genius. Frederick's cavalry, in its organization and tactics, forms a model for cavalry pure and simple on the battle-field, even at this day; that of his opponents equally furnishes a model for the strategic use of mounted troops.

The Napoleonic Era.—The cavalry of the French Republic, in 1793, consisted of twenty-nine regiments of heavy cavalry, two regiments of carbineers, and fifty-four regiments of light cavalry, aggregating about 66,000 sabers. The heavy cavalry was armed with pistol and straight sword, and the carbineers had, in addition to the same weapons, a carbine with bayonet. The light cavalry consisted of dragoons, *chasseurs à cheval*, and hussars, all provided with saber and pistol, and with either carbine or musketoen. Each regiment consisted of four squadrons, each composed of 200 troopers.

This force, sufficiently formidable if properly trained, organized, and handled, was largely composed of ill-instructed recruits, was almost incapable of shock action, and was disseminated as divisional cavalry among the many small divisions composing the several French armies. Hoche first formed the cavalry into divisions; and Napoleon, in his first Italian campaign, united his cavalry in a similar manner. At a later period Napoleon formed brigades and divisions of cavalry, and finally combined the divisions in

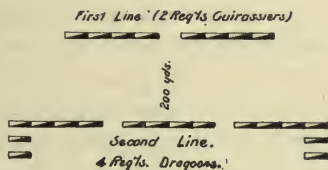
cavalry corps. In the Russian campaign, in 1812, a division of light cavalry was attached to each army corps (but none to the infantry divisions), besides which there were four corps of reserve cavalry, under Murat. This enormous force, aggregating 80,000 sabers, and constituting one-sixth of the entire army, consisted of cuirassiers, dragoons, lancers, and *chasseurs à cheval*, all in a high state of efficiency, resulting from the experience of many campaigns.

In the dispositions preceding the battle, the light cavalry was generally placed in echelon behind the flanks of the corps to which it belonged; the reserve cavalry, in second line, usually in rear of the center; and the cavalry of the Guard, sometimes reinforced with a portion of the reserve cavalry, in the third line. During the battle the positions of the several bodies of cavalry were changed as circumstances demanded. This disposition was very different from that of Frederick, who always placed his cavalry entirely upon the flanks. It is to be observed that Napoleon's armies were generally much larger than those of Frederick, and that if the French cavalry had been placed on the flanks, it often could not have received the orders of the Emperor until the time for its decisive employment had passed. (As a rule, the cavalry of Napoleon attacked in column of regiments or brigades deployed one behind another at a distance of fifty or sixty paces.) Murat habitually formed the reserve cavalry for attack with two regiments of cuirassiers in the first line, with an interval of about twelve paces; four regiments of dragoons or chasseurs in second line, about 200 paces in rear of the first, three regiments being in line, with intervals of about eighteen paces, and half of the fourth, in column of squadrons, being behind each flank. The lines advanced simultaneously. In case of the repulse of the first line, the center regiment of the second line ployed its center squadrons in rear of its flanks and allowed the first line to pass through, immediately re-forming and continuing the attack, the cuirassiers re-forming as a

second line. The four squadrons in rear of the flanks of the second line were employed in the pursuit of the enemy. (See Fig. 3c.)

Figure 30.

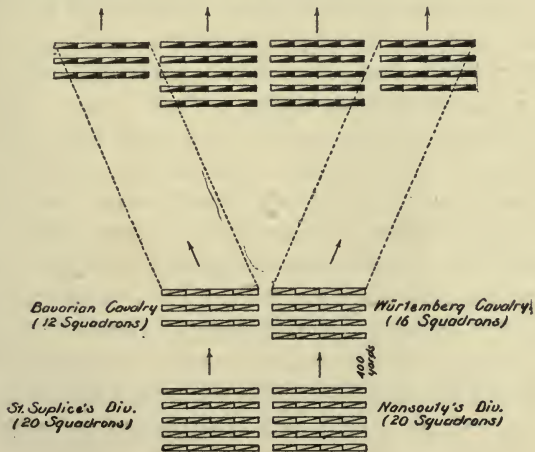
— *Murat's Habitual Formation of a Division of Reserve Cavalry.* —



In the battle of Eckmühl, April 22, 1809, the reserve cavalry was formed with sixteen squadrons of Würtemberg and twelve of Bavarian cavalry in the first line, each body formed in column of deployed regiments. At 400 paces distance was the second line, composed of two divisions of French cuirassiers under Nansouty and St. Sulpice, each in the same formation as the cavalry of the first line. Just

Figure 31.

— *Charge of French Reserve Cavalry at Eckmühl.* —



before collision with the Austrian cavalry, the Bavarians and Württembergers moved towards the flanks and advanced abreast of the cuirassiers, the attack being thus made in a single line of columns of deployed regiments, consisting of sixty-eight squadrons. (See Fig. 31.)

Master of everything pertaining to the art of war, Napoleon made the most perfect use of his cavalry. In delivering a decisive shock on the field of battle, and in the relentless and unflagging pursuit of a beaten enemy, his cavalry rivaled that of Frederick; while in screening and reconnoitering duty it went everywhere and learned everything. The Emperor used cavalry successfully against the enemy's cavalry, infantry, and artillery, and combined its use with that of the other arms in the most harmonious manner. The artillery prepared the way by its fire, the infantry bore the brunt of the combat, and heavy forces of cavalry were held in readiness to make charges at decisive moments. The formation of the French left at Austerlitz illustrates the perfect manner in which the three arms were combined. The infantry of Lannes' corps was drawn up in two lines, the first deployed and the second in line of battalions in close column by division, from which battalion squares could be readily formed. The divisional artillery was in the intervals between brigades, and a battery of position consisting of eighteen heavy guns was on the hill, known as the Santon, on which the left rested. The light cavalry belonging to the corps was on the left wing, echeloned slightly to the front. The reserve cavalry, under Murat, was drawn up behind Lannes' corps, each cavalry division being in two lines of regiments in column of squadrons, one division being held in reserve. In the course of the battle the first line was broken by Lichtenstein's cavalry, which penetrated through the intervals of the second, when it was struck by the reserve cavalry and driven back. Between the fire of the battalion squares, which it received in passing both in attack and retreat, and the shock and

pursuit of the reserve cavalry, Lichtenstein's force lost half its numbers and was eliminated as a factor in the battle.

The uses made of the cavalry on the field of battle by Napoleon were many and great. At Marengo a charge by Kellerman's cavalry checked the victorious Austrian infantry, and, in conjunction with the attack of Desaix, turned defeat into victory; at Austerlitz the success on the French left was mainly due to the cavalry; at Eylau a charge by Murat upon the flank of the Russians, who had overthrown Augereau's corps, saved the day; at Wagram, Macdonald's column, having suffered great losses, and being compelled to halt by a heavy attack of the Austrians in front and on the flank, was relieved by a vigorous charge of Nansouty's cavalry, and resumed its advance; at the pass of Somosierra the Polish lancers, charging over difficult ground, captured the batteries of the Spaniards and put their entire army to flight; at Borodino the great redoubt was captured by a charge of the cuirassiers; and at Dresden the victory was decided in Napoleon's favor by a brilliant charge by Murat, which overwhelmed the Austrian left, and resulted in the capture of 10,000 prisoners. The charges of Napoleon's masses of cavalry have been likened to avalanches throwing down and sweeping away everything in their path, and they generally marked the decisive moment of the battle. Caval

Notwithstanding the vigor with which Napoleon's cavalry was used, and its great reliance on shock action, it was unable to charge at full speed after the manner of the cavalry of Frederick. The constant wars of Napoleon did not give an opportunity for the careful training in peace time that had made the Prussian cavalry so formidable in war; and, in order that the proper degree of cohesion might be maintained, the French cavalry charged at a trot or controlled canter.* Napoleon restored the cuirass and helmet, * Caval shock

*It is claimed, however, that the cavalry of Murat began to charge at a trot, but that it usually (and in the later campaigns habitually) finished at full speed, the formation being both deep and dense, so that nothing was left to the discretion of the trooper.

which had fallen into disuse, and they have been retained in most armies until the present day.

★ Though in the use of cavalry Napoleon, like Frederick, placed his reliance upon shock, fire action was not altogether neglected. "I cannot," said the Emperor, "accustom myself to see 3,000 *élite* cavalry (cuirassiers) at the mercy, in the event of a surprise, of a few light troops, or liable to be checked on the march by a handful of poor marksmen posted behind trees and houses."* At Eylau an effective use of mounted fire action was made by the Twentieth *Chasseurs à Cheval* under peculiar circumstances. It is thus described by Captain Parquin: "Toward 2 P. M., an enormous mass of cavalry advanced on us at a walk, the snow and the boggy soil not permitting a faster gait. Colonel Castex asked if the carbines were loaded. Receiving an affirmative reply, he commanded 'Advance carbine!' and ordered the officers into the ranks. The enormous mass of dragoons kept advancing upon us at a walk, but our colonel remained undisturbed; and when the Russians were within six paces he commanded 'Fire!' The effect was terrible. Nearly the whole of the first rank of the Russians was placed *hors de combat*. There was a moment of hesitation on the part of the enemy; but soon the dead and wounded were replaced by the second rank and the *mêlée* became general. . . . The Twentieth *Chasseurs* lost more than a hundred men; the enemy [driven back] lost at least three hundred."†

In the great cavalry fight at Eckmühl the cuirassiers of Nansouty and St. Sulpice received the charging Austrian cavalry with a discharge of fire-arms, followed by an attack at a gallop.‡ There seems, however, to have been but a single volley, and the remainder of the *mêlée* consisted of a prolonged and desperate contest of steel against steel. The

*Letter to the Minister of War in 1811.

†"Souvenirs du Capitaine Denis Charles Parquin, 20ième regiment de Chasseurs à Cheval."

‡Thiers.

authenticated instances of mounted fire action by Napoleon's cavalry were few, however, and it is evident that in the use of mounted troops he, like Frederick, depended almost exclusively on shock. (For fire action the cavalry habitually depended upon the horse artillery,) of which there were forty-eight batteries, aggregating 288 guns, or a little more than four guns to every 1,000 cavalry.

The invasion of Russia first brought into prominent notice a peculiar force of light cavalry, the Cossacks, which perhaps contributed more than any other troops to the overthrow of Napoleon. The Russian army also contained a great force of cuirassiers, dragoons, hussars, and Uhlans, but their influence on the final result of the campaign was as nothing compared with that of the clouds of irregular light cavalry furnished by the Cossack tribes. (The Cossack cavalry was armed with the lance, sword, and pistol; and extreme mobility and expert horsemanship were its chief characteristics.) General Morand describes the Cossacks as follows: "These natural horsemen are not organized in divisions; pay no attention to regular alignments and the order so highly prized by us; clasp their horses tightly between their knees; rest their feet in great stirrups, which serve as supports to them when using their weapons, so that they can bend their bodies forward to deliver a blow, or backward to avoid one. Trained to pass at once from a halt to a gallop, and from a gallop to a halt, their horses second their dexterity, and appear to be part of themselves. These men are always on the lookout, move with extreme rapidity, have but few wants, and warlike thoughts are the only ones that can arouse their interest."* Their tactics was peculiar, consisting of the *lava*,† or enveloping movement, made rapidly and in dispersed order, for the purpose of harassing the enemy, exhausting him,

*De Brack's "Cavalry Outpost Duties" (translated by Carr), page 328.

†This term is said to be from an old Tartar word, *laou*, signifying to work from a circumference toward a center.)

and forcing him to break his ranks, preparatory to charging him with the sword. In executing the *lava*, firing was generally employed. If charged by the enemy, the Cossacks, like the Sioux, gave way quickly, only to re-form promptly and renew the attack. In the campaigns of 1813-14 the Cossacks, arming themselves with infantry muskets, captured from the French, are said to have developed a system of fighting on foot somewhat similar to that employed a half-century later by our own cavalry.

There are different accounts of the tactics of the Cossacks on the battle-field, and various estimates of their worth in action; but all accounts prove their inestimable value in everything pertaining to the service of security and information. De Brack (quoting De la Valette) says: "The Cossacks rendered military operations very dangerous, especially for the officers charged with the duty of making reconnaissances. Many of these, and especially the officers of the headquarters staff, selected by the commanding general, preferred to send in reports obtained from peasants to exposing themselves at a distance to the attacks of the Cossacks. Under such circumstances it was impossible for the Emperor to keep himself properly informed in regard to the enemy."* General Morand further says: "The march of the Grand Army was first delayed by the Cossacks, and later they cut it off from every source of supply, and swarmed around its flanks like savage bees engaged in tormenting and exhausting a roaring lion with their innumerable stings."† This irritating plague, elusive and omnipresent, made itself especially felt at the time when Napoleon's own cavalry, depleted in numbers and exhausted by hardship, was less than one-fourteenth of the strength of his infantry. Never, indeed, had a commander greater cause to deplore his lack of cavalry than the Great Emperor, who understood its use so well. For want of cavalry to conduct a pursuit,

*De Brack (translated by Carr), page 327.

†Ibid., page 328.

his brilliant victories of Lützen and Bautzen were barren; and for days before the battle of Leipsic he was in the dark as to the movements of the Allies, while the latter were thoroughly informed in regard to his own. His military genius was paralyzed by lack of information, and to his deficiency in light cavalry, more than to any other cause, is to be attributed his downfall.

The Crimean and Italian Wars.—For nearly forty years after Waterloo no important campaigns were conducted; and the first great war demonstrated the completeness with which the essential principles of tactics had been forgotten in the long peace. In the service of security and information the cavalry (of both the Russians and the Allies) was deficient to a lamentable degree. In the flank march from the Alma to Balaklava the head of the column, marching through a thick wood, was composed of the commanding general and staff, followed by thirty field guns in column of sections. "What this might have portended," says Hamley, "was presently made evident, for in an open space Lord Raglan came suddenly on a Russian column moving at right angles to his own force. . . . We had been absolutely unaware of this march of an army across our front till we stumbled on it; while Menschikoff remained in such complete ignorance that the Allied army was defiling within four or five miles of him that even on the 28th [three days later] a messenger from him arrived in Sebastopol, part of whose errand was to get news of the movements and position of the enemy."* In this extraordinary march neither army was seen by the cavalry of the other.

Nor was the use of cavalry on the field any more intelligent than its use in reconnaissance. At Balaklava (the only battle of the entire war in which cavalry played any considerable part) a heavy force of Russian cavalry, advancing to attack the British Heavy Brigade, deliberately slackened its pace before contact, and received a counter-charge

*"The War in the Crimea," page 76.

at a halt. In this action the flank of the Russian cavalry was exposed to the Light Brigade, whose commander, Lord Cardigan, failed to avail himself of the opportunity thus presented, because his orders did not contemplate such action; but he afterwards engaged in a heroic, but senseless, charge on the Russian batteries, which furnishes a theme for poets, but not a model for a cavalry general.

In the Italian war of 1859 the use of cavalry was slight. This was largely due to the nature of the country, which was cut up with irrigating ditches and filled with mulberry groves and rice plantations. At Solferino there was a considerable combat between the French and Austrian cavalry; but the use of mounted troops in the campaign produced such unimportant results that many military men argued that the day of cavalry had gone entirely into the past; and at the close of the war Austria made a material reduction in her mounted force.

The War of Secession.—At the beginning of the war the cavalry of the United States army consisted of two regiments of dragoons, one of mounted rifles, and two of cavalry, aggregating about 4,000 men. Each regiment consisted of ten troops, each troop having a war strength of 100 men. The arms of the dragoons were the saber, carbine, and revolver; the mounted rifles were armed with the rifle and hunting-knife; and the arms of the cavalry were similar to those of the dragoons.* The designation of all the regiments was changed in 1861 to "cavalry"; and all were alike armed with the saber, revolver, and carbine. This small force was augmented by a new regiment of cavalry belonging to the regular army, and by great levies of volunteers, until the cavalry of the United States reached the enormous

*It was prescribed in G. O. No. 13, A. G. O., August 15, 1855, that three squadrons of each cavalry regiment should be armed with the Springfield rifle-carbine; one squadron of each with the movable stock carbine, with the barrel ten or twelve inches long, as might be found best by experiment; one squadron of the First Cavalry with the breech-loading Merrill carbine; and one squadron of the Second Cavalry with the breech-loading Perry carbine.—Price's "Across the Continent with the Fifth Cavalry," page 29.

aggregate of 80,000 men—a mounted force equal in numbers to the cavalry of Napoleon at the height of his power. Each regiment was organized on the model of the regular regiments in service at the beginning of the war. In the Southern States large forces of cavalry were also organized; and in the course of the long war the tactical and strategical uses of cavalry were such as to revolutionize the tactics of that arm. ★

To avoid the confusion into which European critics of our cavalry methods have generally fallen, the cavalry in the War of Secession should be divided for description into regular cavalry and partisan cavalry; the first consisting of troops armed and trained as dragoons and forming a part of larger armies; and the latter made up of mounted soldiers placing habitual or entire reliance on fire-arms, and used mostly in detached action, though often engaged as part of a larger army in battle. ★

Confederate Partisan Cavalry.—The best type of Confederate partisan cavalry is found in the forces commanded by John Morgan and N. B. Forrest, two cavalry generals without previous military training or education, but endowed with natural soldierly capacity, which in the case of the latter amounted to military genius.

(Morgan's force, at the height of its efficiency, consisted, nominally, of ten regiments of 500 men each; but, in reality, it never exceeded 4,000 men.) The men were, at first, armed with a variety of rifles, muskets, and shot-guns, but were finally uniformly provided with the Enfield muzzle-loading rifle, of a pattern between the infantry rifle and the carbine. Each trooper had a brace of Colt's "army revolvers," but the saber was practically an unknown weapon in the command. Two small howitzers, and at a later date several light Parrott guns, were attached to the command. ★

(Morgan's men habitually fought on foot, using tactics adapted from that in use in the "old army" for skirmishing, but extended so as to be applicable to regiments, or even

brigades, as well as to the small detachments for which it was originally devised. One-fourth of the men being detailed to hold the horses, the rest dismounted and deployed, in single rank, to the front, rear, or either flank, the intervals between the men being about two yards. In fighting on open ground the command was generally formed in two lines, the distance between them depending upon circumstances. The first line fired and lay down, and the second, passing through the intervals some yards to the front, then fired and lay down, the lines thus passing each other in succession and keeping up a steady fire. In withdrawing, the lines passed each other in a similar manner. The general line was usually somewhat concave, the flanks extending slightly toward the front, the design being to bring a converging fire upon the enemy. The deployment was often covered by the flank companies as mounted skirmishers.

Forrest's command at one time numbered about 6,000 men, and was divided into three divisions, each consisting of three brigades, each brigade composed of two regiments. The arms were practically the same as those of Morgan's command, with the addition of the saber, which was attached to the saddle, but does not seem to have been frequently used. Two light guns were attached to each brigade. Forrest's tactics was similar to that of Morgan, though he generally kept in hand a mounted reserve, which sometimes, as at Okolona, in February, 1864, fell with decisive effect upon the enemy's flank while the dismounted troopers engaged in front. At Guntown, Miss., in June, 1864, Forrest's men, dismounted and posted behind cover, consisting of a low breastwork of logs and fallen timber, repulsed a well-conducted attack of Union infantry, by using rifle fire until the assailants were within close pistol range, and then opening fire with revolvers. This gave, practically, the same effect as fire from magazine rifles, twelve shots being rapidly delivered at close quarters. In

the same battle Forrest's cavalry made a successful dismounted charge, which decided the contest, after which they mounted and followed in pursuit.

Both Morgan's and Forrest's commands were used at times as component parts of large armies in battle. But their services were of greater value in independent operations, and especially in raids, which may be said to have had their first complete development in the War of Secession. Raids had, it is true, been made before. Haddick had made a raid in the Seven Years' War, in which he captured Berlin; in 1813 Tchernicheff, with 3,000 Cossacks and four guns, had passed around Napoleon's army and captured the city of Cassel; in the same year Tettenborn, another Cossack leader, had made a raid in which he captured Hamburg; and in 1831 Dembinski, a Polish rebel leader, with a command of about 4,000 mounted men, made a successful raid from Kurszany to Warsaw, a distance of nearly 600 miles, in the course of which he eluded the Russians and captured considerable quantities of supplies. <But in strategic results, in skillful execution, and far-reaching effects the American raids surpassed all previous operations of the kind, and have as yet been unequalled>

Morgan and Forrest each made a number of raids, in which they captured many prisoners and immense quantities of supplies, besides interfering so seriously with the communications of the Union army as almost to paralyze its advance. After the battle of Murfreesboro, or Stone's River, a forward movement by Rosecrans was impossible until the Confederate cavalry could be checked in its devastating detached operations. The army was dependent mainly upon the Louisville & Nashville Railroad for its supplies; and, owing to the persistent raids of the enemy, that road was operated only seven months and twelve days in 1862. The report of its superintendent for that year states: "All the bridges and trestleworks on the main stem and branches, with the exception of the bridge over

Barren River and four small bridges, were destroyed and rebuilt during the year. Some of the structures were destroyed twice and some three times. In addition to this, most of the water stations, several depots, and a large number of cars were burnt, a number of engines badly damaged, and a tunnel in Tennessee nearly filled up for a distance of 800 feet.* The enemy's cavalry had steadily increased in numbers, efficiency, and audacity, until it had become "a greater problem how to meet this arm of the enemy's force than his infantry."† Morgan made his first raid with a force of about 900 men, traveling over a thousand miles in twenty-four days, taking possession of seventeen towns, destroying all the military supplies found in them, capturing nearly 1,200 Union soldiers, and dispersing 1,500 home guards. He lost only ninety men and gained about 300 recruits on the raid.

When Sherman began his campaign in Georgia, in 1864, his communications from Louisville to Chattanooga, a distance of about 400 miles, were in danger of being intercepted, and his advance being brought to a standstill, by destructive raids of Confederate cavalry. General Sherman says: "There was great danger, always in my mind, that Forrest would collect a heavy cavalry command in Mississippi, cross the Tennessee River, and break up our railroad below Nashville."‡ Two successive expeditions were accordingly sent against Forrest, the first being defeated with heavy loss at Guntown, and the second, consisting of two divisions, defeating him at Tupelo, and "so stirring up matters in North Mississippi that he could not leave for Tennessee." But Forrest was still a thorn in the flesh of Sherman, who, after the fall of Atlanta, sent Newton's division back to Chattanooga, and Corse's division to Rome, and instructed Rousseau at Nashville, Granger at Decatur,

*Cist's "The Army of the Cumberland," p. 138.

†Ibid.

‡"Memoirs," Vol. II., page 52.

and Steadman at Chattanooga, to adopt the most active measures to protect the railroad communications from raids by Forrest and Wheeler.* Finally General Grant urged Sherman to drive Forrest out of Middle Tennessee, as a preliminary to any other move.† (In the whole range of military history it would be hard to find the name of another cavalry leader who, with the same numbers, caused his enemies so much trouble as N. B. Forrest.)

In Virginia a force of mounted troops under Mosby* *Mosby* waged war in true guerrilla style. (They were armed in the same manner as Morgan's cavalry, but, when not actively engaged, remained at their own homes, or billeted among sympathizers.) When any operation against the convoys, or a raid upon the communications, of the United States armies was contemplated, the men were assembled at some designated rendezvous. The operation terminated, they again dispersed to their homes, and Union cavalry operating in the region infested by the guerrillas could rarely find anything but apparently peaceable farmers. Mosby's men were, however, regularly enlisted, and constituted a part of the Confederate army under Lee.‡ These enterprising partisans neutralized a large force of cavalry for the protection of the Union communications, and caused much loss and infinite annoyance to the Union commanders. In a report to General Stuart, in September, 1863, Mosby says: "The military value of the species of warfare I am waging is not to be measured by the number of prisoners and material of war captured from the enemy, but by the heavy details it compels him to make in order to guard his communications, and to that extent diminish his aggressive

*"Memoirs," page 30.

†Ibid., page 141.

‡Mosby says: "All I did had the sanction of the commander of the Army of Northern Virginia, of which my own command—the Forty-third Battalion of Virginia Cavalry—was a part. I was independent simply in the sense that General Lee and General Stuart had such confidence in me that they never undertook to trammel me with orders, but gave me full discretion to act as I chose."—*Mosby's "War Reminiscences,"* page 81.

strength."* Mosby's guerrillas each received, by way of reward, a portion of the plunder captured; as a punishment, offenders were transferred to the line of the Confederate army. Mosby's guerrillas have often been confounded by ill-informed European critics with the regular Confederate cavalry, a mistake scarcely more justifiable than would be a confounding of the *Franc-tireurs* with the French dragoons.†

* (The essential characteristics of the Confederate partisan cavalry were extreme mobility, habitual and almost exclusive reliance upon fire action, and the tactics of fighting dismounted, using horses only in marches and in pursuit.) The saber was held in disrepute; but this is not remarkable, as the men had never had much or any training in its use, while they had all been accustomed to the use of fire-arms from youth. Great as were the deeds of the partisan troops in the War of Secession, the history of the *cavalry* in the same conflict shows that the latter could do all that lay in the power of the former and much more.

* { The Regular Cavalry.‡—In both the United States and the Confederate armies the cavalry was all light, and consisted entirely of dragoons.§ The Confederate cavalry, being recruited from a population accustomed to horsemanship and the use of arms, reached a condition of efficiency much sooner than that of the Union army, to which it may be said to have furnished, in some degree, a model. It will, therefore, be considered first.

The Confederate Cavalry.—The cavalry of the Army of Northern Virginia may be taken as the finest type of the Confederate cavalry. During the greater portion of the

*Scott's "Partisan Life with Mosby," page 392.

†The *Franc-tireurs* were irregular troops, resembling "home guards."

‡In order to prevent misconception, it is repeated that under the caption "Regular Cavalry" is considered not merely the cavalry of the Regular Army, but all cavalry used as *cavalry* instead of mounted infantry.

§The Sixth Pennsylvania Cavalry was, at first, armed with the lance, and known as "Rush's Lancers." The lance was soon abandoned, however, and the saber and carbine were adopted in its stead.

war it was under the command of General J. E. B. Stuart, an educated soldier of great merit, and a born cavalry commander. Ignoring the cavalry traditions of the Old World, and seeking only the most ready means to meet the ends in view, he originated a new method of using mounted troops, and may be said to be the father of the cavalry tactics of the present day. *

At the beginning of the Gettysburg campaign, Stuart's cavalry, which was then at the height of its efficiency and numerical strength, consisted of six brigades, and aggregated about 10,000 men. The *personnel* of the command was excellent, and it was well mounted, the troops furnishing their own horses. The men were generally armed with revolver and saber. One or two squadrons of each regiment were armed with breech-loading carbines, the rest being provided with Enfield rifles. (The cavalry was trained to use the saber or to depend upon fire action, as circumstances might dictate; and the tactical versatility of the command was well illustrated in the combat of Poolesville, Md., of which General Stuart reports.) "Guarding well my flanks and rear, I pushed boldly forward, meeting the head of the enemy's column going towards Poolesville. I ordered the charge, which was responded to in handsome style by the advance squadron (Irving's) of Lee's brigade, which drove back the enemy's cavalry upon the column of infantry advancing to occupy the crest from which the cavalry were driven. Quick as thought, Lee's sharpshooters sprang to the ground, and, engaging the infantry skirmishers, held them in check till the artillery in advance came up, which, under the gallant Pelham, drove back the enemy's force upon the batteries beyond the Monocacy."*

More formidable in battle than the troops of Morgan or Forrest, the cavalry of Stuart rivaled them in detached action. Stuart made a number of successful raids

*Official Records of the Union and Confederate Armies, Series I., Vol. XIX., Part II., page 53.

(on three occasions passing entirely around the Union army), in which he captured great quantities of stores, destroyed valuable public property, gained important information, and created consternation among his enemies. So well did his cavalry perform the duties of outpost and reconnoissance, that it is said that a force of but little more than 300 of his men at one time watched efficiently more than fifty miles of front, and reported every important movement of the United States forces.*

The United States Cavalry.—During the first two years of the war the cavalry of the Army of the Potomac performed but little valuable service. Unappreciated by the first commander of that army, and frittered away in innumerable detachments, it was, as a body, deficient in instruction, wanting in *esprit de corps*, and lacking in the self-confidence so indispensable for cavalry. Finally assembled into a corps by Hooker, its improvement was rapid; it profited by the lessons of its enterprising opponent, rose to an equality with its antagonist, and finally demonstrated its superiority over the foe to which, at the outset, it had been so distinctly inferior.

The battle of Beverly Ford, Va. (June 9, 1863), was the first engagement in which the United States cavalry manifested real efficiency; and this action, more than any other, illustrates the many-sided nature of the American cavalry. In this battle a cavalry charge was repulsed by cavalry mounted; an attack by cavalry dismounted against cavalry dismounted and behind cover was repulsed by sharpshooters in front, aided by mounted charges on the flanks of the assailants; a mounted charge with saber against dismounted cavalry using fire action and supported by a mounted detachment was successfully made; and two opposing brigades of cavalry met in direct charge with the saber. In brief, every possible condition of cavalry action seems to have been encountered in this remarkable engagement.

*McClellan's "Campaigns of Stuart's Cavalry," page 32.

As the United States cavalry improved, more and more reliance was placed by it on the saber, which was regarded as its first weapon, though the effective use of the carbine was sedulously cultivated. At the battle of Winchester, Va. (September 19, 1864), the Union cavalry made charges on foot or mounted, according to the nature of the terrain; and, finally, Merritt's division made the finest cavalry charge of the war, first striking Early's infantry on the flank, and then squarely in the face as it changed front to meet the attack. The charge was first made by Devin's brigade, which returned to rally, the charge being continued by Lowell's brigade, which rallied similarly, and the entire division (three brigades) then charging in a body, simultaneously with an advance of the infantry in front. The last charge completely routed the Confederate infantry, the first cavalry division capturing in the three charges 775 prisoners, seventy officers, seven battle-flags, and two guns. In the rest of Sheridan's "Valley campaign," the superiority of the Union cavalry over its adversary in tactical handling and general efficiency was manifest, and was mainly due to its equal expertness in the use of carbine or saber. In his report of the battle of Tom's Brook (October 9, 1864) General Early says: "This is very distressing to me, and God knows I have done all in my power to avert the disasters which have befallen this command; but the fact is, the enemy's cavalry is so much superior to ours, both in numbers and equipments, and the country is so favorable to the operations of cavalry, that it is impossible for ours to compete with his. Lomax's cavalry is armed entirely with rifles and has no sabers, and the consequence is they cannot fight on horseback, and in this open country they cannot successfully fight on foot against large bodies of cavalry. "This," says General Merritt, "is a statement on which those who think our cavalry never fought mounted and with the saber should ponder. The cavalry had scant justice done it in reports sent from the battle-field; and current history, which

is so much made up of first reports and first impressions, has not to a proper extent been impressed with this record."*

The battle of Winchester demonstrated the efficiency of the United States cavalry in using the saber; the battles of Dinwiddie Court House and Five Forks, in the following spring, illustrated equally its effectiveness when using the carbine. In the first of these battles (March 31, 1865) the Union cavalry dismounted, and, fighting behind such cover as it could find, held in check a superior force of Confederate infantry; and in the second (fought on the next day) it made a front attack, dismounted, upon the enemy, while the Fifth Corps attacked his left flank. In this action the dismounted cavalry carried earthworks manned by Confederate infantry. In the subsequent pursuit of Lee the mobility and effective fire action of the cavalry were brilliantly displayed. Pressing rapidly ahead, Sheridan attacked the flank of Ewell's corps, consisting of 6,000 men, and constituting the rear guard of Lee's army.† Holding the enemy with the fire of one division, he pushed the others ahead, moving them behind his own line, until he had planted Merritt's entire cavalry corps directly across the enemy's line of retreat. Holding Ewell in check with the cavalry, Sheridan hastened forward the Sixth Corps, and thus placing the Confederate rear guard between two fires, compelled its surrender. The following remarks of Sir Henry Havelock on this action, though made more than a quarter of a century ago,‡ constitute, perhaps, the best criticism that has ever been made upon it: "The mode in which Sheridan, from the special arming and training of his cavalry, was able to deal with this rear guard, first to overtake it in retreat, then to pass completely *beyond* it, to turn, face it, and take up at leisure a position strong enough to enable him

*"Battles and Leaders of the Civil War," Vol. IV., page 514.

†Gordon's corps originally formed the rear guard of Lee's army; but that corps having been defeated by Humphreys' corps and deflected to the right in retreat, Ewell's corps was left as the real rear guard of the retreating army.

‡In "Three Main Military Questions of the Day," London, 1867, page 97.

to detain it in spite of its naturally fierce and determined efforts to break through, is highly characteristic of the self-reliant, all-sufficing efficiency to which at this time the Northern horsemen had been brought. The practical experience of nearly four years of continual war, the entire and untrammelled confidence placed in good men amongst the Northern leaders, when they proved themselves to be so, and the complete freedom left them of devising and executing the improvements their daily experience suggested, had enabled Sheridan, and one or two more of similar bent of mind, to shake themselves free of the unsound traditions of European cavalry theory, and to make their own horse not the jingling, brilliant, costly, but almost helpless unreality it is with us, but a force that was able, on all grounds, in all circumstances, to act freely and efficiently, without any support from infantry. Not only is there no European cavalry with which the writer is acquainted that could have acted the part now played by the force under Sheridan, but there is not on record, that he is aware of, an instance in the eventful wars of the last or the present century in Europe of a strong rear guard having been thus effectually dealt with."

In a similar manner Sheridan outstripped and headed Lee's entire army, bringing it to bay until the main body of the Army of the Potomac came up, when, resistance being hopeless, Lee surrendered.

The nature and tactics of the United States cavalry in the West were essentially the same as those of Sheridan's cavalry. It is said of Minty's cavalry brigade, in the Army of the Cumberland, which may be taken as a type of the mounted troops of the Western armies, that "it made five successful saber charges against superior numbers of infantry, four successful saber charges against artillery, in battery, supported by infantry and cavalry, resulting in the capture of guns; and over one hundred saber charges against the enemy's cavalry. It made twenty-five charges dismounted,

and captured three strongly fortified and entrenched positions, when fully manned and defended by infantry and artillery.* At Nashville the dismounted cavalry under Wilson fought so successfully against the Confederate infantry that Hood, in anxiety and alarm, sent a message to Chalmers, saying, "For God's sake, drive the Yankee cavalry from our left and rear or all is lost!"† The Union cavalry was not driven back, and the battle resulted in Hood's complete defeat. It should be observed that in this battle the Union cavalry was armed with the breech-loading carbine and its opponents with the muzzle-loading rifle.‡ As soon as the victory was gained, the cavalry mounted and pursued the retreating enemy.

Long before the close of the war the United States cavalry had developed a degree of efficiency in detached action that placed it on a level with its adversaries, if it did not surpass them. In screening and reconnoitering duty, and in all the details of the service of security and information, it furnishes, as yet, the best model for the military student;§ and in raiding its achievements have never been surpassed. It is not the purpose here to give a narrative of the raids made by the Union cavalry. It will suffice to give a brief sketch of the raids of Grierson and Wilson, which may be taken as a type of those made by the mounted troops of the United States. In 1863, Grierson, with a brigade of cavalry, numbering about 1,700 men, left La Grange, Tenn., on April 17th, and reached Baton Rouge, La., on the

*Vale's "History of Minty and the Cavalry," page 5.

†"Battles and Leaders of the Civil War," Vol. IV., page 469.

‡Before the close of the war nearly all the Union cavalry regiments were armed with breech-loading carbines. In the early part of the war they were often very poorly armed. (The Fourth Iowa Cavalry, for instance, was at first armed with sabers, Austrian rifles, muzzle-loading holster pistols, and a revolver of a very defective pattern. It received breech-loading carbines in the spring of 1863. In the Army of the Potomac the issue of carbines was made nearly a year earlier.) (See Scott's "History of the Fourth Iowa Cavalry," and Preston's "History of the Tenth Cavalry, New York State Volunteers.")

§See the chapters on "Reconnaissance" and "The Cavalry Screen," in "The Service of Security and Information."

2d of the following month, having marched more than 300 miles through hostile country, passing in rear of the Confederate army, destroying the railroad at several points, and burning considerable quantities of supplies. General Grant states that this raid was of great importance in attracting the attention of the enemy from the main movement against Vicksburg.*

In point of numbers engaged and the amount of destruction wrought, the greatest raid of the war was that made by General J. H. Wilson, in the spring of 1865. Wilson's command, numbering about 13,000 cavalry and eighteen guns, left Chickasaw, Ala., on the 22d of March. Each trooper was armed with a Spencer magazine carbine, and was provided with five days' rations, twenty-four pounds of grain, a pair of extra horse-shoes, and 100 rounds of cartridges. A train of 250 wagons, carrying supplies, accompanied the command, which was also provided with a ponton train. The line of march lay through Elyton, Montevallo, Selma, and Montgomery, Ala., and West Point, Columbus, and Macon, Ga., terminating at the last-named point on the 20th of April. The command (notwithstanding its being accompanied by a train) had lived entirely upon the country; had marched 525 miles in twenty-eight days; had defeated Forrest at Plantersville and Selma, the Confederate works at the latter place being carried by the Union cavalry in an assault on foot; had captured 6,820 prisoners and 280 guns; and had destroyed a gun-boat, an armored ram ready for sea, 99,000 stands of small arms, 1,000,000 rounds of artillery ammunition, 235,000 bales of cotton, 20 locomotives, 250 cars, and all the mills, iron works, factories, railroad bridges, and military establishments found on the line of march. At Macon, Wilson learned of the armistice between Sherman and Johnston, the fall of Richmond, and the dispersion of the Confederate government. Distributing his troops along the line of the Ocmulgee and Alta-

*"Memoirs," Vol. I., page 489.

* (maha rivers, he fitly terminated his remarkable expedition by the capture of the fugitive President of the Confederacy.

Mounted Infantry.—To protect his communications from the enemy's raids, Rosecrans, not having a sufficient force of cavalry, organized a brigade of mounted infantry, which was placed under the command of Colonel John T. Wilder, an enterprising and meritorious officer. Five regiments of infantry composed the brigade, to which a light battery was attached. The command was at first mounted on horses or mules impressed in the country, and was armed * with the Spencer magazine rifle, using metallic cartridges. It soon reached a high state of efficiency, as mounted infantry pure and simple, the horses being used merely as a means of locomotion, and all the fighting being on foot. At the battle of Hoover's Gap (June 24, 1863) it repulsed with great slaughter a determined attack made by a division of Confederate infantry; and, owing to its mobility and its superior arms, it constituted a formidable force both in detached action and in the line of battle. But, though this force was the most perfect body of mounted infantry used in the War of Secession, it did nothing that the cavalry did not do equally well, while the decisive mounted charges of the latter in the Shenandoah Valley would have been impossible with even such exceptionally good mounted infantry as Wilder's brigade.

The Austro-Prussian War.—In 1866 the Prussians had in the field a force of 30,000 cavalry, consisting of cuirassiers, armed with saber and pistol; Uhlans, armed with saber, pistol, and lance; and dragoons and hussars, both armed with sword and carbine. Each regiment consisted of four squadrons,* each 150 sabers strong. Two (and in some cases three) regiments formed a brigade, and three brigades a division. The Austrian cavalry aggregated about 27,000 sabers, and was similar in its composition, arms, equipment, and organization to the cavalry to which it was opposed.

*Each regiment had, in addition to its four field squadrons, a depot squadron.

The results accomplished by the cavalry in this short but momentous war were insignificant. The reconnaissance duty on both sides was performed so negligently that on the day before the battle of Königgrätz the outposts of the two opposing armies faced each other within a distance of four and one-half miles, without either army suspecting the near and concentrated presence of the other one.* After each battle the pursuit by the cavalry was exceedingly feeble, and after the battle of Königgrätz the Prussians lost all touch with the Austrian army, and for three days were completely in the dark in regard to its movements. There was, moreover, no attempt to execute raids, although excellent opportunities were offered the Austrians to paralyze the advance of the Prussians upon Vienna by operating against their communications. In everything pertaining to the detached action of mounted troops, the Austrian and Prussian cavalry in this war were, in fact, pitifully impotent.

On the battle-field the cavalry was used with vigor and gallantry; but its action taught nothing new. At Nachod the Prussian cavalry was used with energy to cover the passage of the main army through the defile, but its lack of firing power limited it to the tactical offensive, and it suffered heavy loss. At Königgrätz the Austrian cavalry displayed admirable courage in covering the retreat of the infantry, and several great cavalry actions occurred, which were stubbornly contested, and with varying success, though resulting generally in favor of the Austrians, when the Prussian cavalry alone was encountered. In these cavalry combats, steel alone was used; and in the tactical formations employed and the weapons used, they differed in no appreciable degree from the cavalry battles of a century before.

The Franco-German War.—When the Germans entered France, in 1870, the cavalry of the invading armies consisted of 336 squadrons, aggregating a little more than 50,000 sabers. In composition, organization, and arms it was the

*"Prussian Official History" (translated by Wright and Hozier), page 161.

same as in the Austro-Prussian War. The cavalry of the French armies aggregated 40,000 sabers, and consisted of cuirassiers, carbineers, dragoons, lancers, chasseurs, hussars, *chasseurs d'Afrique*, and Spahis. The *chasseurs d'Afrique* were troops designed originally for service in Algeria. They were mounted on Arab horses, and may be classed as light dragoons. The Spahis were light cavalry composed of native Algerians, officered by Frenchmen, except in the subaltern grades. The cuirassiers and carbineers (twelve regiments) were classed as heavy or reserve cavalry; the lancers and dragoons (twenty-two regiments), as cavalry of the line; and the rest (twenty-nine regiments), as light cavalry. Each regiment had four squadrons in the field, besides which the light and part of the heavy cavalry had two depot squadrons to each regiment; the other regiments had one depot squadron each. The squadrons averaged 125 sabers. The formation of brigades and divisions was similar to that of corresponding units in the German army.

The inefficiency of the Prussian cavalry in 1866 had been taken to heart by its own officers, and in the interval between the two wars with Austria and France the instruction of the Prussian horsemen had continually held in view a more vigorous and enterprising action in the field. The result was visible at the opening of the campaign in France, the German cavalry being used in detached action with a vigor that astonished and disconcerted its opponents. The German cavalry "overflowed the country miles, and even several marches, ahead of the main body of the infantry," scouting vigilantly, reporting every movement of the enemy, and screening its own army from him with a veil of horsemen. In this duty the vigilant Germans found an opponent deficient in enterprise, and bewildered by a method of cavalry employment which, in the French army, had become a lost art. So negligently did the French cavalry perform the duty of security and information that Forton's cavalry division was surprised in its own camp at Vionville; and at

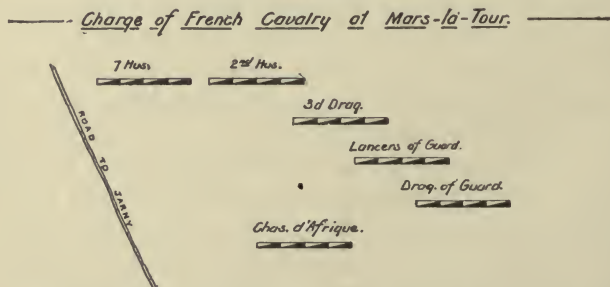
Beaumont there was a remarkable surprise, which can best be described in the words of Borbstaedt:* "In the most inexcusable way, nothing whatever was done on the part of the cavalry to reconnoiter the wooded country south of Beaumont, in order to ascertain with certainty whether the supposition of the enemy being on his march to Stenay was founded in fact or not. . . . The French troops in the open encampment south of Beaumont were enjoying their ease, and, incredible as it may seem, had not the remotest idea of the storm that was on the point of bursting over them. The men were employed in cooking, and a good many of the horses had been taken to water. Thus it happened that the Seventh and Eighth Infantry Divisions, on debouching from the woods, threw themselves without further hesitation on the camp, which was only about 3,000 paces distant, and completely surprised the enemy's troops. The Prussian and Saxon shells falling in the midst of the camp was what, all of a sudden, alarmed the French, every one rushing to take up his arms; but Prussian infantry had meanwhile reached the camp and put to flight the isolated bodies of troops that formed themselves. The French artillery had no time to harness their horses and put them to the guns, which were consequently abandoned. All the tents, the entire baggage, and considerable camp stores fell into the hands of the victors, and the remnants of the French division sought safety in most disorderly flight through Beaumont up to the heights north of the town, where the remaining three brigades of the corps had been encamped."

On the field of battle both the French and the German cavalry were used with energy and great gallantry; but the desperate cavalry charges, in almost every instance, resulted solely in appalling losses on the part of the assailants. At Wörth (August 6, 1870) Michel's cuirassiers and part of Nansouty's lancers charged upon the infantry of the German

*Borbstaedt's "History of the Franco-German War" (translated by Dwyer), pages 549-50.

XI. Corps, and were almost annihilated by rifle fire. Later in the day Bonnemain's division of heavy cavalry attacked the same corps, making the charge through hop-gardens and over other impracticable ground, and was repulsed with destructive losses. At Mars-la-Tour (August 16, 1870) a number of charges were made by the cavalry of both armies, the battle furnishing instances of the action of cavalry against cavalry, and cavalry against infantry. The greatest cavalry action of the day was between the German cavalry division of General von Barby and the French cavalry division of General Legrand, six regiments in each. The French division was formed as follows: In the first line were two regiments of hussars; in second line a regiment of dragoons was echeloned to the right of the first; in third line a regiment of lancers covered a part of the second line, and extended beyond its right; a regiment of dragoons was similarly formed in fourth line; and in fifth line a regiment of *chasseurs d'Afrique* was echeloned behind the left flank of the fourth. (See Figure 32.)

Figure 32.



The formation of Von Barby's division was quite similar, the left flank being protected by echelons to the rear. The two divisions coming together, there was a series of shocks, and of flank attacks by successive echelons on either side, until the two divisions were commingled in a confused mass of struggling horsemen, vigorously plying the saber and lance

in the *mêlée*. The French were finally crowded back, and their leader sounded the recall. The retreating French were pursued by some squadrons of the German cavalry until the latter came under the fire of infantry and dismounted *chasseurs d'Afrique*, when they retired and rejoined the main body of the cavalry division, which had been assembled by Von Barby, on the ground where the collision had occurred.

In only one of the many cavalry combats in the battle of Mars-la-Tour was anything really accomplished. In this case, a headlong charge by General von Bredow, with six squadrons, composed equally of cuirassiers and Uhlans, upon the French infantry, checked the advance of the French Sixth Corps, and gained time for the arrival of the German infantry, so sorely needed on that part of the field.*

At Sedan a desperate charge was made upon the Prussian infantry by a great body of French cavalry, consisting of the heavy divisions of Margueritte and Bonne-main, and several regiments detached from army corps. This was the greatest cavalry-infantry combat of the war. Nothing in the existing circumstances justified the charge, except, perhaps, the desperate position of the French army; for the Prussian infantry, on which the attack fell, was strong in numbers (seventeen battalions), unshaken by infantry or artillery fire, well supplied with ammunition, and possessed of the confidence resulting from a succession of great victories. The charge is thus described by General Sheridan, who was an eye-witness:

"Presently, up out of the little valley where Floing is located, came the Germans, deploying just on the rim of the plateau a very heavy skirmish line, supported by a line of battle at close distance. When these skirmishers appeared, the French infantry had withdrawn within its intrenched lines, but a strong body of their cavalry,

*For a description of this famous charge, see the chapter on "Cavalry in Attack and Defense."

already formed in a depression to the right of the Floing road, now rode at the Germans in gallant style, going clear through the dispersed skirmishers to the main line of battle. Here the slaughter of the French was awful, for, in addition to the deadly volleys from the solid battalions of their enemies, the skirmishers, who had rallied in knots at advantageous places, were now delivering a severe and effective fire. The gallant horsemen, therefore, had to retire precipitately, but, re-forming in a depression, they again undertook the hopeless task of breaking the German infantry, making in all four successive charges. Their ardor and pluck were of no avail, however, for the Germans, growing stronger every minute by the accession of troops from Floing, met the fourth attack in such large force that, even before coming in contact with their adversaries, the French broke and retreated to the protection of the intrenchments, where, from the beginning of the combat, had been lying plenty of idle infantry, some of which at least, it seemed plain to me, ought to have been thrown into the fight."*

After Sedan, the war produced no cavalry action of importance. All the engagements thus far considered were, on the part of the cavalry, combats with sword and lance alone. Dismounted fire action was effectively used by the French at Spicheren, where the necessity of sending reinforcements to the front left only two squadrons of dragoons and a company of sappers to hold the village of Forbach. On the approach of the advance guard of the Prussian Thirteenth Division, the dragoons opened fire, and for some time held the enemy in check. Finally, when both of their flanks had been turned, the dragoons remounted, charged the enemy, and retired to another position in rear. At Noisseville, on the 31st of August, a squadron of Clérembault's cavalry division dismounted and held the German infantry in check with its fire until the division was rejoined by its own infantry, from which it had

*Sheridan's "Memoirs," Vol. II., page 401.

been separated. On the same occasion a regiment of dragoons, belonging to the same division, dismounted and drove the enemy out of the village of Coincy, which they held until relieved by their own infantry. At Pont-à-Mousson (August 15th) a squadron of Prussian hussars, using the carbine, skirmished successfully with a detachment of French infantry, which they drove out of the village, thus opening a passage for the cavalry. But the use of fire action was very slight. Borbstaedt says that the French cavalry received Von Barby's charge with a volley from their carbines; and Bonie says that in the same engagement the German dragoons fired upon the advancing French cavalry; but both statements have been denied.

The inability of the German cavalry to use fire-arms effectively led it, more than once, into an embarrassing position. The day after the battle of Weissenburg, two cavalry regiments, conducting a reconnaissance towards Hagenau, were stopped by a small party of French infantry at a broken bridge and compelled to retire; and in the winter campaign on the Loire the conditions were to the German cavalry mortifying in the extreme. The country was filled with *Franc-tireurs*, who boldly stated that they had 'come out to hunt Prussians,' and the Uhlans, with their lances and sabers, were obliged either to avoid every village and wood occupied by these undisciplined and untrained bands of men who could shoot, or else to bring infantry along for their own protection. Their mobility was thus reduced to a minimum, and it was only when the Uhlans armed themselves with rifles captured from the French that they again began to be of value to their army.*

Raiding seems not to have been thought of by either army in this great war, though the French might, it would seem, have made profitable use of this method of employing cavalry. Bazaine allowed 15,000 cavalry to be shut up

*See essay on "Mounted Riflemen," by Captain J. R. Lumley, late Thirtieth Prussian Uhlans, in *Ordinance Notes*, No. 169.

in Metz, where they were utterly useless, when he might, immediately after the battle of Gravelotte, have sent them out to destroy the railroad communications to the east of the Moselle, on which all three German armies depended, relying upon their making their way safely to Paris or the south of France. If successful, the results of the raid would have been momentous, at least checking for a time the progress of the German armies; if unsuccessful, the raid would have resulted in the capture of the cavalry, which eventually had to surrender in Metz without having done the enemy any damage whatsoever.

In organization, armament, and tactics the cavalry of the Franco-German War did not differ appreciably from that of the Napoleonic era. In the European cavalry service the art of war seems to have been at a standstill, and the cavalry constituted just such a force as Hamley must have had in mind when he stated that, although improvements in weapons had materially affected the actions of infantry and artillery, science had done nothing for cavalry.* It might have been expected that the large, carefully trained and thoroughly appointed force of cavalry in the German army would have produced results commensurate with its numbers and the cost of its maintenance; but it did not, and the French cavalry did vastly less. Not one battle was decided by the use of cavalry; only one charge (Von Bredow's) produced appreciable results; and while the detached action of the German cavalry was brilliantly performed in the earlier stages of the war, its success was mainly due to the incapacity of the opposing cavalry, and it failed as soon as it encountered bodies of partisans who could use the rifle. When we compare the enormous results wrought by the American cavalry in the War of Secession with the feeble service rendered by the German cavalry in France a few years later, it is impossible to avoid the conclusion that there was something radically wrong in the tactics and arms of

*"Operations of War," page 362.

European cavalry. The Germans were not slow to appreciate their defects and the causes of the same; and the following views of Von Schmidt, expressed soon after the close of the war, have been carefully considered in the reforms since made in the German cavalry service: "The experiences of the last campaign have proved irrefutably that it is indispensably necessary that cavalry should, to a certain extent, be able to fight on foot, if it would be prepared to fulfill all the tasks which, without demanding too much from it, will, in certain situations, fall to its lot in the field. Although during the last campaign abnormal circumstances required that cavalry, in order to fulfill the task entrusted to it, should dismount and exchange the saber for the carbine more frequently, perhaps, than will hereafter be necessary, yet similar circumstances will arise in future wars and render the same mode of action necessary, especially when hostile cavalry divisions endeavor to prevent our screening and reconnoitering operations by occupying defiles and localities with dismounted men. If in such cases the cavalry had to call upon infantry, it would suicidally degrade itself to the rank of a secondary arm, and surrender the last vestige of its independence. However important the services that might in certain cases be rendered by battalions of infantry being attached to cavalry divisions, such a procedure would in the further course of operations be very prejudicial to the cavalry; the infantry would be like a leaden weight attached to its feet, destroying its mobility and rapidity of movement, in which the whole power of the arm resides."*

The Russo-Turkish War.—In the Russian campaign in Turkey, in 1877, the invading army, numbering about 200,000 combatants of all arms, contained 204 squadrons of cavalry, aggregating about 37,000 sabers. The cavalry was composed of dragoons, hussars, lancers, and Cossacks, in about equal proportions. The dragoons were armed with

*"Instructions for Cavalry" (translated by Bell), page 186.

the saber and musket with bayonet; the hussars and lancers, with the saber, lance, and revolver for the front rank, and the saber, carbine, and revolver for the rear rank; and the Cossacks, with lance, musket, and curved sword. Each regiment consisted of four squadrons, and each cavalry division was composed of four regiments.

The Turkish cavalry numbered eighty-five squadrons of regular troops, armed with saber and Winchester rifle. In addition to these were considerable numbers of irregular cavalry, known as *bashi-bozouks*, who are characterized by Greene as "insubordinate and unruly, occupied in marauding and pillaging instead of reconnoitering, cowardly and disobedient in battle, and of no military service whatever to the Turks."

The only cavalry operations, either on the field of battle or in the theater of war, worthy of note in this campaign, are found in Gourko's first expedition across the Balkans. On the 30th of June, a few days after the Russian army had crossed the Danube, General Gourko was directed to push south to Tirnova and Selvi, reconnoiter the surrounding country, and be prepared, on the receipt of orders, to seize a pass in the Balkan Mountains, for the passage of the main army. He was, at the same time, to send cavalry on a raid to the south of the mountains to destroy the railroads and telegraphs, and do such other damage as might be possible. The force under Gourko's command consisted of 8,000 infantry, 4,000 cavalry, and thirty-two guns.

"On the 19th of July, the Shipka pass was in the hands of the Russians, and the principal objects of Gourko's expedition were accomplished. In eight days from the time of leaving Tirnova, and sixteen days from the Danube, he had gained possession of three passes (Hainkioi, Travna, and Shipka), covering a length of thirty miles in the Balkans, and one of them the great high-road from Bulgaria to Roumelia; he had dispersed various Turkish detachments, numbering in all about 10,000 men, had captured eleven guns

and a large quantity of ammunition, clothing, and provisions, and had disarmed the Turkish population throughout a large part of the valley of the Tundja; and all with the loss of less than 500 men. His men and horses had lived off the country and what they captured from the Turks, and on the 19th they still had three days' rations of hard bread (out of the five they had taken with them) untouched.*

After resting a few days at Shipka, Gourko sent raiding detachments southward, which destroyed a number of bridges and culverts, several railway stations, and some miles of railroad and telegraph line, besides gaining important information in regard to the location of the Turkish forces. Pushing forward some thirty miles from Shipka, Gourko was finally pressed back by superior forces of Turks, 50,000 of whom he held in check for two days. His cavalry passed to the northern side of the Balkans, where it rested and refitted, the passes of Shipka and Tirnova being held by the infantry.

"This expedition of Gourko," says Greene, "was more than a mere cavalry raid; it was an admirably conducted movement of an advance guard composed of all arms. With 8,000 infantry, 4,000 cavalry, and thirty-two guns, it had, in less than a month, gained possession of one of the principal passes of the Balkans, from which the Russians, though terribly attacked, never let go their hold, and which they finally used in January for the passage of a large portion of their army. It had carried a panic throughout the whole of Turkey between the Balkans and Constantinople; and its scouting parties had penetrated to within seventy miles of Adrianople, the second city of the Empire, and had destroyed the railroad and telegraph on the two principal lines; finally, it had gathered accurate information concerning the strength and positions of the large Turkish force advancing toward the Balkans. In this expedition alone of the whole campaign was the cavalry energetically handled. On several

*Greene's "Russian Campaigns in Turkey," page 174.

occasions it fought on foot; it was constantly on the move; it subsisted on the country; and on the 29th and 30th of July fourteen squadrons of it (1,800 men) held their own against 4,000 infantry and several hundred *bashi-bozouks* and Tcherkesses; and it finally covered Gourko's retreat before a force more than three times superior to his own. The irregular cavalry of the Turks never waited long enough to come to hand-to-hand blows; on one occasion (July 16th), while fighting on foot against infantry, the dragoons advanced with fixed bayonets, but the Turks retired without accepting a hand-to-hand struggle."*

The Russo-Turkish war was the last one in which large forces of cavalry were employed; but later conflicts have not been altogether barren of examples of a profitable use of cavalry. In the campaign in Egypt, in 1882, the British cavalry vigorously pursued the defeated enemy after the battle of Tel-el-Kebir, and, pushing on more than fifty miles ahead of the infantry, seized Cairo within less than forty-eight hours after the battle.

At the battle of La Placilla, in Chili, in 1891, the Congressional cavalry, by a bold charge upon the right flank of the *Gobernistas*, decided the battle;† and the cavalry of the *Gobernistas* also distinguished itself by covering the retreat of the disorganized army so efficiently that the defeated troops were able to reach Valparaiso almost without molestation.

Conclusions.—In considering the use of cavalry in modern wars, we cannot fail to be impressed with the following manifest facts:

1. The most successful cavalry on the battle-field has always been that which possessed the power of giving the most effective shock; in other words, the one which united the greatest mobility with the highest power of cohesion and the most effective use of their weapons in the *mêlée*.

*Ibid., page 183.

†Official report of General Estanislao del Canto, commanding the Congressional army.

2. Mounted fire action is often useful in pursuit, and exceptional circumstances have even made it useful, in some cases, before the charge; (but cavalry depending upon such action instead of the shock has rarely accomplished important results on the field of battle, and never against good opposing cavalry relying upon the shock.)

3. Extreme mobility is an essential characteristic of good cavalry. An army having only a good heavy cavalry, irresistible in battle, may nevertheless be ruined in the course of a campaign by an adversary possessing only a highly mobile and efficient light cavalry.

4. Cavalry unable to deliver effective dismounted fire action is essentially a dependent arm, unable to act on a tactical defensive, and easily checked by insignificant bodies of hostile infantry well posted in defensive positions. The use of cavalry in reconnaissance, in raids, in pursuit, and in holding defensive positions, requires that it should be armed with a good fire-arm and be expert in its use. In this way only can it act with independence and vigor.

5. The dragoon, being armed and trained to fight either on horseback or on foot, fulfills all the requirements of cavalry, both in battle and in detached action.

In the discussion of cavalry tactics in the following pages, it will be assumed, therefore, that the cavalry consists of men equally capable of mounted action with the saber and dismounted action with the carbine; in other words, of dragoons.

CHAPTER VII.

CAVALRY IN ATTACK AND DEFENSE.

"No army can enter the lists with a fair chance of success, unless it has a cavalry that can both ride and fight."—*Wilson*.

The characteristics of cavalry have already been generally considered; the tactical handling of this arm will now be more particularly discussed.

THE CHARGE IN LINE.

Formation.—The charge in line is made in close order, boot-to-boot, the forward movement increasing in rapidity until it finally terminates in a shock delivered at full speed. The effect of the shock depends upon the cohesion, weight, and speed of the charging force; in the *mêlée* which follows, the result depends upon the weapons of the trooper, and his skill in their use.

Whether victorious or unsuccessful, cavalry is invariably disordered by the shock and succeeding *mêlée*. In small bodies the disorder is of short duration, but in large masses it lasts a long time, the confusion of broken ranks being increased by wounded and riderless horses, as well as by troopers who have lost their weapons or become separated from their tactical units. If, then, cavalry were to charge in a single line, it might, while disordered by its own success, be easily overthrown by even a small body of hostile cavalry attacking in close formation and well in hand. To guard against a counter-charge, a support is, therefore, necessary; and as the flanks are dangerously weak points in cavalry, the support must be so placed that it can readily attack the flank of the enemy or protect that of its own attacking line. It should, therefore, be echeloned on the

flank which is more exposed to the enemy's attack, or from which it can better operate against the flank of the hostile cavalry; though, in the case of a large force, a portion of the support may be placed, *with wide intervals*, in rear of the attacking line, or echeloned on the less exposed flank. As a rule, however, the support should not be immediately in rear of the attacking line (and *never* except with wide intervals), lest, in case of the defeat of the latter, it be thrown into confusion or ridden over by the retreating troopers, who almost invariably break straight to the rear. Either to assail or defend a flank, the support is almost sure to be drawn into the *mé.ée*, and a reserve must, consequently, be at hand to decide the victory, to ward off an attack upon the first line while disordered by the charge, to pursue the enemy, or cover the retreat. The reserve is usually echeloned on the opposite flank from the support. When this flank is covered by other troops or by natural obstacles, the reserve should ordinarily be on the same flank as the support, and echeloned on the outer flank of the latter. In general terms, the support and reserve should be so disposed that the attacking line may be relieved from all anxiety in regard to its flanks, and devote its whole attention to the enemy in its front. In a cavalry combat, that force which can bring into action the last formed reserve is almost sure to be victorious. At Wagram, Grouchy drove back Rosenberg's cavalry with great slaughter; but Hohenlohe's cuirassiers fell upon the disordered French horse, and would have swept it from the field, had not Montbrun brought up a fresh cavalry force and defeated Hohenlohe in turn.

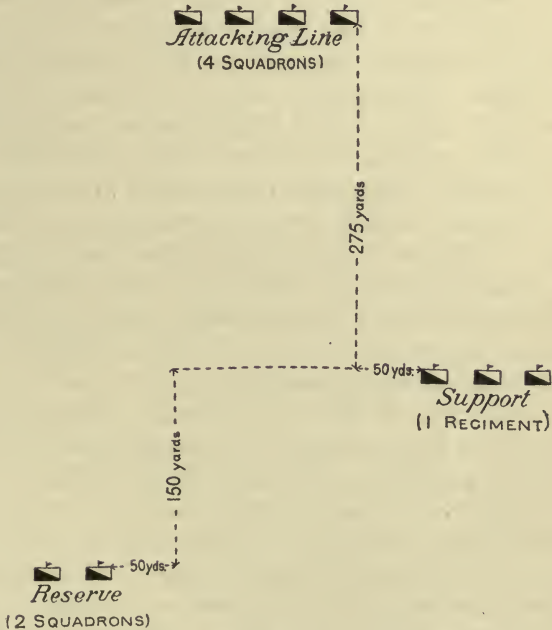
In a small force the duties of support and reserve are combined in a single body, part of the support being kept unbroken and held well in hand when the rest is launched into the fight; but in general an attacking force of cavalry consists of an *attacking line*, a *support*, and a *reserve*. The attacking line must be strong, for if it fails, the rest can generally do no more than prevent a complete reverse; but

if too much of the force be placed in the attacking line, the lack of a proper support and reserve may cause it to be defeated while in disorder. As a rule, the attacking line should consist of about one-half of the strength of the entire force, the support varying from one-fourth to one-third, and the reserve accordingly from one-fourth to one-sixth. Troops and, if possible, squadrons should be preserved intact in each line; though one or more platoons of a flank troop may be echeloned on its outer flank, and in small bodies the reserve and support may both be taken from the same troop.

The distances between the lines, or echelons, vary with the size of the attacking force. In the case of a troop, the distance from the attacking line to the support is about eighty yards, and from the support to the reserve not more than 150 yards. In the case of a brigade or division, the former distance is about 275 yards, and the latter from 150 to 200 yards. If the flank of the attacking line be seriously threatened, the support may close to not less than 100 yards. The inner flank of the support should be from fifty to seventy-five yards beyond the outer (or exposed) flank of the attacking line; and the reserve should be similarly placed in relation to the inner (or protected) flank of the same line. (See Figure 33.)

Even though the attack be made in line, small columns are the proper formation for maneuvering cavalry. They possess greater mobility and flexibility than the line, present a smaller target to artillery fire, and admit of the easy passage of obstacles and the utilization of sheltering features of the terrain. In moving forward to attack, the attacking line should be formed either in line of troops in columns of fours at full interval, or in line of platoon columns. The deployment into line must be made at the right moment; if delayed too long, the attacking body may be itself attacked before it is in proper formation; if it be made too soon, there is less chance of surprise and greater exposure to loss,

Figure 33 NORMAL ATTACK FORMATION
 OF A
 BRIGADE OF CAVALRY.



and changes of direction in line, which always impair the cohesion of the attacking body and weaken the force of the shock, may become necessary. The support should also be in line of small columns at deploying intervals, and its movements should conform to those of the attacking line. The reserve is similarly formed. If, in issuing from a defile, forming on right or left into line, or changing front, time does not admit of completing the formation, each troop or squadron may be advanced to the attack as soon as it is formed.

In most armies, each part of the charging force is formed in two ranks. In our service the charge is made in single rank. There is a decided lack of unanimity in the views of the best authorities on this subject. The advocates of the single-rank formation claim that the rear rank generally merges into the front rank in the course of the charge, thus producing a charge in single rank; that where this merging does not take place, the rear rank is useless; and that casualties are increased, and the rear rank thrown into confusion, by the disabled men and horses in the front rank being run over. On the other hand, it is claimed that a line invariably loosens out in the charge, and that a charge boot-to-boot is impossible unless there are men in a rear rank to push forward into the vacant spaces created in the first. It is often practicable to deliver the charge in a line of platoon columns in single rank; the distance between successive ranks in this case being much greater than in a line in double rank, and most of the objections to a line in that formation being obviated.

Pace and Conduct of the Attack.—In moving to the attack, a slow trot is taken and continued until the zone of effective artillery fire is entered, when the trot is increased to its full rate of speed and maintained until within point-blank range of the enemy's small arms—generally from 600 to 400 yards from the hostile position.* The columns then deploy into line and take the gallop, gradually increasing in speed until within seventy-five to fifty yards of the enemy, when the charge is sounded and the line rushes forward at full speed, but without losing its cohesion, the men yelling and the trumpet sounding.

In former times the charge did not extend over more than 800 yards, including the trot and gallop; but, owing to the long-range guns and rifles of the present, large bodies of cavalry cannot often be held in hand, without great exposure, at a less distance than 4,000 yards from the enemy.

*For the rate of speed of the "slow trot" and the "trot," see Appendix II.

With small bodies the distance may, of course, often be much less; but the distance is generally so great that it is now conceded that cavalry, to be worthy of the name, must even be able to pass over four or four-and-a-half miles at the more rapid paces (trot and gallop), and then have enough energy left to make a charge and carry it through.

On open ground the rapid advance must naturally begin at a greater distance than when sheltering features of terrain protect the cavalry from the enemy's fire. Against formed cavalry the trot should be continued to within a few hundred yards, in order that the cohesion of the line and the simultaneity of the shock may not be destroyed by a long gallop. The gallop, in fact, should not, as a rule, begin sooner than may be necessary to give a proper impetus to the charge; for a long gallop distresses the horses, and when they are blown and exhausted the cavalry is at the mercy of the enemy. In Ponsonby's famous attack with the Union Brigade at Waterloo, he charged with great gallantry through and through the columns of French infantry (which had recoiled from the attack on Wellington's left), reached the great battery in the French position, and was sabering cannoneers and horses, when, just as the force of the charge was completely spent, he was struck by the French lancers and cuirassiers. The exhausted cavalry was completely and easily overthrown, the French horsemen making mere sport of overtaking and dispatching the retreating British troopers.

When the attacking line charges, the support takes the full gallop; and when at proper distance, it charges against the flank or an intact organization of the enemy. It may often be expedient to detach the support, either entirely or in part, early in the attack, to make a distinct but simultaneous charge upon the enemy's flank in connection with the main attack. Under the cover of dust or smoke, this may be of the nature of a surprise; and even if plainly seen, it may deceive the enemy as to the direction from which

to expect the main attack, and it will, at least, compel him to divide his force to make dispositions to protect his flank. The reserve is not habitually thrown into action except to meet an unexpected flank attack, or take advantage of an opening to strike the enemy on the flank. In a large force—such as a brigade or division—the reserve takes advantage of natural obstacles to screen itself from the view and fire of the enemy; but it must not lose sight of the attacking line or of the commander, nor must it get so far to the rear that it cannot respond quickly to his orders. This should not, however, be understood as depriving the reserve commander of all initiative; and the mere absence of orders should never excuse him for failing to take advantage of an opportunity of striking the enemy on the flank, or of delivering any other decisive blow. If in column, the reserve forms line of columns at deploying intervals when the attacking line charges, and it assumes the functions of the support when the latter charges.

In the charge the officers lead, except when the revolver is used, in which case they take their positions on the flanks or in the rank, opposite their habitual places. Every unoccupied detachment of cavalry near the charging body should form a part of the reserve without orders to do so, unless it has been stationed at a certain point for some particular object. Even then the commander of the detachment must decide as to which is his paramount duty in the case, and must be prepared to accept the consequences of any error of judgment on his part. An error inspired by zeal and bravery is generally easily pardoned.*

In all cases, and especially when infantry is the object

*In the great cavalry battle at Gettysburg, Captain Miller, of the Third Pennsylvania Cavalry, seeing an opportunity to strike Wade Hampton's column in flank as it was charged in front by Custer, turned to his first lieutenant with the remark: "I have been ordered to hold this position, but, if you will back me up in case I am court-martialed for disobedience, I will order a charge." The charge was opportune and effective, and no mention of a court-martial was ever made. Miller's conduct on this occasion is in striking contrast with that of Cardigan at Balaklava. (See p. 188 *ante*.)

of the attack, the enemy should be shaken by artillery fire (generally from horse batteries), which should be continued until the charging cavalry masks the front of the guns.*

When the charge is successful, the enemy is pursued by the troopers engaged in the *mêlée*, until the pursuit can be taken up by the support and reserve, when the first line rallies and acts as a support to the pursuing force. From the moment the enemy breaks, no time should be allowed him to rally, but he should be driven either entirely off the field or under shelter of his infantry. In the case of an unsuccessful charge, the attacking line should so withdraw as to avoid collision with the support and reserve, which should both attack the pursuing force in flank. The attacking line then rallies, and comes up to act as a support to its former support and reserve.

Influence of the Terrain.—The influence of the terrain is greater upon the action of cavalry than upon that of infantry, though less, perhaps, than in the case of artillery. The Germans train their cavalry to charge with unbroken ranks over ditches, low walls, and broken ground; but such riding is possible only with cavalry horses that are acknowledged to be the most carefully trained in the world. Plowed ground, heavy sand, and wet and swampy soil will retard, and in some cases check, the charge of cavalry. It is a mistake to suppose that open, level ground is the best for cavalry action; for on such ground surprise is impossible, and the fire of infantry and artillery has an unbroken sweep. Undulating ground, if not broken by woods, inclosures, or other obstacles, is the best, as it affords very considerable shelter without impeding the force of the attack. A charge may be made down a slope of less than five, or up a hill of not more than ten degrees. A combination of open and inclosed ground is favorable for a cavalry attack, provided that passages exist by which the columns may go from one clear space to another, and open

*See Chapter IX.

ground suitable for the charge exist immediately in front of the place of collision. The worst possible ground is that which impedes the progress of the cavalry without affording shelter from the enemy's fire—such as the ground over which Michel's cuirassiers charged at Wörth, where "rows of trees cut down close to the ground, and deep ditches, impeded the movement of large bodies in close formation, whilst the infantry had a perfectly open range over the gentle slopes of the otherwise exposed heights."*

The extent of the ground will have a great influence on the formation of the attacking cavalry. For a charge in line, there should be room enough laterally for deployment and for flank attack; failing this condition, the charge must be made in a different formation. In any case, there should be room enough to the front to enable full headway to be gained for the charge, and for the *mêlée* and rally; and to the rear there should be no insurmountable obstacle on which the cavalry, in case of reverse, might be forced back.

Ground Scouts and Combat Patrols.—A knowledge of the ground is imperatively necessary for the cavalry leader, for a charge made over unknown ground frequently results in serious disaster independently of the efforts of the enemy. At Shiloh, Forrest charged against a body of United States infantry, and came within forty paces of them, when he found his progress checked by an impracticable morass, in which the horses became entangled, and from which some of them could not be extricated. The charge thus came to naught without any damage whatever having been done to the opposing infantry. In a similar manner, the Prussian Fourth Hussars, at Königgrätz, charging over unknown ground, came, while in full gallop, upon a gully which had been concealed from view by the high standing grain, and nearly all were precipitated headlong therein, the charge thus coming to a disastrous end.

To avoid such accidents, ground scouts should be sent

*German official account.

forward to reconnoiter the ground. These men, who should be selected for their intelligence, daring, and power of quick observation, move at a considerable distance to the front, and communicate by signal with the commander. The duty is an extremely hazardous one, but the occasion generally demands it, and even if all the scouts should be killed or wounded, the loss would be justified by the preservation of the command from disaster. When the charge begins, the scouts clear away from the front at a run, and take position on the flanks. In many parts of the United States it would be found necessary to equip the ground scouts with nippers with which to cut wire fences. Combat patrols, consisting of two or three men each, should be sent out to the flanks to give timely notice of threatened attacks by the enemy. The men composing these patrols should have the same qualifications as the ground scouts. Whenever a body of cavalry halts in the presence of the enemy, it should send out ground scouts and combat patrols at once.

Flank Attacks.—Of cavalry charges it may be said without material error, that only flank attacks give decisive results. Indeed, as Von Schmidt declares, ten men on a flank are worth more than a hundred in front; and all cavalry movements in the charge should aim to strike a hostile flank either directly or in conjunction with the front attack.

The flank attack may be made either by a portion of the line overlapping that of the enemy and wheeling inward, or by a detached force making a direct attack upon the hostile flank. The former method is dangerous when the force does not exceed that of the enemy; for in order to overlap with one flank, the other must be similarly exposed to the enemy. The second method generally produces the most decisive results, but it can be effected only by surprise. This, however, is not always difficult, as by utilizing the various features of the terrain it is often possible to get within a comparatively short distance of the opposing force without being seen; and this is especially the case when the

attention of the hostile troops is taken up with a body of menacing cavalry in its front. Opportunities for direct attacks upon a flank are often presented by a body of cavalry engaged in an attack. At Gettysburg, a charging column of Confederate cavalry, consisting of the brigades of Fitzhugh Lee, Hampton, and Chambliss, while opposed in front by Custer with only a single regiment, was assailed in flank by several regiments of Union cavalry, and driven back.

A charge on the enemy's flank in conjunction with a front attack is more effective just after the clash of the two opposing lines than when simultaneous with it. The two lines rebound from the shock, horses frequently being turned "end over end" and crushing their riders underneath them, and the opponents then interlock in a *mêlée* which often lasts only one or two minutes, and rarely continues more than five or ten. If the flank attack can strike just at the moment of the rebound from the collision in front, it may ride down the disordered line, and sweep it off the field before it has a chance to recover from the first shock.

Time for Attack.—In a cavalry charge the first consideration is that the attack should be opportune. A timely attack in a poor or disordered formation and over unfavorable ground is worth more than the most perfectly prepared and conducted charge made either prematurely or after the "golden moment" has passed. If the attack be made too soon, the enemy will be found unshaken and unsurprised; if made too late, the confusion, bad position, or other unfavorable circumstance of the enemy will be found remedied, and the opportunity will be lost. By a charge in the nick of time, Kellerman, with only four squadrons, saved the day for the French at Marengo. Marmont, who was an eye-witness of the attack, says that a difference of three minutes sooner or later would probably have rendered the charge useless.

It is necessary, therefore, that a cavalry leader should be a man of keen observation, quick decision, and such reso-

lution that he will never shrink from taking the initiative when the fleeting opportunity for a successful charge presents itself. Good cavalry leaders are the rarest of all military men.

THE CHARGE IN COLUMN AND AS FORAGERS.

When not made in line with support and reserve in echelon, the charge should be made in a column of subdivisions, the distance between which should be such as to admit of each rendering timely support to the one in front, without being so close as to be compromised in its defeat. Until the time of deploying for the charge, the rear subdivisions should be in small columns, so as to leave openings for the first line in case of defeat. The subdivisions charge successively, the leading unit, if repulsed or broken by the shock, endeavoring to clear the flanks of the column and form in rear. The charge in column of subdivisions may be made in column of platoons, column of troops, column of squadrons, or in a line of such columns. A charge in column of subdivisions gives a succession of shocks falling in the same place, and is preferable to the attack in line, unless the latter offers an opportunity for an attack on the hostile flank, either direct or in conjunction with a front attack.

It is of vital importance that the subdivisions be not too close. At the battle of Sohr (September 30, 1745) fifty Austrian squadrons were formed in three lines, with distances of only twenty yards. The Prussian cavalry, charging them squarely in front, threw the first line in confusion upon the second, and the combined lines upon the third, and swept the whole mass in disordered rout from the field.

The charge in column of subdivisions was frequently used in the War of Secession, the most celebrated instance of its use being at Gettysburg, where the brigades of Hampton and Lee, charging in close column of squadrons, were met by Custer in the same formation. On this occasion the

especial weakness of a charge in this formation—the exposure of the flanks—was also manifested. It is with a heavy and dense column of cavalry as with a similar column of infantry. It cannot be actuated by a single impulse, and every trooper added to increase its mass adds to the number of individual wills it contains, and the number of individual impulses of self-preservation to be overcome. Its progress depends mainly on the courage and skill of the few men in front, who cannot easily be pushed on by those in rear without incurring disorder, while the fall of a single trooper in the column is likely to throw into confusion all in rear. If the column were a solid body influenced by a single mind, its force would be in proportion to its mass; but under actual conditions, none but small columns can, as a rule, be used.

Nevertheless, charges have been made successfully in column of fours, even by forces as large as a regiment; and the nature of the terrain may often be such as to present the alternative of using cavalry in this formation or not using it at all. At Boonsboro, Md., in 1862, Colonel W. H. F. Lee, in command of the Confederate rear guard, charged with the Ninth Virginia Cavalry in column of fours, through the streets of the village, where no other formation was possible, and succeeded in his object of checking the Union pursuit. In this charge, a considerable interval was left between the squadrons, and each, as it was broken by the shock of the charge, returned to the rear and re-formed, the attack thus taking the form of a series of shocks. A similar charge was made by the Third Virginia Cavalry at the battle of Kelly's Ford, in 1863. Many other similar instances in the same war might be noted.

In charging in column of fours, each four takes the extended gallop when the one next preceding has gained the distance of one horse's length. The charge may be made in double column of fours, when the ground does not admit of a charge on a wide front, and the front of a single four

seems inadequate. In such a case, the saber and revolver might be combined, the men on the left flank of the column using the latter weapon, as the left is the weak side of a swordsman.*

The charge as foragers may be made from either close-order or extended-order line, the troopers always using the revolver, unless otherwise ordered, and charging in couples with intervals of about six yards. A reserve consisting of not less than one-fourth of the command should be kept in hand in close order. This method of charging is adapted to wooded and broken ground, and is also employed to lessen the target presented to infantry or artillery fire, to annoy and occupy the enemy for the purpose of gaining time for the deployment of troops in rear, or in pursuit of a defeated enemy. If the enemy's cavalry turn and break without awaiting the shock, the charge may be checked and a rapid pursuit be made by foragers, the rest of the command following in close order.

CAVALRY AGAINST CAVALRY.

While the use of cavalry against the other arms on the battle-field will, probably, not be so great as it was formerly, the number of cavalry battles will doubtless be much greater. The success of a campaign depending upon proper screening and reconnoitering duty, and this in turn depending upon the superiority of the cavalry over that of the enemy, each army will strive at the outset to overthrow the mounted force of its opponent. Hence, as so often prophesied, the next great war will begin with a cavalry battle of considerable magnitude. Moreover, the constant attempts to break through the screen of the enemy, and to thwart him in similar attempts, will lead to continual encounters between the screening troops, until finally, when the armies arrive within the presence of each other, the cavalry of each will

*The formation in double column of fours is prescribed in the Drill Regulations only for a squadron or a larger body. Its use as a charging formation is recommended above only under the peculiar conditions mentioned.

uncover the front, and withdraw to positions on the flanks. From these positions, the cavalry, accompanied by horse artillery, will endeavor to gain the flanks, or even the rear, of the enemy, for the purpose of creating a diversion; and it will aid and support every attempt to attack the enemy's flank, and use every endeavor to prevent similar attacks in return. This will often lead to such great cavalry combats as those on the flanks at Gettysburg and Mars-la-Tour.

Again, it being the duty of the cavalry of a defeated army to cover the retreat, and of that of the victor to conduct the pursuit, almost every great battle will close with an engagement of cavalry. At Eckmühl forty Austrian squadrons fought the French cavalry for more than three hours, and thus gained time for the Archduke's army to retreat across the Danube. At Königgrätz, when the Austrian army was shattered by the concentric attack of the Prussians, when most of its guns had been captured, when its infantry was in full flight, and its line of retreat was threatened, its cavalry threw itself upon the pursuing cavalry of the Prussians, and, under cover of the long struggle which ensued, the defeated army withdrew in safety across the Elbe. "It is beyond a doubt," says Hoenig (a Prussian officer), "that this cavalry knew the fate which awaited it, surrounded as it was on three sides by the fire zone of breech-loaders. It was sure to be defeated at last, but the well-delivered stroke had a tremendous tactical effect. It relieved the pressure on the retreating army and saved it from the utter rout which would undoubtedly have followed if the Prussian cavalry had remained master of the field, or had not been attacked as it was. This is not a case for flattering national sentiment, but for reviewing the events calmly, truthfully, and justly, and anyone who considers the attacks of the Austrian cavalry in this way will unhesitatingly conclude that it carried out most successfully one of the most difficult tactical duties which has ever fallen to the lot of cavalry. Cramped and shut in, it attacked the Prus-

sian cavalry, in spite of a ceaseless flank fire of breech-loaders, forced its way right up to the infantry line of an army already intoxicated with the assurance of its great victory, and brought the whole Prussian line to a standstill."

An attack made with vigor and audacity by a small force of cavalry against a large one may often be the means of gaining time and averting a disaster. On Stoneman's raid, in 1863, Captain James E. Harrison, in command of the Fifth United States Cavalry, which was on outpost duty, finding that a brigade of Confederate cavalry had gained his flank and was about to cut him off from the main body, charged with a single picket, consisting of about thirty men. The Confederates, who were coming down a road, about eight abreast, charged to meet the small Union force, which they defeated with the loss of every man, except its leader, killed, wounded, or captured; but the force of the charge temporarily checked the enemy, and gained time for Harrison to effect the safe withdrawal of the regiment. Lee seems to have been of the opinion that he had encountered the whole regiment.*

The best opportunities for a cavalry attack upon the enemy's cavalry are when the latter is issuing from a defile and presents a narrow front; when it can be surprised in a column formation; when it can be taken in flank while charging another body; when it is exhausted; while it is changing formation, or when it is on ground unfavorable to its deployment. In the latter case, the ground, while unfavorable to the deployment of the enemy, must, of course, offer no obstacle to that of the attacking cavalry, and it must not afford shelter behind which a portion of the enemy's cavalry could be placed for effective dismounted fire action. For instance, the enemy may be emerging from a wood into an open plain on which the attacking cavalry can readily deploy, while the enemy's deployment is still obstructed by the wood; but a

*Reports of Captain James E. Harrison, Fifth United States Cavalry, and General W. H. F. Lee, C. S. A., in "Official Records of Union and Confederate Armies," Vol. XXXIX.

charge upon him might subject the attacking troops to a destructive fire from a part of his force dismounted and sheltered by the timber.

It is evident that the combats of cavalry with cavalry will generally be fought by the cavalry divisions. The corps cavalry will habitually be used in conjunction with the other troops of the corps, and will rarely be engaged in a pure cavalry fight, except when united with the cavalry divisions in screening duty, in the pursuit, or in covering the retreat, or when employed in defending the divisional artillery from an attack by the enemy's cavalry.*

CAVALRY AGAINST INFANTRY.

* While it may be set down as an axiom that good, intact, infantry, plentifully supplied with ammunition, and not taken by surprise, cannot be broken by a cavalry charge, however gallantly made, the fact remains that many opportunities will still be presented in war for the use of cavalry against infantry; for infantry is not always good, it is not always intact, it is not always supplied with ammunition, and its surprise, though more difficult than formerly, is still by no means impossible. Cavalry may be used with effect against infantry under the following circumstances:

I. When the infantry is demoralized or of poor quality.

Inferior infantry is not only unable to deliver the effective fire on which the defeat of a cavalry attack depends, but it is susceptible in the highest degree to the moral effect produced by the charge. A notable instance of the effect of a cavalry charge upon inferior infantry is furnished by the battle of Somosierra (November 30, 1808). It is best described in the words of Napier: "At daybreak three French battalions attacked St. Juan's right, three more as-

*The "corps" cavalry was formerly known as "divisional" cavalry. The author has long been of the opinion that the cavalry attached to a corps in our service should be known by the new designation; and after the first chapters of this work had gone to press, he was gratified to learn that his view is shared by the board of officers now engaged in the revision of the Cavalry Drill Regulations.

sailed his left ; as many marched along the causeway in the center supported by six guns. The French wings, spreading over the mountain side, commenced a skirmishing fire, which was well returned, while the frowning battery at the top of the causeway was held in readiness to crush the center column when it should come within range. At that moment Napoleon rode into the mouth of the pass ; his infantry was making no progress, and a thick fog mixed with smoke hung upon the ascent ; suddenly, as if by inspiration, he ordered the Polish cavalry of his guard to charge up the causeway and seize the Spanish battery. The foremost ranks were leveled by the fire of the guns, and the remainder thrown into confusion ; but General Krazinski rallied them, and, covered by the smoke and the morning vapor, led them sword in hand up the mountain ; as they passed, the Spanish infantry on each side fired and fled toward the summit of the causeway, then the Polés took the battery, and the Spaniards, abandoning arms, ammunition, and baggage, fled in strange disorder. This exploit, so glorious to one party, so disgraceful to the other, can hardly be matched from the records of war. It is almost incredible that a position nearly impregnable, and defended by twelve thousand men, should from a deliberate sense of danger be abandoned to the wild charge of a few squadrons which two companies of good infantry should have effectually stopped. . . . The charge, viewed as a simple military operation, was extravagantly rash ; but, as evincing Napoleon's sagacious estimate of Spanish troops, and his promptitude in seizing the advantage offered by the smoke and fog which clung to the side of the mountain, it was a felicitous example of intuitive genius."

II. When the infantry can be taken by surprise.

At the battle of Custozza (June 24, 1866) a squadron and a half of Austrian lancers surprised an Italian infantry brigade, and so completely routed four of the five battalions of which it was composed that they were of no further use in the battle.

During the German autumn maneuvers in 1879, a regiment of lancers charged suddenly from behind some rising ground, and surprised four battalions of infantry, who did not see them until they were on the flank only two hundred yards away, and in full charge. Scarcely a shot was fired, and the Emperor and Von Moltke ruled three battalions out of the fight.* In other words, it was decided by the highest military authority in existence, that 3,000 good infantry, *taken completely by surprise*, could be routed by 600 cavalry.

III. When the infantry is out of ammunition.

At the battle of Eylau (February 7, 1807) Augereau's corps, while its fire-arms were wet with the falling snow, was attacked by a large force of Russian cavalry, aided by a heavy artillery fire, and was almost annihilated. An infantry force at the present time could not, it is true, be at all affected by wet fire-arms, but it is liable to exhaust its ammunition, and it will then be as helpless as the infantry of Augereau. With the exhaustion of its ammunition, infantry is set back six centuries in its efficiency, and becomes a tactical anachronism of which the cavalry can take advantage.

IV. When the infantry is broken by the fire of the opposing infantry or artillery.

At Austerlitz the infantry of Bagration, having been long engaged with the infantry of Lannes, was charged by Kellerman's cavalry and driven from the field.

V. When the infantry is engaged with opposing infantry.

At the battle of Winchester (September 19, 1864) the Confederate infantry, while engaged with the United States infantry in front, was struck in the flank by Merritt's cavalry, and routed with great loss.†

VI. To compel the infantry to take up such a formation as to present a good target to the fire of the opposing infantry or artillery.

*Maurice.

†See page 197 *ante*.

Near Almeida, in 1811, a brigade of French infantry was attacked by a British force consisting of six squadrons and a battery of horse artillery. Continually menaced by the cavalry, the brigade was compelled to form squares, thus presenting a target on which the battery played with such deadly effect that the French were compelled to withdraw with severe loss. This mode of action will be profitable when the infantry is in extended order with unprotected flanks, and its use in future wars will probably not be rare. When the employment of cavalry is combined in this manner with that of infantry, it is necessary that the latter arm be used with vigor.

VII. To check an attack of the enemy's infantry and gain time for the arrival of reinforcements.

This is one of the most important duties, and certainly the most dangerous one, that cavalry can be called upon to perform; and it should never be required, except when the necessity of gaining time is so imperative as to justify the sacrifice of the troops making the attack.

At Chancellorsville (May 2, 1863), when Stonewall Jackson had struck the flank of the Eleventh Corps, and was sweeping everything before him in wild confusion; when any sacrifice was justifiable to stem the torrent of disaster; a charge by the Eighth Pennsylvania Cavalry, under Major Pennock Huey, upon the advancing Confederates, though repulsed with great loss, gained time for General Pleasonton to assemble a battery of twenty-two guns, with which Jackson's onset was checked. Probably no more valuable use of cavalry was made during the entire War of Secession.

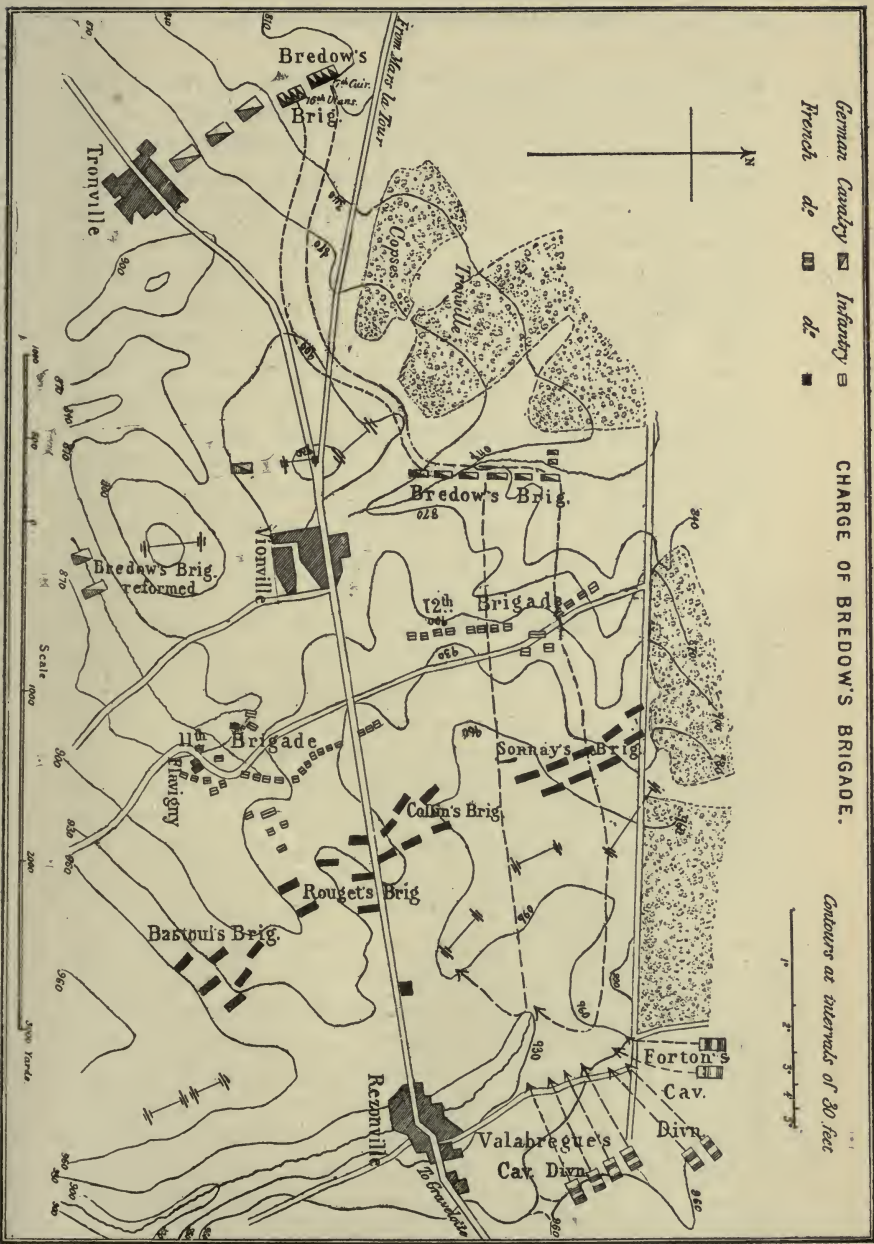
A similar, but much more celebrated charge, was made at Mars-la-Tour (August 16, 1870). The Germans, in inferior numbers, were struggling to hold their own until reinforcements could arrive. Canrobert's corps completely overlapped Buddenbrock's division, and a flank attack by the French seemed imminent. In order to

secure a point of support for his menaced flank, Buddenbrock accordingly endeavored to occupy some wooded and broken ground to the front with his main body; and the greater part of his division was there engaged in an obstinate fight with the French infantry, when he was informed that another French corps was coming up on the right of Canrobert, thus doubly increasing the danger of a flank attack. It was now necessary at any cost to gain time for the arrival of the Prussian Tenth Corps, which was approaching the field. To this end, General von Bredow was ordered to charge the French infantry with his cavalry brigade. One of his regiments having been detached, he had at his disposal only the Seventh Cuirassiers and the Sixteenth Uhlans; and some Prussian infantry in the Tronville copses in front having been mistaken for French, two squadrons were sent against them, thus further diminishing the attacking force to six squadrons. The brigade, thus reduced to half its strength, advanced toward Vionville (see map) in close column of squadrons, the cuirassiers leading. Crossing the road at a point west of Vionville, it changed direction half-left to the low ground north of the village, and deployed to the right; the cuirassiers being on the left with nine platoons in line, and two echeloned to the left rear, the Uhlans on the right with all squadrons in line and echeloned slightly to the rear of the cuirassiers. The deployment executed, the brigade wheeled slightly to the right and advanced at a gallop; four batteries of horse artillery posted west of Vionville concentrating their fire upon the enemy's batteries, and so engaging their attention that Von Bredow arrived near the guns with but slight loss. Only two pieces of the first battery had time to fire before the Prussian horsemen were among the guns, cutting down cannoneers and horses, and completely silencing the battery. Without stopping to make prisoners, the cavalry charged on, struck another battery in rear of the first, and dashed through the supporting infantry squares, riding

German Cavalry [Symbol] *Infantry* [Symbol]
French *de* [Symbol] *de* [Symbol]

CHARGE OF BREDOW'S BRIGADE.

Contours at intervals of 30 feet



down two and breaking up several others. Owing to the fury and excitement of the collision, the squadrons had become disordered and out of hand, and they continued the charge, overtaking a retiring mitrailleuse battery, sabering the drivers and horses, and pushing on to the second line of infantry. But just as the troopers were becoming thoroughly exhausted and the horses blown with the fatigues of an attack in which they had passed over a distance of 3,000 yards, they were struck in counter-charge by French hussars and chasseurs on the right, and cuirassiers on the left. The German horsemen were violently thrown back, and a confused mass of cuirassiers, Uhlans, hussars, chasseurs, and dispersed infantry men, thrusting, cutting, shooting, and yelling, went whirling back through the guns of the batteries, the rallied infantry opening fire whenever friend and foe were sufficiently separated to offer a target, and the French cavalry ruthlessly cutting down their exhausted opponents. When the remnants of Von Bredow's command reached the Prussian position, it was found that the casualties, out of a force numbering 800 sabers, were 379 officers and men killed, wounded, and missing. The result of the charge was worth the loss; for the French right was checked, the German reinforcements arrived, and nothing more was seen of the movement which had threatened to sweep Buddenbrock's division from the field.*

VIII. When infantry is exhausted by a prolonged contest with infantry.

In a determined contest of infantry against infantry, the fatigue of a long advance over broken ground, and the excitement, turmoil, noise, and appalling losses of a fire combat at close range, subject the combatants to such physical fatigue and mental strain at the crisis of the fight that their exhaustion is often marked by a distinct lull in the battle. If at such a time the infantry can be charged

*It is claimed by the French that the suspension of their movement was due to an order from Marshal Bazaine, and was not caused by Von Bredow's charge. The real truth of the matter will probably never be ascertained.

by cavalry, the latter should have every chance of success; for the infantrymen, with their overstrained nerves, are no longer in a condition to use their weapons with effect. If, at the battle of Gravelotte, the French cavalry, instead of standing idle behind the left, had been posted on the right near St. Privat, it might have circled out and attacked the Prussian Guards when they were exhausted and shattered by their repulse, and there is every reason to believe that the German attack at that point would then have failed completely.

IX. When infantry is disordered in retreat.

The mere fact of infantry being in retreat does not justify cavalry in charging them; for if the retiring force be not demoralized or disintegrated, it will probably inflict heavy loss upon the attacking cavalry. It is only when the retreating infantry is thoroughly beaten and demoralized, as at Jena or Waterloo, that the cavalry can charge them successfully and break down their resistance. When the retreating infantry is still intact and in good heart, the cavalry in pursuit should limit its action to threatening demonstrations.

X. In covering a retreat.

Here it may be merely a question of gaining time; and intact infantry may, therefore, be attacked with the deliberate intention of sacrificing the charging cavalry for the purpose of enabling the other troops to escape. The attack, if skillfully made, may, under favorable circumstances, result in checking the pursuit altogether. On the day after the battle of Shiloh, Forrest, covering the Confederate retreat with about 350 troopers, observed that a pursuing force, consisting of a regiment of infantry and two battalions of cavalry, was thrown into some confusion in crossing a stream, boldly charged it, and the moral effect of his audacious assumption of the offensive, combined with the losses inflicted, practically stopped the pursuit, though the charge was finally repulsed.

XI. (To cut through a surrounding force of hostile infantry.

This use of cavalry is generally a desperate one, and is made as the only alternative to surrender. The chances are in favor of its failure, but there have been instances of its successful employment. At Lovejoy, Ga. (August 20, 1864), Kilpatrick, finding his raiding force of 4,800 cavalry (two divisions) surrounded by 12,000 Confederates of all arms, determined to cut his way out. The hostile infantry had formed in three lines, about fifty yards apart, in double rank, and had constructed barricades of fence-rails. The first division of the Union cavalry was formed with the leading brigade in line of regiments in column of fours at deploying intervals, the other brigade in column of fours. The second division followed in column of fours. The leading brigade was covered by two troops deployed as skirmishers, who threw down an intervening fence, and appear generally to have performed the functions of ground scouts. The charging columns lost their formation, the men rushing to the front, and (according to a Confederate account) "charging in a solid column, ten or twelve lines deep, running their horses, and yelling like devils." The Confederate cavalry did not wait to receive the charge, but broke in confusion, and Kilpatrick's cavalry dashed over and through the three lines of opposing infantry, capturing a battery of artillery, three flags, and 400 prisoners, and rejoining Sherman without further serious molestation from the Confederates.

Moral Effect of Threatened Attack.—By merely hovering in the vicinity of the enemy and threatening attack, the cavalry may sometimes temporarily check the hostile infantry and gain valuable time. At Gettysburg (July 1, 1863) Howard ordered Buford to go to the support of Doubleday's sorely pressed corps. It seemed hopeless to attempt anything against the long lines of hostile infantry, but Buford quickly moved out into plain view of the enemy and formed

for the charge. The Confederates at once formed squares, which caused them to delay, and permitted the withdrawal of the First Corps, probably saving a large portion of it from capture.

A similar result was produced by the Austrian cavalry at Custozza. Two Austrian brigades of cavalry charged shortly after 7 A. M., upon two Italian divisions, consisting of thirty-six battalions, and, though compelled to retire, shook the Italians up so badly that they had to be supported by another brigade. The cavalry then remained in front of these divisions all day, and kept them so thoroughly on the defensive that they were unable to advance to the aid of the rest of the army. In this case, 2,400 cavalry kept 25,000 infantry out of battle all day; but it is to be observed that the best of cavalry was here opposed to a poor quality of infantry.

Formation for Attack.—Infantry in masses or in line in close order should be attacked in line of columns or in successive lines at about 100 yards distance, the lines as nearly equal as practicable, successive waves of cavalry being necessary to prevent the infantry from re-forming when the charge has passed over it. When the infantry is in extended order, it should be charged by foragers, supported by about half of the force in close order; the latter to advance in reinforcement, or form a rallying point in case of repulse.

In charging infantry, cavalry should take the shortest line, but should endeavor, from the first, so to shape its course as to strike the infantry in flank. In attacking the infantry in front, the cavalry should endeavor to approach from the right of the infantry, as the oblique fire of the latter is less effective towards its right than towards its left. It is also an advantage, in attacking infantry, to charge up a slight slope, as the bullets are in such a case likely to pass over the heads of the advancing troops. In attacking infantry, it is necessary that the gallop should be taken

much sooner than in attacking cavalry, as it is of the utmost importance to diminish the time of exposure to the hostile fire.

In attacking infantry, the cavalry must be careful not to mask the fire of its own infantry and artillery; otherwise the charge might, under some circumstances, be of positive benefit to the enemy. Hohenlohe mentions the following incident: "An infantry officer who was present told me, with regard to a cavalry charge at Wörth, that at the moment our infantry were falling back down a slope from an attack which had failed, a hail of chassepôt and mitrailleuse bullets followed them, and everyone felt that he would never reach the cover of the wood which lay below. Tired to death and resigned to their fate, the whole of the infantry were slowly crawling towards this wood. Suddenly this murderous fire ceased. Everyone stopped, astonished to see what had saved them from the fate which seemed certain to them. Then they saw the French cuirassiers, who, as they pushed forward, masked the fire of their own infantry and artillery. These cuirassiers appeared to them like guardian angels. With the most perfect calm, every man halted on the spot where he stood and fired at the cuirassiers, who were soon swept away by the rapid fire."* In this case an ill-advised charge upon repulsed, but not demoralized, infantry played completely into the hands of the enemy.

The Use of Cavalry Against Infantry Not a Thing of the Past.—There is no reason to believe that cavalry will not frequently be used against infantry in the wars of the near future. Those critics who would rule cavalry off the battle-field because of the disasters of the French horse in charging intact infantry at Wörth and Sedan, should remember that the same era that saw the Mamelukes annihilated by the French infantry at the Pyramids, and Blücher's cavalry wrecked against Davout's squares at Auerstädt, wit-

*"Letters on Cavalry," Letter VI.

nessed the decisive charges at Marengo, Austerlitz, and Borodino. Granting, as we must, that front attacks of cavalry against good, intact, infantry are out of the question, there are, nevertheless, eleven distinct cases, as enumerated above, in which cavalry can be profitably used against infantry. The employment of cavalry in these cases will certainly often subject it to great loss, but it is everywhere acknowledged that under the conditions of the modern battle-field, infantry must incur enormous losses in attack, and there is no reason why infantry should be expected to face death more cheerfully than cavalry should. Infantry can profit by the shelter of the terrain, and so (in a lesser degree) can cavalry. Infantry does not present so good a target as cavalry; neither does it pass over the ground so rapidly. The physical effect produced by the fire of attacking infantry is lacking in the case of cavalry; but the moral effect of a cavalry charge is greater than that of an infantry attack. Cavalry still has a great future before it on the battle-field; but it must have clear-headed, quick-witted, and fearless leaders, and it must be good *cavalry*, not merely brave men on horseback.

CAVALRY AGAINST ARTILLERY.

Of artillery, as of infantry, it may be said, that, if unshaken, well prepared, abundantly supplied with ammunition, and composed of good troops, it should not fear a front attack of cavalry. Nevertheless, many opportunities will occur in battle in which artillery may be attacked by cavalry with every prospect of success.

I. When artillery, hurried into action, is unsupported by the other arms.

It is the tendency of modern tactics to hurry the artillery into action and deploy the army under the protection of its guns. The artillery is habitually massed in huge batteries, the corps and divisional artillery being often united in a line of guns more than a mile in length. If the

artillery be audaciously hurried forward without proper escort—as at Sedan, where a great German battery of 200 guns was, for several hours, under the protection of a single regiment of cavalry—an opportunity will be presented for cavalry to move up under the shelter of various features of the terrain, make a sudden dash, and break the line of guns, capturing or damaging the pieces, causing confusion, and giving the enemy an impression of disaster at the very beginning of the fight. Even though a front attack might in this case be necessary, a certain amount of protection could be found in the element of surprise and the difficulty of altering the elevation of the guns to meet the quickly changing target afforded by the cavalry as it rapidly approaches, now in plain sight, and an instant later concealed by the undulations of the ground.

In the battle of Tobitschau (July 15, 1866) an aide-de-camp, looking for a passage across the Blatta Brook, found a dilapidated bridge, and at the same time discovered that an Austrian battery of eighteen guns was without any support. Von Bredow (then a lieutenant-colonel) at once led three squadrons across the shaky bridge and advanced upon the battery, two Prussian horse artillery batteries at the same time opening fire on the Austrian guns. The attention of the Austrians being attracted to the Prussian batteries, Von Bredow moved straight for the front of the hostile guns, with one squadron in the attacking line, one as a support in echelon on his left, and the third as a reserve to the right rear. The undulating ground afforded considerable shelter until the cavalry was close up to the guns, and a few rounds of grape nervously fired at the last moment produced but little effect upon the charging cavalry, who dashed into the battery, sabered cannoneers and drivers, and captured eighteen guns and 168 men. The cavalry lost only ten men.

A similar attack upon artillery for the purpose of compelling it to abandon its position was made by the French

at Mars-la-Tour. It is thus described by Bonie: "About 4:30 P. M., whilst our troops were engaged in front, one of the enemy's batteries was detached to take us in flank, and with that object took up a position on the road itself, nearly in a line with the Gréyère farm; in order to avoid being turned, it was absolutely necessary to silence this fire. . . . Immediately General du Barail passed over the ravine that lay in his front, with the Second *Chasseurs d'Afrique*, wheeled to the left, and charged the battery in skirmishing order. The enemy had scarcely time to fire before our men were on them. The Second sabered the gunners as they fled, and, still continuing their advance, they came in contact with a superior force of the enemy; they managed, however, to disengage themselves by going off to the right; and, rallying in the angle formed by the wood and the road, they opened a sharp fire on the enemy. After this brilliant feat of arms the battery was no more seen."*

II. When in the course of the battle the infantry supports have been driven back, or have exhausted their ammunition, and the artillery stands alone.

An opportunity of this kind was open to the French at Mars-la-Tour (Vionville). It is thus spoken of by Von der Goltz.

"When, in the evening of the battle of Vionville, the dusk descended, and scarcely anything more could be discerned of the infantry on the wide battle-field, and the great masses of the artillery on the center, more than 100 guns strong, stood defenseless, a similar thought ['How if the enemy's cavalry should now appear?'] arose in our breasts. It appeared impossible to check a resolute cavalry charge that might have hurled itself upon these batteries. This view of the case was one of the reasons for dispatching all our available cavalry against the enemy."†

*"The French Cavalry in 1870" (translated by Thomson), page 53.

†"The Nation in Arms" (translated by Ashworth), page 261.

III. When the artillery can be surprised, especially while limbering up or in the act of unlimbering.

In these cases the artillery is manifestly practically helpless, if not supported by the other arms.

Formation for Attack.—In attacking a battery, the cavalry is divided into two or three parts. The attacking line charges as foragers, divides near the center as it advances, and assaults the battery on each flank, attacking the cannoneers and the battery escort. The support advances to secure the battery. The reserve follows in close order, and is held in hand to repel a counter-charge should one be made. If the escort consists of cavalry, the attack on the guns must be made in extended order, but the escort must be attacked by a force in close order. If the battery be in position, the cavalry should always endeavor to strike it in flank or rear. Generally a troop or squadron will be sufficient for the attack of a single battery. In any case, the defeat of the support is necessary to complete the capture of the battery. At Brandy Station (June 9, 1863) the Sixth U. S. Cavalry and the Sixth Pennsylvania Cavalry charged upon the Confederate artillery. "Never," says Major McClellan, "rode troopers more gallantly than did those steady regulars, as under a fire of shell and shrapnel, and finally of canister, they dashed up to the very muzzle, then through and beyond our guns, passing between Hampton's left and Jones' right. Here they were simultaneously attacked from both flanks, and the survivors driven back."*

Measures to be Taken on Capturing a Battery.—Cavalry may attack a battery, either with the object of capturing it, for the purpose of disabling it, or with a view to causing it so much annoyance as to compel it to change its position. The cavalry, once in possession of a battery, should endeavor to carry it off. If this be impossible, the guns

*McClellan's "Campaigns of Stuart's Cavalry," page 268.

should be disabled,* and the horses and limbers carried off if practicable; if this cannot be done, the horses should be killed and the traces cut. When a gun is limbered up and retreating, an attempt should be made to shoot one or more of the horses of the team, preferably the wheelers.

DEFENSIVE USE OF SHOCK ACTION.

Shock action, from its very nature, belongs to the offensive; but it may be used in counter-charge as a part of a general defensive plan. The flanks of the infantry and artillery must be protected from surprise by the enemy's cavalry, which should be taken in flank or vigorously assailed in front when it attempts to strike. In such a case, the advantage of position is with the cavalry of the defensive, as the place where it is to be used can be known beforehand, and it can often be stationed in a position affording shelter, concealment, and proximity to the point of action.

Corps cavalry may sometimes be used defensively with effect at the crisis of the fight, to delay the opposing infantry, or even to check it altogether; this being a case of the use of cavalry against exhausted infantry. The best time for a counter-charge by the corps cavalry is, however, at the moment when the enemy has penetrated the position, as the effect of the infantry fire of the defender is then kept up until the last moment, and the counter-charge strikes the enemy at the instant of his greatest disorder.

The local defense of cavalry is possible only with fire action.

DISMOUNTED ACTION.

The dismounted fire action of cavalry may be usefully employed for the following purposes:

*"To disable a field gun, open the breech-block and then break it with a heavy hammer; or load the piece, close the breech without locking it, and fire the piece; or place two or three blank cartridges in the gun, close and lock the breech-block, ram from the muzzle a ball of clay or sod, then unlock the breech-block and fire; or fire a shotted gun with its muzzle against the chase of another. Guns of the Krupp system may be temporarily disabled by carrying off the breech-block or breaking the handle of the breech-block."—*U. S. Cavalry Drill Regulations, par. 966.*

- I. To drive away or capture small bodies of infantry or partisan troops, who endeavor to check the progress of raiding or reconnoitering cavalry.

The difference in self-reliance and power between a cavalry that cannot use effective fire action and one that can, is shown in the following instances where cavalry found its way blocked by irregular troops:

"On the 23d of December, the Eleventh Cavalry Brigade, consisting of a cuirassier, dragoon, and Uhlan regiment, was brought to a standstill before the village of Vibray. The dragoon officer in command of the advance guard reporting the village to be occupied by infantry, General von Barby decided, as it was getting dark, to bivouac his brigade for the night before the place. The next morning, my squadron relieved the dragoons and took the advance guard of the brigade, I being ordered to command the advance guard of the squadron. The orders I received were: 'Vibray is still occupied; if you are fired upon, send one man back to report, leave two to watch the road we are advancing on, and gallop through the town with the remainder.' We were fired on, and I galloped through the town, receiving a parting volley, fired from their horses, by a dozen *chasseurs d'Afrique*, who then made off in the opposite direction. Here is an instance of a whole cavalry brigade stopped by twelve mounted riflemen."*

"At the little town of Corydon, Colonel Morgan's advance guard found a body of militia posted behind rail barricades. He charged them, but they resolutely defended their rail piles, killing and wounding several men. . . . A demonstration was made upon the flank of the enemy by one regiment of the second brigade, and Colonel Morgan again advanced upon their front, when, not understanding such a fashion of fighting upon two or three sides at once, the militia broke and ran, with great rapidity, into the town,

*Captain Lumley, late Thirteenth Prussian Uhlans, in *Journal of the Royal United Service Institution*.

their progress accelerated (as they got fairly into the streets) by a shot dropped among them from one of the pieces."*

II. To force a defile which blocks an advance, and thus avoid a delay.

On the retreat from Gettysburg, Stuart, finding the pass of the Catoctin Mountains, near Cooperstown, Md., occupied by United States troops, dismounted a large portion of his command, and, fighting from crag to crag, finally forced the passage.

III. To seize and hold localities until the arrival of infantry.

At Gettysburg (July 1, 1863) Buford, discovering the approach of the enemy, and realizing the value of the position, dismounted his cavalry, and stubbornly held his ground against heavy bodies of Confederate infantry until the arrival of the First Corps.

IV. To reinforce infantry in emergencies.

General Buford illustrated this use of cavalry also at Gettysburg. In his official report, he says: "After the fall of General Reynolds, whose advance troops partially drove back the enemy and made heavy captures of prisoners, the enemy brought up fresh troops, and engaged General Doubleday's command, which fought bravely, but was greatly outnumbered and forced to fall back. Seeing our troops retiring, and their need of assistance, I immediately rushed Gamble's brigade to Doubleday's left, and dismounted it in time to render great assistance to our infantry, and to check and break the enemy's line. My troops at this place had partial shelter behind a low stone fence, and were in short carbine range. Their fire was perfectly terrific, causing the enemy to break and rally on their second line, which made no further advance toward my position."

V. To fill a gap in the line of battle.

At Wagram (July 6, 1809) Napoleon, finding that the Austrians were making dangerous progress on his left, withdrew Massena's corps from the center of his line, and

*Duke's "History of Morgan's Cavalry," page 435.

moved it to the left, filling with cavalry the gap thus formed until he could occupy it with artillery. Such a use of cavalry would now be vastly more practicable, the cavalry dismounting and taking the place of the infantry in every sense of the word. Indeed, had the present conditions then existed, the cavalry would probably have been moved to the left, and Massena would not have been withdrawn.

Similarly, cavalry may occupy a position for the purpose of relieving infantry, and causing the enemy to believe that the position is still held in force.

VI. In an inclosed, wooded, or broken country, where mounted action is impracticable.

Innumerable instances of this use of cavalry because of the impracticability of using it mounted might be cited from the history of the War of Secession. The most striking, perhaps, was the use of Wilson's entire cavalry corps dismounted at the battle of Nashville (December 15-16, 1864).

VII. In covering a retreat.

Describing the pursuit of Hood's army after Nashville, General Wilson says: "Hatch's column had not gone more than two miles when its advance, under Colonel Spalding, encountered Chalmers' cavalry strongly posted across the road behind a fence-rail barricade. They charged it at once, and a spirited hand-to-hand *mêlée* ensued, in which many men were killed and wounded on each side. . . . The gallant Confederates were driven in turn from every fresh position taken up by them, and the running fight was kept up till nearly midnight. Chalmers had, however, done the work cut out for him gallantly and well. He was overborne and driven back, it is true, but the delay which he forced upon the Federal cavalry by the stand he had made was sufficient to enable the fleeing Confederate infantry to sweep by the danger point that night, to improvise a rear guard, and to make good their retreat the next day."*

VIII. When exhausted or defeated cavalry is called upon to resist a charge of fresh cavalry.

*"Battles and Leaders of the Civil War," Vol. IV. page 469.

At Upperville, Virginia (June 21, 1863), Gamble's cavalry brigade, having been repulsed in a charge upon superior numbers of Confederate cavalry, retired a short distance, quickly dismounted, took a position behind a stone wall, and repulsed with its carbine fire several charges of the opposing cavalry.

IX. In conjunction with cavalry mounted.

At Aldie (June 17, 1863) Colonel Munford, commanding a brigade of Confederate cavalry, posted a force of dismounted cavalymen behind a stone wall perpendicular to the front of the mounted troops. The United States cavalry, charging upon the mounted Confederates, received a heavy fire from the dismounted men, and being driven back by a counter-charge, were again subjected to a biting fire in their retreat.

At Okolona (February 22, 1864) Forrest, holding his antagonist in front with a dismounted force, made a decisive mounted charge against his right flank.

X. Whenever cavalry, through force of circumstances, is deprived of the power of using mounted action.

When the cavalry of Bazaine's army, shut up in Metz, had lost its horses from starvation, the dismounted men were armed with chassépôts, and drilled to work as infantry. With cavalry armed and trained as most of the cavalry of the present day is, any catastrophe causing the loss of the horses could be promptly met by making use of the cavalry dismounted, without any additional drill.

Increased Value of Dismounted Action.—The increased value of dismounted fire action is due solely to the increased range of fire-arms. With the old muzzle-loading, smooth-bore weapons it would have been almost impossible for cavalry to do any effective work on foot, and then mount and withdraw. Dismounted fire action was accordingly limited to a very few objects, such as forcing a passage or defile against inferior numbers of foot troops, or in defending some similar position to the last extremity. Cavalry

can now, however, dismount and subject the enemy to a destructive fire, and still have time, if pressed by superior numbers, to mount and withdraw in safety.

Formation.—To prepare for dismounted action, the cavalry is always formed in column of fours, or in line of columns of fours, usually one man of each four holding the horses, and the rest of the command forming for action to the right, left, right-front, or left-front of the column. A mounted reserve is retained for such mounted action as circumstances may require. It may be charged with the protection of the led horses, or the latter may be intrusted to a designated detachment or detachments.

The proportion of men dismounted is generally three-fourths of the whole command, excepting the mounted reserve, but depends upon the degree of danger to which the horses are exposed, and the amount of mobility required of them, as well as the amount of fire action required of the dismounted line. It may be necessary to keep as many as half of the men mounted; and on the other hand, when a strong firing line is imperatively necessary and the horses are well sheltered and likely to remain stationary, all the horses of a platoon may be linked together in a circle, and left to the care of a single horse-holder, almost the entire force being thus made available for action. The horse-holders usually remain mounted; but when charged with the care of many horses, or in order to obtain shelter, they may be allowed to dismount. The horses should never be exposed to direct fire if it can possibly be avoided; but they should be kept as near the line as considerations of protection permit, and they should not be moved unless a material change is made in the position of the dismounted men. The horses should be kept under cover in rear of their respective subdivisions, and it is very important that they should be brought up to the line (or remain standing) in the same formation that they were in when the troopers dismounted; otherwise there will be confusion and delay at a time when haste is urgent.

The dismounted men are maneuvered and fought in essentially the same manner as infantry, the fighting line consisting of skirmishers, support, and reserve. The latter is in addition to the mounted reserve. When the squadron is in action as a part of the regiment, there is no mounted squadron reserve, except such mounted guard as may be necessary for the led horses.

In partisan or Indian warfare, or in guarding convoys, especially in a broken or wooded country, mounted skirmishers may dismount and retain their horses on the line. A more effective fire can thus be obtained than would be possible in mounted firing. This method of dismounted action is only for the purpose of fighting a delaying action, or for repulsing an annoying but insignificant enemy; real work must be done either by regularly dismounting to fight on foot, or by making a mounted charge.

Offensive Action.—As a rule, the cavalry approaches as near as possible to the enemy before dismounting. It should at least be able to remain mounted until it encounters artillery fire. The attack on foot is conducted according to the principles already prescribed for infantry; but the dismounted force should put as many carbines as practicable in the firing line from the first, and should close with the enemy as quickly as possible. When the hostile position is carried, the dismounted men should at first merely hold it, the mounted reserve pursuing, and the led horses being brought up to the position. The attacking force is then assembled as soon as possible, and may either mount and follow the mounted reserve in pursuit, or prepare to defend the position from counter-attack. Whenever a sufficient number of mounted men can be spared, an attempt may be made, in conjunction with the dismounted attack, by the mounted reserve against the enemy's flank or rear.

Even when the attack is to be made on foot, ground scouts and combat patrols (mounted if practicable) should always

be sent out, for the change from dismounted to mounted action is one for which the cavalry should always be prepared. The ground scouts should be drawn in when the fight begins, the patrols remaining on the flanks.

Defensive Action.—When dismounted cavalry is acting on the defensive, the whole of the reserve should, as soon as the enemy's attack is developed, be put in the firing line, unless there be danger to the position at other points. If attacked by a superior force, the defenders should discontinue the action in time to mount and retire to another position, unless ordered to hold on at all hazards. In defending a bridge, street, or defile, the dismounted cavalry should construct barricades, and, as a general rule, cavalry should intrench whenever it is on a pure defensive.

If opposed to mounted cavalry (as in the eighth case mentioned above), the cavalry on the defensive should endeavor to subject it to an annihilating magazine fire at short range, a reserve being kept mounted. If the assailants are thrown into confusion by the fire, or if they attempt to dismount, an opportunity may be offered to the reserve to charge them, or to attack their led horses.

As a rule, cavalry should avoid engaging in a dismounted fight with infantry; but should an emergency demand such action, it should endeavor to make up for its inferior shooting power by its superior mobility. Cavalry may often, by celerity of movement and skill in utilizing concealing features of the terrain, be able to strike the flank of a marching column of infantry, which it can annoy and throw into disorder with its fire, gradually withdrawing from the firing line as the infantry becomes engaged, and mounting and retreating before it can receive heavy loss in return.

Dismounted fire action adds immeasurably to the independence and fighting power of cavalry, and is an indispensable part of the functions of that arm; but, great as its importance is, it is only the complement of mounted action, and must never be regarded as the chief use of cavalry.

MOUNTED FIRE ACTION.

Mounted fire action with the carbine is here considered. The pistol may be used in shock action in place of the saber.

Mounted fire action may be used as follows :

- I. As a means of temporary resistance by small scouting parties, or by the point and flankers of an advance guard.
- II. In the pursuit of a beaten enemy, when a mounted charge is impracticable.
- III. In covering a retreat when the pursuit is so active and so strong as to make it unsafe to dismount and inexpedient to charge.*
- IV. When the opposing cavalry is charging over heavy and unfavorable ground.†

Mounted fire action may be used by cavalry in close order, but the habitual formation for this mode of fighting is in extended order, the skirmishers being deployed with intervals of four yards.

Mounted fire action is the least effective use of cavalry, and it may be well to repeat that it should never be used when either shock action or dismounted fire action is practicable.

THE EFFECT OF SMOKELESS POWDER ON CAVALRY TACTICS.

The absence of smoke on the field of battle will deprive cavalry of one of its best means of surprise; and it will be more difficult than heretofore to bring the squadrons unshattered up to a point from which their charge can be launched with effect. A field with a suitable combination of concealing features and good charging ground is, consequently, more necessary than ever. Reconnaissance will be more difficult than formerly, as the scouts will be

*See the subject "Mounted Fire Action," in Chapter III.

†See the description of the use of mounted fire action by the 20th *Chasseurs à Cheval* at Eylau, page 184 *ante*.

plainly visible, while the difficulty of obtaining shelter from the fire of an unseen enemy will be great. Under the increased danger, the scouts will probably often shirk their duty, and the engagement may thus begin without the position of the enemy being well known. The duties of ground scouts will be more difficult and dangerous than ever.

There is, however, one compensating advantage—a great one—for the cavalry, in the fact that the absence of smoke will make it possible to form a more correct estimate of the condition of the enemy than was possible under the old conditions. Shaken and demoralized infantry will no longer be concealed by a friendly mantle of smoke, and if the cavalry be within striking distance, it will be an easy matter to seize the opportune moment for a charge.

CAVALRY RAIDS.

* The subject of raids belongs really to the strategic service of cavalry; but this duty is so important and so intimately connected with the various tactical uses of cavalry that it may well be considered in connection with tactics.

Cavalry raids are undertaken for one or more of the following objects:

I. To threaten or destroy the communications of the enemy, thus compelling him to weaken himself for their protection, or delay his advance.

* The operations of Morgan and Forrest against the communications of the Army of the Cumberland after the battle of Murfreesboro, and Forrest's threatening movements toward Sherman's communications in 1864, exemplify this use of cavalry raids.*

II. ✓ To check an invading army by operations against its communications and the capture of its immediate base of supplies.

In December, 1862, Grant, operating against Vicks-

*For a sketch of these operations, see pp. 191-2 *ante*.

burg from the north, was in the vicinity of Oxford, Miss. His base of supplies was at Columbus, Ky., his immediate base being at Holly Springs, Miss. Forrest left Columbia, Tenn., on December 11th, and, in a three weeks' raid, wrecked sixty miles of the railroad between Jackson, Tenn., and Columbus, cutting off Grant's communications with Columbus and Washington for twelve days, and completely interrupting the transportation of supplies for a much longer period. At the same time, Van Dorn, with the entire cavalry force of his army, 3,500 men, moved from Grenada, around Grant's left, and captured Holly Springs, with its garrison of 1,500 men, where he destroyed an enormous quantity of stores, valued at \$1,500,000, and retreated in safety to Grenada.

These combined operations of Forrest and Van Dorn constitute, perhaps, the most successful and profitable raid ever undertaken. The region in which the armies were operating was exhausted, and the destruction of the depot and the railroad by which further supplies could be accumulated compelled Grant to abandon his movement against Vicksburg and fall back upon Memphis.

In a similar manner, raids may be made for the object of compelling the enemy to abandon a position by cutting the railroads on which he depends for supplies. The raids of Stoneman, McCook, and Kilpatrick, in the Atlanta campaign, were for this purpose, but were unsuccessful.

III. ✓ To make a diversion in favor of the main army by drawing off troops in pursuit of the raiding force.

After the battle of Antietam (September 17, 1862), Lee's army, diminished in numbers and suffering from its disastrous check, had crossed into Virginia, and it was of great importance that it should have time for recuperation before again confronting the Army of the Potomac. Stuart, with a select force of 1,800 cavalry, recrossed the Potomac, and, in a raid of three days, passed completely around McClellan's army, captured Chambersburg, de-

stroyed a vast quantity of public property, seized 1,200 horses, and captured 280 prisoners.

"Not the least important of the results of this expedition," says Stuart's biographer, "was its effect on the physical and moral condition of the Federal cavalry. As to its physical results, General McClellan sufficiently describes them when he says in his report, that it was necessary for him to use all of his cavalry against Stuart, and that 'this exhausting service completely broke down nearly all of our cavalry horses and rendered a remount absolutely indispensable before we could advance on the enemy.' On the 6th of October, General McClellan had received positive orders 'to cross the river and attack the enemy.' He was unable to execute these orders until the last days of that month. His correspondence with General Halleck shows that the condition of his cavalry was one of the chief causes of this delay."*

X IV. To gain information.

In June, 1862, McClellan's army was on the Chickahominy awaiting reinforcements. Lee, contemplating an offensive movement, sent Stuart "to make a scout movement to the rear of the enemy," the object being mainly "to gain intelligence of his operations, communications, etc.,"† with incidental instructions to capture trains, destroy supplies, etc. Beginning his raid on the 12th of June, Stuart reported to General Lee on the 16th, having made a circuit around McClellan, in the course of which he captured a few prisoners and destroyed a considerable quantity of United States property.

"The greatest results, however, were those which followed from the information obtained by Stuart. All doubt as to the location of the Federal Army was solved, and the possibility was demonstrated of those movements which,

*"Campaigns of Stuart's Cavalry."

†Official instructions of Lee to Stuart.

on the 27th of June, culminated in the defeat of the Federal right wing at Cold Harbor."*

- x V. To cause alarm in the enemy's country, and thus destroy confidence in the enemy's commanding general, or create a sentiment unfavorable to the prosecution of the war.

The greatest result of Stuart's Chickahominy raid was, however, a moral one. It caused a great commotion and excitement throughout the Army of the Potomac, and shook the confidence of the North in McClellan.†

The raid of Morgan into the Northern States, in the summer of 1863, was undertaken with a view (among other objects) to bringing home to the people of the North "something of the agony and terror of invasion," and, in connection with Lee's invasion of Pennsylvania, to give such an impression of Confederate success as to strengthen the opposition of a faction in the North to continuing the war. In this object it failed signally; for, though great excitement and alarm were caused among the inhabitants of Indiana and Ohio, no assistance was received from the anti-war element in those States, and Morgan's entire command was dispersed or captured. His raid had, however, the effect of keeping employed for a number of weeks a force of United States troops many times larger than his own command, and thus deprived Rosecrans of reinforcements that would have sufficed to turn Chickamauga into a Union victory.

- x VI. To interfere with the mobilization and concentration of the enemy's forces at the beginning of a campaign.

Raids for this purpose should be made by small forces, as their object will generally be the destruction of a bridge, viaduct, tunnel, or lock, and celerity will be of paramount

*"Campaigns of Stuart's Cavalry."

†See "The Civil War in America," by the Comte de Paris (American edition), Vol. II., page 83.

importance, in order that the raiding force may escape the large bodies of troops concentrating in the theater. This kind of raids may often be made by mere expeditionary patrols.*

VII. To devastate the enemy's country and destroy his
X resources.

The best illustration of such an operation is the great raid of Wilson in the spring of 1865.† A raiding force employed for this purpose should be large—in fact, an army of cavalry able to fight a battle, and resembling an ordinary raiding column only in its independence of a base or depots of supply.

X VIII. To effect the release of prisoners.

In February, 1864, Kilpatrick moved against Richmond with a raiding force, consisting of 4,000 cavalry and a battery of artillery, for the purpose of making a dash upon the Confederate capital and releasing the Union prisoners confined there. He reached the outskirts of Richmond, but was unable to effect his object. One of the objects of Stoneman's unsuccessful raid in Georgia, in 1864, was the release of Union prisoners confined at Macon and Andersonville.

When raids are undertaken for this purpose, it is necessary to avoid embarrassing the raiding column with a mass of unarmed prisoners on foot. The raid will be unsuccessful unless the prisoners can be quickly conducted to some point of safety near at hand, or can be provided with arms, and thus form a reinforcement sufficient to enable the raiding force to repulse any attack that is likely to be made upon it.

X *When Raids are Practicable.*—Raids are rarely practicable in the enemy's country. In the War of Secession the only raids on Northern soil were Stuart's Chambersburg raid, which was of only three days' duration, and Morgan's

*See "The Service of Security and Information," page 126 *et seq.*

†See page 201 *ante*.

great raid, which resulted in his own defeat and capture. It being necessary to obtain information in order to elude the hostile forces pursuing or endeavoring to head the raiding column, it follows that in a hostile country a raiding force is operating in the dark while its adversaries have every advantage. In Tennessee and Kentucky, Morgan was always well informed of every movement of the United States forces; but after he crossed the Ohio River he found it "utterly impossible, moving as rapidly as he was forced to do, and in the midst of a strange and hostile population, to get positive information regarding any matter."*

The raiding columns of United States cavalry in the South met with an advantage not often found in an enemy's country; for while the white population was intensely hostile, the slaves were, as a rule, more than willing to give information, and act as guides or spies. This limitation of raids to a friendly country is all the more certain when the belligerent nations speak different languages. Raids of French cavalry against the communications of a German army invading France should be perfectly feasible; but if the French were invading Germany, they would doubtless find raiding exceedingly difficult. The objection of some European authorities† to making raids in a thickly populated region may be dismissed at once with the remark that cavalry that cannot overcome the resistance of home guards, *Franc-tireurs*, or armed peasants is not fit for raiding, however valuable it may be on the field of battle.

The allurements of adventure offered by a raid furnish a temptation to every true cavalry leader, but it is a temptation that should be resisted unless the object justifies the raid; for aside from the peril of capture (which may be evaded by courage and skill) there exists the danger of the demoralization of the command by a spirit of depredation, or of its being for some time rendered unserviceable by the

*Duke.

†Notably Von der Goltz and Hohenlohe.

fatigues and exhaustion of raiding duty. Above all is the risk of being absent from the army when a decisive battle occurs. Many of the raids in the War of Secession, being undertaken without an adequate object, or not conducted with skill, terminated in disaster.

In Stuart's Chambersburg raid, his entire command marched eighty miles in twenty-seven hours. In Morgan's great raid, his command averaged for some days twenty-one hours a day in the saddle, and on one occasion marched ninety miles in thirty-five hours. "The men in our ranks," says General Duke, "were worn down and demoralized with the tremendous fatigue, which no man can realize or form the faintest conception of until he has experienced it. It is as different from the fatigue of an ordinary long march, followed by some rest, as the pain given by an hour's deprivation of water is unlike the burning, rabid thirst of fever." In General Wilson's raid against the railroad junction at Burkesville, Va., in June, 1864, with his own and Kautz's cavalry divisions, the command marched over 300 miles and destroyed sixty miles of railroad in ten days. General Kautz says that for nine days and nights his men were in the saddle or destroying railroads, and were so tired that every exertion of the officers was necessary to keep them awake even under the enemy's fire. Many were captured asleep on the road.*

The object must be an important one to justify such demoralizing fatigue and the consequent necessary rest for recuperation. Van Dorn's raid upon Holly Springs had an object worth any sacrifice; for it decided a campaign, and a great battle could have done no more. Even if his success had been gained with the loss of every trooper in his command, the raid would have been worth its cost. On the other hand, Stuart's third raid around the Army of the Potomac, though successfully effected, was a positive misfortune to the Confederates; for it caused his absence from Lee's army on the first day of the battle of Gettysburg,

*Official Report, July 4, 1864.

when his cavalry would have been of incalculable value. In a similar manner, an ill-timed raid of Forrest, in compliance with Hood's orders, "to drain the country of persons liable to military service, animals suitable for army purposes, and subsistence supplies," caused his absence from the battle of Nashville, and doubtless contributed materially to the defeat of the Confederate army.

Composition and Preparation of a Raiding Force.—A raiding force should be composed of well-mounted, well-disciplined, self-reliant troops, sufficiently toughened by service to be able to endure the greatest hardships. It should consist of complete organizations, instead of detachments from different ones, and should usually vary in numbers from 1,000 to 3,000 men. When quick work, requiring absolute secrecy, is the object, the force employed may be very small; when, on the other hand, the expedition is for the purpose of devastating a region and destroying the enemy's resources, the force must be large.* As the force should be strong enough to brush away the hostile bodies met in its path, and small enough for mobility, the resistance likely to be encountered should be carefully considered, and the strength of the raiding column regulated accordingly.

As a rule, no infantry should form a part of a raiding column. If a deficiency in cavalry render the employment of infantry necessary, the latter should be transported in wagons or mounted on impressed animals. Artillery may often be used with great advantage on raids, but it should consist of mountain artillery, carried on mules, as the raiding force should be entirely independent of wheels. As a rule, the proportion of artillery should not exceed two guns

*Morgan's first raid into Kentucky was made with 900 men; his great raid with 2,400. Stuart's raiding columns varied in strength from 1,500 to 2,000 men; his great Chambersburg raid being made with 1,800. Grierson's raiding column numbered 1,800 men. Wilson's command, including Kautz's, in the Burkesville raid, consisted of a force of 5,500. Wilson made his great raid through Alabama and Georgia with 13,000 men; and Sheridan had 10,000 troopers under his command in his raid against the James River Canal.

to 1,000 cavalry. If mountain artillery be not available, horse artillery may be used.

A raiding force should always count upon living upon the country; but, to meet emergencies, a reserve of supplies for a few days should invariably be carried along. The commander of the raiding force should compute as accurately as possible the number of days for which he should be compelled to provide his command with supplies in the event of the enemy's resistance, or other emergency, preventing him from foraging, and should carry half rations and half forage for such number of days. These supplies should be carried by a train of pack-mules; for a wagon train with a raiding column may be characterized as an unmitigated nuisance. A single pack-mule will carry one day's half rations for 160 men, or one day's half forage (grain) for thirty-five horses. Each trooper might be required to carry as much as five days' full rations on his own horse, and he should invariably be required to carry 200 rounds of carbine ammunition and an extra pair of horse shoes. Pioneer tools and explosives, for use in the destruction of railroads, bridges, tunnels, etc., should be provided and carried in the pack-train.

The objective of the raid should be definitely determined, and the commander should know beforehand just how he is to attain it. It is always well to have an alternative objective, so that in case it should be impossible to attain the principal object, the accomplishment of the second will prevent the raid from being altogether fruitless, and will even give it the appearance of success—a matter of no small importance in its effect upon the enemy and upon the *morale* of the raiding troops. Everything possible should be done to obtain a clear knowledge of the region through which the raid is to be made, and to gain information while in it. It was the custom of Morgan to send scouts and spies into the region in which he intended to operate, where they remained, familiarizing themselves with everything pertain-

ing to its roads, bridges, resources, and the location of hostile troops, until the raiding column arrived, when they were at once ready to act as guides. For manifest reasons, this plan would not work well in a hostile country, where it would probably be necessary to impress guides at all hazards.*

Conduct of the Raid.—But little can be prescribed for the conduct of a raid, as each expedition will present its own peculiar circumstances to which the operations must conform. Except in the case of a very large raiding force, it is generally advisable to march in a single column, in order that the force may be kept well in hand; for in moving with the rapidity required in raids, the junction of parallel columns in critical emergencies could not be counted upon with any degree of confidence. The main command should be in constant readiness for action. Individual scouts and small patrols should be kept well out to the front and flanks, and small parties (not exceeding in the aggregate more than one-third of the command) should be sent out to forage and seize horses, to replace those which may become exhausted and broken down. Receipts should be given for all forage, provisions, and horses taken, and no family should be left in want. The receipts given enable the people to present to their own government claims for remuneration, and should also protect them from further requisitions, except in cases of imperative necessity. A tendency to plunder is likely to spring up in a raiding column, even if composed of the best of troops;† and it should be promptly and sternly repressed, not only from motives of humanity, but to prevent the demoralization of the command.

*For the manner of selecting and using guides in a hostile region, see "The Service of Security and Information," page 110 *et seq.*

†General Kautz, in his official report of his raid of May 5 to 17, 1864, says: "The fighting qualities of the men I have never seen excelled, and in this respect I can congratulate the whole command without distinction. I have, however, to deplore a disposition to pillage and plunder on the part of some of the men, and a want of proper officering on the part of some of the officers to check this tendency."

If circumstances render a detachment necessary for any purpose, its commander should be clearly instructed, not only in regard to the object he is to accomplish, but also what he should do in case it becomes impossible to rejoin the main column. Detachments should not be made without some important object; for the commander must always regard as very possible the definite separation of the detachment from his command.

For the leader of a raiding force, secrecy, celerity, and resolution should be the motto; for his command, discipline and endurance are the two essential qualities.

DESTRUCTION OF COMMUNICATIONS.

The principal destructive efforts of a raiding force will be directed against railroads, bridges, tunnels, locks, and ordinary roads.

Bridges.—To destroy a bridge, a charge of gun-cotton should be exploded in the haunches of an arch, or, if time does not admit of this, in the crown of the arch. Iron girder bridges can be most easily destroyed by placing the charges under the supports.

Railroads.—The following manner of destroying a railroad is based on the method employed in the War of Secession. The men are divided into sections, several hundred men in each. The first section is distributed along the track, one man at each tie, and, at a given signal, the entire piece of track thus manned is raised to a vertical position. At a second signal, the track is thrown over so that the rails are underneath and the ties on top. Each man next loosens his tie from the rail, and the section moves on to another portion of the track. The second section now takes its place at the portion already torn up, collects the ties in piles of about thirty each, and places the rails on the top of the piles, the center of the rail over the center of the pile. Fire is then set to the piles, and the second section follows the first. The third section now comes up, takes the place of the second, and, when the rails are sufficiently heated, re-

moves them, two men to each rail, with "railroad hooks" or pinchers, and bends them around trees or posts, at the same time twisting them. The third section now follows the second, which, continuing the work of the first, has by this time another lot of rails ready, and the work is thus carried on to completion. When the road is well ballasted, preliminary work with pick and shovel will, of course, be necessary.

The rolling stock should be burned, blown up, or run at full speed to a broken bridge and precipitated into the river. When haste is urgent, rails may be broken, here and there, by exploding gun-cotton against them, or by removing the outside rail on a curve. This would, however, be only a temporary impairment of the road, worthy of an expeditionary patrol, but not of a raiding column.

Tunnels.—An effectual way of blocking a railroad—at least temporarily—is by blowing in a tunnel. The tunnel should be blown in at several places simultaneously; or, beginning at the center, it should be blasted at different points to the end.

Telegraph.—A line of telegraph may be destroyed by cutting down the poles, cutting the wires, and breaking the insulators. It may be temporarily disabled by winding together the wires (first scraped clean) with fine wires.

Locks.—The gates of a lock can easily be destroyed with gun-cotton. If time permits, the lock can be more permanently damaged by blowing in the walls at the sides.

Ordinary Roads.—Ordinary roads can be blocked by felling trees across them, or by blowing up the roadbed.*

RÉSUMÉ.

The tactics of cavalry is more varied than that of any other arm. It embraces shock action in line and in column; fire action mounted and on foot; a combination of fire and



*For detailed instructions in regard to hasty demolitions, etc., see the "Manual of Field Engineering," prepared at the U. S. Infantry and Cavalry School.

shock action either mounted or dismounted; and the simultaneous use of fire action dismounted and shock action mounted by different parts of the same command. The arms, training, and tactical formations of modern cavalry adapt it to use on varied ground, and in every phase of the battle, and sustain General Kilpatrick's apothegm, that "cavalry can fight anywhere except at sea."

CHAPTER VIII.

HISTORICAL SKETCH OF FIELD ARTILLERY.

"In proportion as the importance of fire-arms has increased, and their ascendancy in the field of battle become established, so also, step by step, has the influence of artillery advanced."—*Von Schell*.

Ancient Missile Machines.—Artillery, as the term is now understood, was a direct result of the invention of gunpowder. Before that momentous event, the artillery consisted of machines for throwing heavy missiles, the motive force being given by the sudden release of a weight or spring which had been raised or stretched by means of windlasses or levers. The best known of these weapons were the ballista, the onager, the catapult, and the springal; the first two throwing projectiles by means of a spring from a bag or a wooden bucket, and the last two being of the nature of gigantic crossbows, throwing similar missiles from a trough or platform. These machines were of many different kinds, but all were operated on the same general principle. Some are said to have been capable of throwing projectiles weighing nearly 700 pounds a distance of more than 1,000 yards; but this is probably an exaggeration, as

many of the most important castles and fortresses were built on sites commanded by hills not more than four or five hundred yards away. It is certain, however, that both their range and their power were considerable. Their projectiles consisted mainly of stones, arrows, beams, and incendiary missiles; though all manner of things, including putrid carcasses and infected human corpses, were sometimes thrown from them into besieged towns and castles. Though used mainly in sieges, these engines sometimes constituted a rude sort of field artillery, though, owing to their lack of mobility, they were not of great value or general use on the battle-field.

Early Cannon.—It is a remarkable fact that the date of the invention of gunpowder, the name of its inventor, and the time of its first application to the purposes of war are all matters of uncertainty. It is claimed that gunpowder was early known to the Chinese and to the inhabitants of India; and the Saracens are said to have used it in Spain in the thirteenth century, though this was some time before its alleged invention by Schwartz in Germany. It is known that cannon came into use in Europe during the fourteenth century, and it is claimed that they first appeared in battle at Crécy (1346), where they were used by the English. There is, however, no well-authenticated mention of their use in battle before the latter part of the fifteenth century; and, indeed, if used in the field before that time, their insignificant power and lack of mobility must have given them but little importance in action.

The earliest cannon were simply tubes, closed at one end, in which the powder was exploded by means of ignition through a touch-hole. These rude guns were at first known as vases and bombards, the former being in shape not unlike a druggist's mortar, and the latter also of a conical rather than cylindrical form. The bombard was usually mounted on trestles, or on a rude carriage, the fore part of which was supported by two wheels, while the trail rested

on the ground. In range and accuracy they were so insignificant that it required two centuries for them to overcome the competition of the old missile engines; and the crudeness of their construction was such that they were almost as dangerous to friend as to foe.* The first guns were generally constructed of iron bars, soldered or welded together, and strengthened with iron hoops. Sometimes they were made of hammered iron, or plates of iron or copper with lead run between them; and at a later date they were made of bell- or gun-metal. As early as 1453, the Turks employed brass cannon of enormous size, which were used without carriages, being rolled along with handspikes and fired from the ground, the muzzle being elevated with wedges, and the breech sunk in the earth. The most famous of these was the great gun of Mahomet II., the bore of which had "a measure of twelve palms," which fired a stone ball weighing above 600 pounds, and which required for its transportation 200 men and sixty oxen.† The use of cannon was at first limited almost exclusively to the attack and defense of castles and walled towns; but by the end of the fifteenth century bronze guns began to appear on the field of battle. They were of all imaginable calibers, had a great length of bore, were mounted on heavy and unwieldy carriages without limbers, and fired projectiles of stone, lead, iron, or bronze. Much more dependence seems to have been placed upon their moral than upon their physical effect, and the noise of the discharge seems to have been regarded as a matter of great importance.

*The old Scottish chronicler, Robert Lyndsay of Pittscottie, incidentally gives a picture of the faulty construction of the early cannon, in his quaint narrative of the death of James II. of Scotland in 1460: "While this Prince, more curious than became him or the majesty of a king, did stand near hand the gunners when the artillery was discharged, his thigh-bone was dung in two with the piece of a misframed gun that brake in shooting, by the which he was stricken to the ground and died hastily."

†For an interesting description of this famous gun, see Gibbon's "Decline and Fall of the Roman Empire," Chapter LXVIII.

The Franco-German-Spanish Wars.—In the wars between Francis I. of France and Charles V. of Germany and Spain, we first find artillery playing a part of some importance in battle. The old bombards had disappeared, and a rude, but genuine, artillery had taken their place. Culverins (usually 18-pounders), drawn by oxen, constituted the siege train, while the field artillery, though containing many kinds of pieces of diverse calibers, consisted mainly of 2-, 4-, 6-, and 8-pounders,* known as falcons, falconets, and sakers. Trunnions of sufficient strength to withstand the force of the recoil having been invented some years before, the easy elevation and depression of the piece became possible, and carriages were devised which answered at once for the transportation and service of the piece. The personnel of the artillery consisted of gunners taken from the fortresses and men hired as their assistants; while for transportation, dependence was now, and for very many years afterwards, placed upon drivers and animals hired or impressed in the theater of operations. On the field, the tactics of the artillery consisted merely in deploying the guns in advance of the line of troops, where they were usually able to fire only a few rounds; for if the army advanced, their lack of mobility did not permit them to accompany it, and if the troops were driven back, the pieces generally fell into the hands of the enemy. Considerable skill was shown in concealing the guns between masses of troops up to the moment of the engagement, in order that the enemy might not make such dispositions as to guard against their effect.

At Marignano (1515) the French artillery, consisting of seventy large cannon and 300 smaller ones, was posted so as to sweep a causeway over which the Swiss infantry, then regarded as the most redoubtable troops in Europe, moved to the assault. Many desperate charges were repulsed, mainly by the fire of the guns, and the battle resulted in the victory of the French; being probaby the first important action ever won by artillery.

*So classed from the weight of the projectile.

* At Pavia (1525) the French artillery nearly scored another great victory. It had thrown the German Emperor's troops into great confusion, when Francis, by an ill-timed attack with his gendarmerie, masked the front of his guns, and, by silencing their fire, lost the battle.

* *The French Religious War (1585-94).*—In the war between the Catholics and Huguenots in France, the skillful use of artillery is supposed to have contributed not a little to the success of Henry IV. He is said to have displayed considerable tactical skill in massing his guns at the extremities of a concave formation, so as to flank his line and subject the enemy to an oblique fire. He seems, at any rate, to have been impressed with the value of field artillery; for in the latter part of his reign more than 400 pieces were made, varying in caliber from $\frac{3}{4}$ -pdrs. to 33-pdrs. They were without limbers, but the 33-pdr. had a four-wheeled carriage, and spare carriages for all the large pieces accompanied the train.

* Henry's great cotemporary, Maurice of Nassau, reduced the number of calibers in the Dutch artillery to four; namely, 6-, 12-, 24-, and 48-pdrs., which were designated as cannons, half-cannons, quarter-cannons, and falcons. (The strength of the artillery at this time was in the proportion of one gun to every thousand men of the other arms.)

* *The Thirty Years' War.*—The military genius of Gustavus Adolphus, which placed its stamp upon every feature of military art, was shown in the great improvement of the artillery as well as the infantry and cavalry of the Swedish army. Recognizing that with artillery, as with the other arms, mobility is one of the greatest elements of power, the king created an artillery which could not only fire quickly, but could accompany the other arms and rapidly change its position according to the exigencies of battle. (In the war with Poland, he used his famous "leather guns," which were light pieces consisting of a copper cylinder screwed into a brass breech, and strengthened with iron bands and

coiled rope, the whole covered with leather.) These pieces not being altogether satisfactory, they were replaced, in the German campaigns, with iron 4-pdrs., each drawn by two horses; two of these guns being attached to each infantry regiment, and placed under the orders of its colonel. The cannoneers being thoroughly drilled, and cartridges being used, the guns were served with great celerity; a cannon firing three times as rapidly as an infantry musket. The guns fired both solid shot and canister. In addition to his light regimental pieces, Gustavus employed strong batteries of larger guns, consisting of 6-, 12-, 16-, and 30-pdrs. These batteries were placed on the wings and in the center of the line, and their fire had a great, if not decisive, influence in gaining the victory of Lützen. The guns in the Swedish army were in the proportion of six to 1,000 men of the other arms. 6:1, 3

Opposed to this efficient artillery, the Imperialists employed cumbersome guns, each drawn by twenty horses, and loaded, by means of a ladle, with loose powder.

About this time bombs came into general use, being introduced by the French.*

The Wars of Louis XIV.—During the wars of Louis XIV. great improvements were made in the French artillery. The guns were made both of bronze and iron, and the calibers, which were made uniform, were limited to 4-, 6-, 8-, 12-, 18-, 24-, and 36-pdrs. Canvas cartridges were used, and grapeshot was introduced. In the struggle between William of Orange and Louis, howitzers and mortars came into use, and explosive projectiles began to be used by field artillery, being employed principally by the

*Bombs seem, however, to have been known at a much earlier period. Brazen balls, filled with powder, are mentioned by a writer of the fifteenth century; and in the reign of Henry VIII. there were made in England "certain hollow shot of cast iron, stuffed with fire-works, or wild-fire; whereof the bigger sort for the same had screws of iron to receive a match to carry fire kindled, that the fire-work might be set on fire to break in pieces the same hollow shot; whereof the smallest piece hitting any man would kill or spoil him."—Grose's "*Military Antiquities*," Vol. I., p. 384.

English and Dutch. Louis raised a regiment of artillery, composed of gunners and artificers, which may be termed the first permanent organization of field artillery. In other armies, cannoneers and artificers were organized in companies, which were distributed among the various garrisons in time of peace, but no special corps or regimental organization existed. Louis also established schools for the instruction of officers in the science of gunnery.

The English artillery at this time consisted of many different kinds of pieces known by various names. The guns were all enormously heavy, a 30-pdr. "demi-cannon" weighing 6,000 lbs., and a 5-pdr. "saker" weighing 1,500 lbs.; these weights being exclusive of the carriages, which were correspondingly heavy. In the War of the Spanish Succession the artillery of the contending armies consisted of more than four pieces to every 1,000 men; and the guns were used with a degree of skill, and with an effect, never before known. The influence of the artillery was strongly felt in every battle of the war, especially at Blenheim (August 13, 1704) and Malplaquet (September 11, 1709). In the former battle a strong battery on the right of the Allies enfiladed the French, and contributed materially to Marlborough's victory. In the latter battle the same commander advanced a battery of forty pieces against the French center, where it was used with telling effect. In this action the French guns were also handled very effectively; and their increased mobility is shown by the fact that though they continued to fire up to the moment of assault, only eight or ten were taken by the Allies.* Marlborough may be characterized as a general who used with consummate

*Duparcq makes the remarkable statement that in this battle a French battery of fifty guns placed 2,000 of the enemy *hors de combat* by a single discharge of grape. In what manner the casualties caused by this deadly salvo were ascertained he neglects, however, to state, and it can scarcely be believed that a single discharge from the great battery could have inflicted upon the Allies one-ninth of all the losses suffered by them in the battle. The statement may, however, be accepted, with due allowance, as evidence that the French artillery was used with great effect—a fact in which all accounts concur.

skill every arm as he found it, but who failed to make the slightest improvement in the organization, arms, or equipment of any; and the close of his campaigns found the field artillery practically in the same condition as at the beginning of the war.

The Wars of Frederick the Great.—In Frederick's earlier Silesian campaigns, though the guns and carriages had been lightened, and guns of the same caliber had been united in batteries and brigades, the pieces were still so heavy that the field artillery was sadly lacking in the essential quality of mobility. The horses employed in transporting the artillery were kept under cover as near the battery as safety permitted, and the guns were maneuvered on the field entirely by hand. The field artillery was classified as batteries of position and regimental or battalion guns. The former, consisting of heavy pieces, were assembled in large batteries on the wings or in front of the line; the latter, consisting of 3- or 4-pdrs., were assigned to the infantry, two to each battalion. The following description, by Decker, of the tactics of the battalion guns, gives a good idea of the crude handling of the field artillery of that time, and of the short ranges at which fire action was then conducted:

"The direction of the two pieces was entrusted to a corporal, to whom all initiative was forbidden. The commander of the battalion alone had the right to control the guns; but he was too much occupied with his men to think of the cannon. The consequence was that the two pieces marched quietly behind the battalion, but upon arriving within 500 paces of the enemy they unlimbered and continued to advance, dragged by the men. It is very doubtful whether the corporal had any particular instructions for the fight. We only know that he had orders not to fire grape until within 350 paces, and always to keep himself fifty paces in front of the battalion; a very convenient measure doubtless, but which did not take into consideration that

artillery is effective only in position, and not while marching. Worst of all, when the battalion was beaten, the loss of the pieces was almost always inevitable, for want of time to limber up."*

Frederick's neglect of his artillery in his earlier campaigns is surprising. With the finest and most perfectly drilled infantry in the world, and with a cavalry the like of which had never been seen since the days of Hannibal, his artillery was treated almost with contempt, until an appreciation of its value was forced upon him by his own experience. In his two greatest battles his artillery performed memorable service. At Rosbach (Nov. 5, 1757) eighteen guns posted on the Janus Hill wrought havoc in the ranks of the Allies, and greatly assisted the cavalry charge of Seidlitz; and at Leuthen (exactly a month later) the Prussian guns constantly playing on the angle formed by the Austrians as they endeavored to change front to meet Frederick's flank attack, contributed greatly to the victory. Nor was Frederick's artillery less valuable in defeat. Surprised at Hochkirch (Oct. 14, 1758) by an Austrian attack in the early morning, he was saved from utter rout and destruction only by the heroic stand made by the artillery, which for some time checked the Austrians, and finally sacrificed itself to cover the retreat of the rest of the army. Appreciating at last the importance of this arm, it received more attention from him; and as his carefully trained and disciplined infantry began to disappear in the carnage of a long war, and their places began to be taken by imperfectly instructed recruits, he increased the number of guns in his army until he had more than five to every thousand men of the other arms. He also created a horse artillery, which consisted of ten light 6-pdrs. sufficiently mobile to accompany his cavalry wherever it went. His field artillery consisted of 3-, 6-, and 12-pdr. guns, and 7-, 10-, and 25-pdr.

*"Batailles et Principaux Combats de la Guerre de Sept Ans," p. 9.

howitzers.* The organization of Frederick's artillery was, however, never satisfactory; it never had a chief of suitable rank, and at the time when the king was engaged in a struggle with nearly all Europe, the inspector general of the Prussian artillery was only a lieutenant-colonel.

In both organization and tactics the Austrian artillery was much in advance of that of Prussia. It consisted of battalion and position guns, and was under the immediate command of Prince Wenzel Lichtenstein who was made chief of artillery with appropriate rank as a general officer. The position guns were separated into four divisions, designated as "reserves," one for the center, one for each wing, and the fourth as a general reserve to be used as exigencies might require. Throughout the entire Seven Years' War the Austrian artillery was efficiently handled. At Prague (May 6, 1757) it constituted the real strength of the Austrians,† and at Torgau (November 2, 1760) a remarkable accident nearly caused the Austrian artillery to give Frederick a heavy defeat. Daun, the Austrian commander, having taken up a strong position, in which, however, he was cramped for room, placed all of his general reserve artillery in his rear, mainly as a means of getting it out of the way. Frederick, directing Ziethen to attack in front, moved around the Austrian right and attacked Daun's rear. The Austrians changed front to rear as quickly as possible, and found their entire new front garnished with the accidentally posted reserve artillery, consisting of 400 guns. These received the Prussians with such a murderous fire of grape that Frederick's attacks were frustrated, and the battle would probably have resulted in a victory for Daun, had not Ziethen been at last successful in his attack on the

*These designations of howitzers were taken from the weight of stone balls which would fit their respective bores; their shells weighed 15, 20, and 50 lbs. respectively.—Owen's "Modern Artillery," p. 349.

†"Redoubts, cannon-batteries, as we said, stud all the field; the Austrian stock of artillery is very great; arrangement of it cunning, practice excellent; does honor to Prince Lichtenstein, and indeed is the real force of the Austrians on this occasion."—Carlyle's "History of Frederick the Great," Vol. V., p. 28.

former front of the Austrian position. It is a remarkable fact that the most effective, and tactically the best, use of artillery in the entire eighteenth century was thus due to pure accident.

The artillery was frequently massed in great batteries by Frederick as well as by his opponents; but the fire of the guns was not concentrated, nor, indeed, was the range of the field artillery of that day such as to enable the fire of a great number of guns to be directed upon the same object. (The experience of the artillery in this war resulted in the separation of the position guns into batteries, which were distributed among the brigades of infantry; the union of howitzers in separate batteries; and the creation of horse artillery.)

The Reforms of Gribeauval.—*Vaquette de Gribeauval* may be termed the father of modern field artillery. An officer of French artillery, he had served with the Austrian army in the Seven Years' War, holding an important command under Lichtenstein. Returning to France, and being ordered, in 1765, to reconstruct the French artillery, he provided a distinct *matériel* for field, siege, garrison, and sea-coast service. The field batteries were limited to 4-, 8-, and 12-pdr. guns and the 6-inch howitzer. The pieces were reduced in length and weight, were cast solid and bored out, and had a plain exterior; the profuse ornamentation which characterized the guns of an earlier day being altogether discarded. They were provided with lighter carriages, having iron axle-trees and being otherwise strengthened. The charge of the field guns was diminished from one-half to one-third that of the shot, but a reduction being made at the same time in the windage, there was no sensible diminution of the range. The essence of Gribeauval's reforms consisted in making everything strong, light, and uniform. All parts of the guns and carriages manufactured at the different arsenals were made according to the same pattern, so as to be interchangeable. The introduction of

tangent scales and elevating screws rendered the laying of the piece more accurate and expeditious. ★

The field guns were divided into battalion guns, and three reserves for the right, left, and center of the army, respectively. The former were distributed among the infantry, two to each battalion, and a company of artillery was assigned to each infantry brigade (of four battalions) for the service of these pieces. The reserve artillery was organized in "divisions" of eight pièces, of uniform caliber, a company of artillery being assigned to each.

The horses of the batteries were now harnessed in pairs, instead of in file, and a rope prolonge was provided to unite the trail with the limber, and thus enable firing to be maintained while slowly withdrawing. A new ammunition wagon, light and strong, was provided, fixed ammunition was introduced, and the *bricole* (a collar with rope and hook), to which the cannoneers harnessed themselves for moving the piece by hand, was adopted.* There were but two serious defects in Gribeauval's system; namely, the drivers were not a part of the military organization, and a large portion of the pieces were dispersed in battalion guns, instead of being all united in batteries.

Horse artillery was instituted in the French army in 1791, and in the British army in 1793.

The Napoleonic Era.—The whole tendency of the reorganization of the French army in the time of the revolution being in the direction of flexibility and mobility, the battalion guns were soon found to be more of an incumbrance than an advantage. In his first Italian campaign, Napoleon accordingly assembled them into batteries, which he distributed among the infantry divisions, thus creating divisional artillery. Himself an artillery officer, with a predilection for the use of that arm, and with an appreciation

*Both the elevating screw and the prolonge had been invented at an earlier date, but do not seem to have been generally used until the time of Gribeauval.

of its power, Napoleon, when First Consul, raised the artillery to a degree of importance before unknown. The number of guns in a battery was reduced from eight to six. The field batteries were armed with 6-pdr. guns and 24-pdr. howitzers; the horse batteries, with 4-pdrs. The old system of employing teamsters by contract or by impressment was abolished, and a corps of special troops consisting of drivers was organized in 1800. These drivers were uniformed and disciplined, and constituted a part of the regular military force. When Napoleon was at the height of his power, his artillery numbered 60,000 men.

Artillery played an important part in every feature of Napoleon's tactics. If the infantry assaulted, its way was prepared by artillery fire; if cavalry charged, it was to complete the work begun by the guns; and if a portion of the army remained on the defensive, its power rested largely in its cannon. The divisional batteries were posted in the brigade intervals and on the flanks, or combined in powerful masses where most needed at the decisive moment. (The artillery of the Guard, which consisted of 96 guns, constituted a general reserve, and was under the immediate control of the Emperor.) "It is the artillery of my Guard," said Napoleon, "which decides most of the battles; because, having it always in hand, I am able to use it whenever it is necessary." Senarmont and Drouot were as illustrious in the artillery service as were Nansouty and Lassalle in that of the cavalry. At Friedland (June 14, 1807) Senarmont, collecting the divisional artillery of Victor's corps (36 pieces) into two batteries of fifteen guns each and a reserve of six guns, subjected the advancing Russians to such a destructive cross-fire as to check their assault. Then pushing onward, in advance of the supporting infantry, he opened fire at a range of 200, and finally 130 yards, and with rapid and effective discharges of canister drove the Russian left from the field. (Napoleon seems to have been profoundly impressed with Senarmont's audacious handling of the art-

lery on this occasion, and to have profited by the lesson in future battles.*

At Wagram, Napoleon collected a great battery of 100 pieces, consisting of sixty guns of the Guard and forty drawn from adjacent corps, and with their fire prepared the way for Macdonald's famous attack against the Austrian center. In the same battle a decisive attack against the enemy's left by Davout and Oudinot was prepared by massing the artillery of their two corps, and bringing to bear such an effective and well-sustained fire that nearly all the Austrian guns on that flank were dismounted and the hostile infantry badly shaken. At Borodino, Napoleon massed 120 guns in three batteries to prepare the way for the first attack upon the great redoubt;† and later in the day he assembled 200 pieces in a great battery, which played with terrible effect upon the Russian infantry drawn up behind the ravine of Semenofskoi. At Lützen, Napoleon massed eighty guns obliquely on his right, where they enfiladed the Allied infantry, and beat back the cavalry which was menacing Marmont's corps. But to describe the cases in which Napoleon made effective use of his artillery would be to write a history of his battles. In his last battle the great attack of D'Erlon's corps against Wellington's left was prepared and supported by the fire of nearly eighty guns.

Napoleon's appreciation of the power of field artillery not only gained him many victories, but, strangely enough, it may be said to have been one of the causes of his final overthrow. Drouot always believed himself responsible for the

*It is said that Napoleon, alarmed at the exposure of the guns, sent an aide to caution Senarmont against rashness, and that the latter replied, "Let me alone. I will answer for the result." Napoleon, seeing the effect of the fire and amused by Senarmont's reply, merely remarked, "Well, he is a pig-headed fellow (*tête mauvaise*); let him have his own way." Thiers, however, implies that Napoleon directed the entire operation himself.

†"Massing guns does not consist in deploying them in a well-dressed line, as at a review, but in keeping large numbers together under unity of command and with a common object, and posting them according to the facilities offered by the features of the ground."—Owen.

loss of the battle of Waterloo. "The Emperor was aware," said he, "of the disposition of the enemy's forces at the break of day; his plan was decided on; he intended to commence the battle at 8 or 9 in the morning at the latest. I observed to him that the ground was so broken up by the rain that the movements of the artillery would be very slow, an inconvenience that would be done away with by a delay of two or three hours. The Emperor consented to make this fatal delay. Had he disregarded my advice, Wellington would have been attacked at 7, beaten at 10, the victory would have been completed at noon, and Blücher, not arriving until 5, would have fallen into the hands of a victorious army. We did not commence the attack until noon, and left all the chance of success to the enemy."

(It is a noteworthy fact that as Napoleon's infantry deteriorated, through the losses of his many campaigns, he increased the proportion of his artillery.) At Austerlitz the proportion was two and a half guns to a thousand men of the other arms; at Wagram it was nearly four. This coincides strikingly with the experience of Frederick the Great, and sustains the view that an infantry weak in numbers or in *morale* needs the support of a numerous and efficient artillery.* It must be noted, however, that both these great commanders showed in their later campaigns a greater appreciation of the value of artillery, and more skill in its use, than they evinced in their early battles.

The British Artillery.—At the beginning of the great struggle with France, all the British artillery was formed into a train consisting of both field and siege guns. There were no batteries, but the guns were divided into nominal brigades of twelve pieces, the *personnel* of each brigade consisting of a company of 100 men. The companies were, however, divided among the infantry battalions, to each of which two guns were assigned. Each piece was drawn by three horses in single file, driven by a teamster

*See p. 16 *ante*.

on foot. Improvement was rapid in the British artillery in the last years of the century. Horse artillery was introduced only two years later than in the French army; and in the institution of a corps of drivers the British were actually six years in advance of Napoleon. In 1802 the battalion guns were abolished, and field and horse batteries of six guns each were organized, the former being termed "brigades" and the latter "troops." The driver corps consisted of non-commissioned officers, artificers, drivers, and horses, and was divided into troops, each of which was under the command of a subaltern officer. A driver troop assigned to a company of foot artillery converted the latter into a field brigade. The officer of the driver troop ranked below all the officers of the artillery company, and had no authority over the cannoneers. The horses were now harnessed in pairs, the drivers riding on the off horses; and the eight cannoneers assigned to each piece were mounted on the limbers and caissons. Six horses were attached to each gun and four to each caisson. The armament of each battery consisted of five guns and one howitzer. The guns in each field battery were of uniform caliber, either 6-, 9-, or 12-pdrs.; the howitzers were all 5½-inch brass pieces. In the Peninsular War the guns in each horse battery were of two different calibers—two 9-, and three 6-pdrs.; but before the Waterloo campaign, the armament of many of the horse batteries was changed to 9-pdrs. exclusively, and with most important results; for the effective fire of the horse artillery contributed greatly to Wellington's victory.*

A great improvement in the effectiveness of the Brit-

"Sir Augustus Frazer, commander of the horse artillery, had succeeded in getting his troops equipped with 9-pounder guns instead of the 6-pounders which they had used in previous campaigns—a substitution which Wellington opposed. The execution done by the heavier arm, especially at the time of the great cavalry charges, was most effective, and no doubt Frazer was quite within bounds when he wrote, 'Had the troops continued with light guns, I do not hesitate to say the day had been lost.' But when the Duke's dispatches found their way back to the army, Frazer looked vainly for any recognition."—"Quatre Bras, Ligny, and Waterloo"* (by Dorsey Gardner), p. 374.

ish artillery fire, in the Napoleonic wars, was made by the introduction of shrapnel and rockets. The former was invented by Lieutenant Shrapnel in 1792, and adopted sixteen years later, when the demands of war had forced attention to the projectile. The first shrapnel was spherical, to suit the smooth-bore guns then in use, and the bullets were mingled with the bursting charge; but they were afterwards separated by an iron diaphragm, and the projectile was termed "diaphragm shrapnel." The bursting charge was placed next to the fuse.

Congreve rockets were introduced in 1806. Their cases were made of sheet iron, and they could be used either as shell or solid shot. They were fired from tubes; were of four sizes, namely, 3-, 6-, 12-, and 24-pdrs.; and were served by separate batteries or "brigades." The moral effect of these projectiles was very great, and they were highly regarded by the British, though they do not seem to have been held in equal esteem by other nations. The first instance of the use of rockets in battle was at Leipsic (October 18, 1813), by the rocket brigade of Captain Bogue. So great was the effect, that "a solid square of French infantry, upon the flank of which it opened its fire, surrendered in a few minutes."* (Their first use in the Peninsular War was at the passage of the Lower Adour (February 23, 1814), where they quickly dispersed the French detachments, which were "terrified by the unwonted sight and sound.")† They were also effectively used against the raw American militia at Bladensburg (August 24, 1814).

The Crimean War.—In the long peace following the battle of Waterloo, many important changes were made in the organization and *matériel* of field artillery. In 1822 the corps of drivers in the British service was abolished, and the men were enlisted as both cannoners and drivers. In 1829 the French followed the lead of the British in this

*Alison.

†Ibid.

respect, and also made considerable changes in *matériel*. The field batteries were now armed with four guns and two howitzers each, the guns being 8- and 12-pdrs., and the howitzers 24- and 32-pdrs. lengthened to correspond to the guns. All other field pieces were discarded, and the carriages were limited to two sizes to fit the two classes of guns and howitzers. The weight of the limber was reduced, and an ammunition chest was placed upon it. Seats for the cannoneers were provided on the limber-chest and caisson, and the two flasks which formed the trail were replaced by a stock consisting of a single piece.

In 1852 the Emperor Napoleon III. substituted for the two guns and two howitzers of the French artillery a single 12-pdr. piece, known at first as the *canon obusier*, or gun-howitzer, but afterwards generally designated as the Napoleon gun. The French artillery was now divided into horse artillery, in which the cannoneers were mounted on horses; line artillery, in which they rode on the ammunition chests; and reserve artillery, in which they marched on foot. The first served with the cavalry, the second with the infantry divisions, and the third was employed as batteries of position and in the attack and defense of fortified places. This was the organization with which the French artillery entered the Crimean War. ★

The British artillery in the same war consisted of position, heavy field, field, horse, and mountain batteries, armed respectively with 18-, 12-, 9-, 6-, and 3-pdr. guns, and 8-in., 32-, 24-, and 12-pdr., and 4-in. howitzers. A rocket section was attached to each battery of field and horse artillery.

The Crimean War being really a gigantic siege, the employment of field artillery was limited. In the battle of the Alma the Russian guns were withdrawn too soon, and were out of the fight at the time when they might have been employed with the greatest effect. At Balaklava the guns played no important part, and only at the battle of Inkerman (November 5, 1854) was artillery used to any purpose.

In this battle the Russians, under cover of a fog, posted twenty-two pieces so as to enfilade the right flank of the Allies; and they finally brought into line ninety-four guns, of which number fifty-four were field guns of the heaviest caliber. The British opposed to this formidable battery thirty-six pieces of lighter caliber (9-pdr. guns and 24-pdr. howitzers), which were overmatched and unable to produce any appreciable effect until they were reinforced with two 18-pdr. position guns and three French batteries of 12-pdr. Napoleons. The Russians did not show much tactical skill in handling their artillery on this occasion. They used it with some success in preparing the way for the infantry attack; but instead of pushing forward their light guns to support the advancing infantry, they kept the entire mass of artillery in its first position, where its range varied from 1,000 to 1,450 yards—a rather long range for the field guns of that day. In this battle the Allied infantry, being armed with rifles, caused infinite annoyance and great loss to the Russian artillery; and Todleben, in his report, says: "A perfect cloud of riflemen, hid in thick brushwood, opened a very violent and very accurate fire against our artillery at a distance of 800 paces. Some of our guns, from time to time, rained case upon them, but the discharge only checked the fire of the enemy's riflemen for a moment."*

* This war rendered it plain that a rifled field gun was necessary if the relative effective range of artillery and infantry was to be maintained. The British employed rifled siege guns at Sebastopol, the guns used being the 68-pdr. and 8-in. Lancaster guns; but they were not a success, and were soon withdrawn from the batteries. Rifled field guns had not yet appeared.†

*The range at which the riflemen delivered this destructive fire would seem, however, to be somewhat exaggerated, as it exceeds the effective range of the rifles of this period.

†It is very remarkable that even as early as 1547 experiments must have been carried out with *rifled* barrels, for there is a barrel now at Woolwich, with that date on it, rifled with six fine grooves, having a twist of one turn in 26

The Italian War.—In the Italian war of 1859 the French had a powerful artillery, in which rifled field guns appeared for the first time. Although it had been decided in 1858 to adopt rifled guns, and 200 batteries had been ordered, the arsenals were able to furnish only thirty-seven rifled pieces, and 240 rounds of ammunition for each, in time for the campaign in Lombardy. Many of the French batteries went to the war with empty carriages, the guns being sent to them after they had left France. Other batteries, field and horse, were armed with the 12-pdr. Napoleon gun. The new rifled guns were 4- and 12-pdr. muzzle-loaders. The Austrian artillery, which was altogether inferior to the French, consisted entirely of smooth-bores, 6- and 12-pdrs., and "long howitzers"—"*obusiers longs*," evidently 32-pdr. howitzers. The French artillery played an important part in the campaign, and made its weight felt in every battle. At Solferino it was used with effect at a range of 2,500 yards; destroyed opposing batteries at nearly 1,700 yards; and demoralized the Austrian reserves, by shelling them at ranges at which they had deemed themselves perfectly safe. The Austrians, on the other hand, used their guns with feeble effect; their artillery reserve did not fire a shot, and scarcely half of their great force of 800 pieces was brought into action. On several occasions the Austrian artillery actually employed solid shot against French skirmishers.

The War of Secession.—At the beginning of the War of Secession the field artillery of the United States army consisted of eight batteries, two from each of the four regiments maintained in the regular service. These were quickly augmented by converting most of the regular artillery into field batteries, and by raising volunteer organiza-

— inches. This barrel is also fitted for breech-loading; and thus we may learn that it has taken three centuries to develop breech-loading and rifled cannon into their present position. We now have the most perfect machinery at our disposal, without which we could no more construct guns, or mountings, or projectiles, than our forefathers could; and, what is quite as essential to success, we have scientific instruments of accuracy with which to study results and learn where improvement is needed."—*Lloyd and Hadcock*.

tions, until in the Army of the Potomac alone the number of light batteries numbered ninety-two, aggregating 12,500 men and 520 guns. The field guns consisted of 3-inch rifles and 12-pdr. Napoleons. Though the latter guns had been discarded in Europe after the Italian war, they were fortunately retained in our service, half the batteries being armed with them. They did excellent work, being better than the rifled guns at the shorter ranges, and were employed until the end of the war. At the request of General Buford, several horse batteries were armed with Napoleon guns; but most of the horse artillery was supplied with rifled pieces. In the latter part of the war each horse battery had both guns in equal proportions. The extreme effective range of the 3-inch rifled "Ordnance gun" was nearly 2,800 yards; that of the 12-pdr. Napoleon, 1,520 yards.* Beyond 600 yards, however, the effect of the fire of the smooth-bore guns was very uncertain; and at a range of 1,000 yards only a third of the shot could be depended upon to hit a target six feet high and fifty yards long.

(In the Army of the Potomac, each field and horse battery contained at first six pieces, though in the latter part of the war the number was reduced to four.) Four batteries were assigned to each division, and when several divisions were organized into a corps, at least half of the divisional batteries were grouped into a corps reserve. For the army, a reserve of 100 guns was provided, consisting of field and position batteries, and all the horse artillery not employed with masses of cavalry. One of the batteries assigned to each division was a regular battery, whose captain commanded all the divisional artillery. In the Gettysburg campaign the horse artillery was attached to the cavalry corps. It consisted of twelve batteries, and was divided into two brigades, each commanded by its senior captain. Later in the war the horse artillery consisted of two brig-

*Ranges obtained at the Washington Arsenal, in 1865, with elevations of 10 and 5 degrees respectively.

ades of eight and ten batteries respectively; the former being detached with the cavalry corps, and the latter belonging to the artillery reserve. In 1863 the divisional artillery was abolished, and all the batteries of each corps were consolidated into an "artillery brigade," which organization was retained until the close of the war. The number of batteries in a brigade varied; being in some cases as low as four, and in others as high as twelve. In the campaign of 1864 a battalion of foot artillery was attached to the artillery brigade of each corps, for guard and escort duty, and to furnish a reserve of men for the batteries. In the same campaign the artillery reserve was broken up, owing to the wooded nature of the theater of operations; but it was again organized during the siege of Petersburg.

The organization of the artillery of the Western armies differed somewhat from that of the Army of the Potomac. In those armies a battery of artillery was assigned to each brigade of infantry, and this vicious organization was retained until after the battle of Chickamauga (September 19-20, 1863). After that battle, the brigade artillery was united as divisional artillery, and a general reserve was organized in the Army of the Cumberland. A similar organization was adopted by the Army of the Tennessee about the same time.

In the Confederate Army of Northern Virginia the artillery organization was practically the same as the one since adopted in Europe and now in almost universal use. To each division a "battalion" of artillery, generally consisting of four batteries, was assigned. There were also two battalions of corps artillery in each army corps. There was no general reserve.*

Almost from the beginning of the war, the field artillery in the United States armies was noted for its excellence, and was spoken of in terms of the highest praise,

*There was at first a large artillery reserve, but, early in 1863, it was broken up and the batteries were distributed among the corps.

not only by foreign observers, but by its own opponents. In the Army of the Potomac it was especially good, being, fortunately, during the greater part of the war, under a chief, General Henry J. Hunt, whose ability as an organizer and a commander of artillery place him in the same rank with Lichtenstein, Senarmont, and Drouot. The topography of the battle-fields often limited the use of artillery, and in some instances, as at the Wilderness, practically ruled it off the field; but whenever suitable opportunities were presented for its employment, it was used with gallantry, skill, and effect.

The first important use of artillery in the War of Secession was at Shiloh, where Grant placed in position, about half a mile from the Landing, two batteries of heavy siege guns, to which he added the batteries and parts of batteries of field artillery which drifted to the rear as the Union troops were pushed back. Some fifty guns were thus assembled, which were manned by detachments of artillery and infantry volunteers. Towards the close of the first day's battle, only this line of guns, supported by about 4,000 infantry, remained to oppose the victorious Confederates; but under the heavy fire of the great battery, the assailants were checked, and the tide of battle first began to turn in favor of the Union army.*

In the battle of Malvern Hill (July 1, 1862) the United States artillery played a very important part; all the Confederate attacks being met with an overwhelming rain of shrapnel from the Union batteries, and the final and most desperate charge, encountering the fire of "an almost continuous battery of sixty pieces," skillfully posted and directed by General Hunt. Of this battle General D. H. Hill, of the

*The number of guns in this important battery is a matter of considerable doubt. Different authorities (apparently all reliable) place it at "twenty or more," "twenty-two," "thirty-five to fifty," "some eighty," etc. Of one thing, however, there can be no doubt; namely, that the advance of the Confederates was finally checked by the fire of a "scratch" battery containing many pieces.

Confederate army, says: "Our loss was double that of the Federals at Malvern Hill. Not only did the fourteen brigades which were engaged suffer, but also the inactive troops and those brought up as reserves too late to be of any use met many casualties from the fearful artillery fire which reached all parts of the woods. Hence, more than half the casualties were from field pieces—an unprecedented thing in war."*

At the battle of Stone River (January 2, 1863) a most effective use of artillery was made by Major Mendenhall, the chief of artillery of the left wing. Van Cleve's division having been attacked by a superior force under Breckenridge, was, after a brief resistance, driven back in great disorder; but the victorious Confederates, while in the full tide of success, suddenly encountered the fire of fifty-eight guns massed by Mendenhall, which first checked their advance, and then drove them back in confusion. "Before this battle," says General Crittenden, "I had been inclined to underrate the importance of artillery in our war, but I never knew that arm to render such important service as at this point. The sound judgment, bravery, and skill of Major John Mendenhall, who was my chief of artillery, enabled me to open fifty-eight guns almost simultaneously on Breckenridge's men and to turn a dashing charge into a sudden retreat and rout, in which the enemy lost 1,700 or 1,800 men in a few moments. I witnessed the effect of this cannonade upon the Confederate advance. Mendenhall's guns were about 100 yards back from the river. Van Cleve's division of my command was retiring down the opposite slope, before overwhelming numbers of the enemy, when the guns, the fire of which had been held until our men should no longer be exposed to it, opened upon the swarming enemy. The very forest seemed to fall before our fire, and not a Confederate reached the river."† The

*"Battles and Leaders of the Civil War," Vol. II., p. 394.

†Ibid., Vol. III., p. 633.

effect of this tremendous fire being supplemented by a charge of four brigades of infantry, Breckenridge was driven back to the position from which he had emerged to the assault.

At Chancellorsville (May 2, 1863) General Pleasonton, first gaining time by the sacrifice of a regiment of cavalry in a charge upon the enemy, assembled twenty-two guns in a continuous battery, and met Stonewall Jackson's attack with a well-directed and rapid fire of double-shotted canister.* In twenty minutes the Confederate advance was checked.

Another conspicuous use of the concentrated fire of field artillery was made at Gettysburg (July 3, 1863), where General Hunt assembled eighty guns, first to reply to the fire of 120 guns with which the Confederates opened upon the Union position, and afterwards to oppose the assault of the Confederate infantry. After replying deliberately for some time to the enemy's cannonade, Hunt ceased firing, for the double purpose of reserving his ammunition for the assault which he foresaw to be inevitable, and, at the same time, to induce the enemy to believe that the Union batteries had been silenced, and thus precipitate the attack. When the Confederate infantry advanced, it was received with a terrific artillery fire, and it would probably have been stopped before it encountered the Union infantry, had not some of the batteries, acting under the orders of their corps commander, exhausted their long-range projectiles before the assault began.†

*See p. 234 *ante*.

†"The steady fire from McGilvery and Rittenhouse on their right caused Pickett's men to 'drift' in the opposite direction, so that the weight of the assault fell upon the positions occupied by Hazard's batteries. I had counted on an artillery cross-fire that would stop it before it reached our lines, but, except a few shots here and there, Hazard's batteries were silent until the enemy came within canister range. They had unfortunately exhausted their long-range projectiles during the cannonade, under the orders of their corps commander, and it was too late to replace them. Had my instructions been followed here, as they were by McGilvery, I do not believe that Pickett's division would have reached our line."—*Gen. Hunt, in "Battles and Leaders of the Civil War," Vol. III., p. 375.*

Many more instances of the effective use of field artillery in the War of Secession might be cited; but they were entirely on the defensive, and the war presents few or no illustrations of the preparation of an infantry attack by an effective cannonading of the enemy's position. (The range of the guns then in use did not admit of the concentration of the fire of such powerful masses of artillery as those which can now be brought to bear upon the objective of the infantry attack; and many other causes combined to prevent the fullest use of artillery in this important function. Chief of these were the wooded and broken nature of many of our battle-fields, the limited and ill-defined authority of the chiefs of artillery, and the lack of appreciation of the proper tactical use of artillery sometimes evinced by corps and division commanders. To illustrate these conditions, the following facts may be cited: In the battle of Spottsylvania the terrain was so heavily wooded that the direction of the attack had to be determined by the compass; and on such ground artillery could neither be massed in good positions, nor its fire directed upon a visible target. At Fredericksburg (December 13, 1862) Hunt covered the crossing of the Army of the Potomac over the Rappahannock with the fire of 149 guns posted on Stafford Heights; but as soon as the crossing was effected, the divisional batteries rejoined their divisions, and in no case was the attack upon the Confederate position prepared by such fire as to silence the enemy's artillery and shake his infantry. Hunt was not informed of the intended attack by Meade and Gibbon, which he could have supported by the fire of a hundred guns drawn from the divisional artillery, most of which stood idle in the streets of Fredericksburg.* At Gettysburg, Lee assembled 120 guns, "apparently in one unbroken mass," with which he opened a furious fire upon the Union position; but the fire, instead of being concentrated on a

*Gen. Hunt, in a paper on "Artillery Administration," read before the Massachusetts Historical Society, in 1888.

* { decisive point, was scattered along the whole front of the opposing army, and had no appreciable effect on the attack which followed.

In the Western armies the offensive use of artillery was still less. For instance, at Kenesaw Mountain (June 27, 1864) the attack was preceded by a puny artillery fire, the only effect of which was to warn the enemy of the approaching attack, and rouse him to active measures to receive it. So ineffective, in fact, had the artillery preparation generally been in the Western armies, that Gen. Hazen, in his attack on Fort McAllister (December 13, 1864), dispensed with a preliminary cannonade altogether, as a proceeding which would only forewarn the enemy, without appreciably aiding the attack.

This unsatisfactory preparation of infantry assault by artillery fire must be attributed to causes for which that arm was not itself responsible; for besides the superb defensive use of artillery almost uniformly made, the individual batteries were handled with skill and great gallantry on the offensive. The guns were not infrequently pushed forward to the skirmish line; and at Spottsylvania the artillery, when it could be employed at all, was used with unparalleled daring. In that battle a section [platoon] of Battery C, 5th U. S. Artillery, and a section [platoon] of Brown's Rhode Island Battery, dashed forward ahead of the infantry, and, though under a heavy rifle fire from the enemy, fired from nine to fourteen rounds of double canister, at close range, into the Confederate works, with frightful effect. The guns were abandoned only when *all* the cannoneers and drivers had been killed or wounded.

* { The War of Secession gave the tactics of artillery a long stride forward. It developed the use of masses of guns to an extent unknown since the days of Napoleon; it infused into the handling of that arm a degree of audacity foreshadowing the tactics of 1870; and if its offensive use in masses had not been all that could be wished, it was due to causes beyond the control of the arm itself.

The Austro-Prussian War.—In the Seven Weeks' War between Austria and Prussia, in 1866, each of the armies took the field with a large and well-appointed force of artillery. In the Prussian service four batteries were assigned to each infantry division, and in the First Army (commanded by Prince Frederick Charles) there was a general reserve of sixteen batteries, besides which one of the corps had a reserve of four batteries. In the Second Army (commanded by the Crown Prince) there was no general artillery reserve; but each corps had a reserve of from five to seven batteries. Two horse batteries were attached to each cavalry division, and one of the cavalry corps had an additional horse battery as a reserve. There was accordingly a combination of divisional, corps, and reserve artillery. Each field battery contained six guns, which were generally steel, breech-loading, rifled cannon, though the 12-pdr. smooth-bore had not altogether disappeared.* The rifled pieces were designated as 6-pdrs. and 4-pdrs., though the larger gun fired a shell weighing fifteen pounds, and the smaller one used a similar projectile weighing nine pounds.† Shell fire was almost exclusively used, and the shells were all provided with percussion fuses. The horse batteries were armed with 4-pdr. rifles. The proportion of artillery in the Prussian army at the battle of Königgrätz was 3.6 to 1,000 men.

The Austrian artillery differed from that of the Prussian army in several important features of organization and *matériel*. Its guns were muzzle-loading rifles, designated as 8-pdrs. and 4-pdrs., and each battery contained eight pieces. The system of brigade artillery, which had been discarded after thorough trial in America, was still retained in the Austrian service, a battery of 4-pdrs. being attached

*Thus in the Guard corps one-third of the field guns consisted of 12-pdr. smooth-bores.

†These guns were classed not according to the weight of the projectile, but according to the diameter of the bore. Thus the gun firing a 15-lb. shell was rated as a 6-pdr., because the diameter of its bore was the same as that of a 6-pdr. smooth-bore gun.

to each infantry brigade. Four field and two horse batteries were attached to each corps as reserve artillery.* A rocket battery was also attached to each corps; brigade artillery and rocket batteries appearing for the last time in this campaign.

The Prussian artillery was handled in a remarkably impotent manner in this war. Its *personnel, matériel*, and training bespoke for it a brilliant part in the campaign; but in no case did it exert an appreciable influence in deciding the battle. Although equaling in number of pieces the opposing artillery, it was so poorly handled that on only one occasion in the whole war did it succeed in gaining a numerical superiority in battle over its opponent. At Trautenau (June 27, 1866), though the Prussians had ninety-six guns, they brought only thirty-two into action. Forty-two guns remained in the immediate vicinity without firing a shot, and the rest were not even brought on the field. In all the other battles up to Königgrätz the same condition existed—plenty of Prussian artillery, but only a small portion of the guns brought into action, and those without appreciable effect. At Königgrätz (July 3, 1866), where the attack of Frederick Charles should have been prepared by a vigorous cannonade upon the Austrian position, the Prussian batteries, according to Captain May, “planted themselves here and there among the reserves, and never found places anywhere to engage.” The Prussian artillery seems to have been afraid of encountering infantry fire, and to have had a bad habit of withdrawing to refit and to renew its ammunition. On the march it was generally kept too far to the rear, and, owing to its inefficient action, the infantry, long before the close of the campaign, showed a disposition to despise its help, and to hurry into action without it, crowding the roads and refusing to make way for the guns to pass.

(The Austrians far surpassed their adversaries in the

*Three of the corps had, however, but five batteries each.

skill and effectiveness with which they handled their artillery.) From the beginning of the campaign, it was an important factor in every engagement, and at Königgrätz it was handled superbly. On the heights between Lipa and Langenhof 160 guns were concentrated in a great battery, and on the entire line opposed to Frederick Charles 250 guns belched forth such a "hailstorm of shells" as to baffle the attack and hold the Prussians at a standstill. When the arrival of the Crown Prince's army turned the tide of battle against the Austrians, the artillery of the latter heroically kept its position until the Prussian infantry was at the very muzzles of the pieces; and, at the sacrifice of many guns and many lives, it made repeated stands to cover the retreat of the infantry. But great as was the value of the Austrian batteries in this campaign, their use was entirely defensive, and the Austrian artillerymen originated no novel features of tactics and taught the military world nothing new. ★

The Franco-German War.—Among the critics whose comments were turned against the Prussian artillery for its feebleness in the war of 1866, none were so severe as the Prussians themselves; and with a freedom from bigotry and a determination to improve, the artillery officers set earnestly to work to remedy the defects of their arm. The result was apparent four years later in a use of artillery so brilliant and effective as to raise that arm to a degree of importance which even the Napoleonic and American wars had not given it. ★

The changes in organization and nomenclature foreshadowed the aggressive tactics upon which the Prussian artillery had resolved. The reserve artillery disappeared both in fact and in name, and divisional and corps artillery alone were employed. Each division had four batteries of field artillery, and in each corps the "corps artillery" consisted of four batteries of field and three of horse artillery,

making a total of fifteen batteries, aggregating ninety guns, to each corps.*

Each cavalry division had two batteries of horse artillery. The guns were all steel, breech-loading rifles, 6- and 4-pdrs. Half of the field batteries were armed with the former, and half with the latter caliber. The horse batteries were all armed with the latter. Shells with percussion fuses were almost exclusively used. The proportion of the artillery was 3.7 guns to 1,000 men.

In the French army also the artillery was divided into divisional and corps artillery; the former consisting of three batteries of guns and one of mitrailleuses to each infantry division, and a battery of horse artillery to each cavalry division; while the latter consisted of five batteries to each corps. Each battery of guns and mitrailleuses containing six pieces, and each corps being composed of from two to four divisions of infantry and one of cavalry, the total number of guns to a corps varied from seventy-two to 108, and the number of mitrailleuses from twelve to twenty-four. The guns were muzzle-loading rifles, 8- and 4-pdrs. A few 12-pdr. Napoleon guns seem also to have been used. The mitrailleuse was a machine gun consisting of thirty-seven rifled steel barrels fitted and soldered into a wrought-iron tube somewhat resembling a field-piece. It was a "volley gun," the barrels being fired simultaneously. The proportion of artillery, exclusive of mitrailleuses, was three to 1,000 men.

From the beginning of the campaign, the French artillery was out-numbered, out-maneuvered, and out-fought. The Prussian guns were handled with audacity and skill, and made their power felt from the beginning of every battle to its close. At Wörth (August 6, 1870) a great battery of 120 guns, which came into action in the preparatory phase

*The entire artillery of an army corps, as given above, consisted of one regiment, divided into three "abtheilungs" of light and one of horse artillery, each abtheilung containing four batteries, except the horse abtheilung, which consisted of three. The German corps contained two infantry divisions.

of the fight and covered the deployment of the infantry, poured an unceasing and concentrated fire upon the French, while the batteries of the latter, coming into action piecemeal, were speedily knocked to pieces. In the frontal attack of the V. Corps on Fröschweiler, in the same battle, the artillery was employed on the skirmish line. At Colombey (August 14) and at Mars-la-Tour (August 16) the reconnaissance was begun by the artillery, and in the latter battle that arm was employed with extraordinary skill and daring. It being of importance to carry the French position at the village of Flavigny, the fire of eight batteries was concentrated upon it, and the village was soon in flames. "Two dense columns of infantry," says Hoffbauer, "issuing suddenly from the farm buildings to the northeast and southeast, were shelled by the whole of the batteries at a range of 1,500 or 1,600 paces, and retreated on Rezonville, leaving the ground literally covered with corpses; while strong French columns which advanced from the hill to re-occupy the village met the same fate. It is reported by the artillery that the occupation of Flavigny was then effected by the infantry without much fighting, although the conflict up to that time had been most bloody."* Later in the day, nineteen batteries, massed under one commander, in the German center, repulsed repeated attacks of the French infantry, which was invariably stopped at a distance of at least 800 paces from the guns. Far from displaying the timidity in regard to infantry fire which it had shown four years before, the artillery was now pushed forward almost with rashness. In the X. Corps seven batteries were advanced to the hills of Tronville (a position of great importance) ahead of the infantry, and by their fire quickly checked the French attack. In this battle "some of the batteries lost all their officers; others all, or nearly all, their horses; while a few lost nearly three-fourths of their men."†

*"The German Artillery in the Battles near Metz," by Captain E. Hoffbauer (tr. by Hollist), p. 82.

†Hoffbauer.

In the battle of Gravelotte (August 18) there was a striking exemplification of the value of artillery fire in preparing and supporting an infantry attack. To prepare the way for an assault by the infantry of the Prussian Guards, a fire of eighty-four guns was concentrated upon the French position at St. Privat, the cannonade continuing for more than half an hour, at first at a range of about 2,200 yards, and later at about 1,650. The enemy's guns having apparently been silenced, it was assumed that the French infantry had also been badly shaken by the cannonade, and the attack was ordered. The Guards advanced with great gallantry; but the artillery had produced but little effect on the opposing infantry, the French guns had merely suspended their fire to await the assault, and the Prussians were received with such a storm of rifle bullets and shrapnel as to stop their progress, with fearful loss, at a distance of 500 to 800 yards from the position.* The batteries were then reinforced until they numbered 192 guns, and they again opened fire upon St. Privat, at ranges from 1,650 to 1,000 yards. Finally, after a furious cannonade of nearly two hours, the village was in flames, the stone houses and walls were demolished, all the French batteries in the vicinity were driven away, and the Guards and the Saxon infantry assaulted the position and carried it.

★ Sedan (September 1) was the great artillery battle of the war, and, indeed, the greatest recorded in all military history. In this battle the German batteries, aggregating 540 guns, formed a veritable "circle of fire" around MacMahon's army, upon which they showered their projectiles from all sides. Attempts of the French infantry to advance against the encircling masses of guns were repeatedly checked by the fire of the latter, generally at a distance of fully 2,000 paces. All accounts concur in regard to the fearful effect of the German artillery fire in this battle. Gen. Douay, commanding the French VII. Corps, declares: "Our adver-

*See p. 98 *ante*.

saries reduced us, so to speak, by their artillery fire alone, for it was only toward the end of the battle, when their guns had crushed and partly disorganized our batteries, our infantry, and our cavalry, that their troops advanced in considerable numbers." Similar statements are made by Generals Ducrot and Le Brun, the other corps commanders; and a correspondent of the London *Daily News*, who passed over the field the next day, wrote: "The ghastly wounds inflicted on most of the French dead whom I saw upon the hill showed that they had fallen under an artillery fire; and the ground was in many places so plowed up that a blanket could scarcely have been laid on it without covering some spot where a shell had exploded." The German "Official Account" says: "The German artillery in the battle of Sedan produces an especially grand and decisive effect. Only the surprise undertaken during the morning mist towards Bazailles, as demanded by this sort of attack, is made by the infantry alone, but at all parts of the extensive battle-field the whole strength of the batteries is brought into play from the outset. Inserting themselves in the columns of route in a position favorable to early deployment, they hasten forward to the battle-field with the advanced parties of the infantry. The batteries of the V. and XI. Corps, which have to traverse the difficult road-defile at the Bois de la Falizette, deploy, trusting mainly to their own strength, in one long line, though in view of the hostile masses of horse threatening them and with their backs to the Belgian frontier. As a general rule, the attack of the infantry is deferred until the artillery has produced its full effect. From the Calvaire d'Illy the enemy is almost exclusively driven off by the fire of the guns, whereupon a few companies take possession of this important height without a struggle. The shells bursting thickly in the Bois de la Garenne prepare the attack of the battalions of the Guard and spare the tremendous losses with which previous victories had been purchased."

The characteristic features of the artillery tactics of the Franco-German War may be summed up as follows: On the march, the German artillery was no longer kept in rear of columns of infantry, but was pushed well to the front, being preceded by only enough infantry to protect it from surprise. It was brought into action at the very first opportunity, and almost invariably in large masses, which concentrated their fire upon the objective of the infantry attacks. Its fire was, in almost every case, deliberate and accurate, and was employed at ranges varying from 3,300 to 650 yards; while the French wasted their ammunition in a rapid fire at ranges too long for the best effect. The French committed the further fault of retaining their batteries too long in reserve, and employing them too often singly instead of in masses. The mitrailleuse did not meet the high expectations that had been formed of it, though its effect was sufficient to foreshadow the extensive use of machine guns in future wars. Borbstaedt acknowledges that these guns did "produce a considerable effect, partly from the strange rattling noise they made, partly from the rapidity with which an immense number of projectiles were fired"; and he says: "It cannot be denied that the French mitrailleuses caused heavy losses to the attacking German troops, especially in positions where it was possible to keep them concealed till the decisive moment had arrived."* The mistake of pitting these guns against the German field artillery was frequently and disastrously made by the French. They were good only in the defense of positions.

The Russo-Turkish War.—The Russian artillery in 1877 was inferior to that of Prussia seven years before, in organization, *matériel*, and tactical handling. It was divided into field and horse artillery, the batteries of the former having eight, and those of the latter six guns. The field batteries were organized into brigades of six batteries each, and one of these brigades was attached to each infantry

*"The Franco-German War" (tr. by Dwyer), p. 154.

division. Two horse batteries were attached* to each cavalry division. There was no general reserve of field artillery, and all the artillery of the corps was divided among the infantry divisions. The guns were bronze, breech-loading rifles, the heavy guns being 9-, and the light 6-pdrs. Half of the batteries of each brigade were armed with guns of the former, and half with those of the latter caliber. The horse batteries were armed exclusively with 4-pdrs. The projectiles used were shell, shrapnel, and canister.* The proportion of artillery in the Russian army was 3.9 guns to 1,000 men.

In *matériel* the Turkish artillery was superior to that of the Russians, being composed of Krupp steel, breech-loading, rifled guns, of 8 and 9 centimeters caliber. The Turks had, however, only 2.2 guns per 1,000 men.

In few cases only was the Russian artillery used with appreciable effect in the campaigns in Turkey. At Lovtcha (September 3, 1877) the Russian artillery cannonaded the Turkish position for eight hours before the infantry assaulted. The effect of this fire was such that the infantry attack succeeded easily and with slight loss. At the battle of Aladja Dagh (October 15, 1877) the Russians concentrated the fire of sixty-four guns upon a portion of the Turkish lines, and after an effective cannonade of six hours at a range of 1,500 yards, the position was easily carried by the infantry. The battle of Telis (October 28, 1877), where the concentrated fire of seventy-two Russian guns caused the surrender of a redoubt without the necessity of an infantry assault, furnishes the only other instance in which the Russian artillery was used with noticeable effect. "With these few exceptions," says Greene, "it contributed to no victory, and averted no defeat. It consumed several thousand tons of ammunition, transported with enormous difficulty and expense, it hammered away at earthworks for weeks at a

*The shell and shrapnel for the 9-pdr. gun weighed 24.30 and 29.48 lbs. respectively. The corresponding projectiles for the 4-pdr. gun weighed 12.6 and 15.19 lbs. respectively.

time without producing any substantial result, and the total losses inflicted by it were probably but little over one per cent of those inflicted by the infantry, and these were nearly all by shrapnel."* The same authority attributes the inefficiency of the Russian artillery largely to the fact that the Turkish rifle fire kept the Russian guns at distances of 1,000 yards or more, and that at such ranges the angle of fall of the projectile was so great with the guns then in use, that the shell generally buried itself in the ground and expended its whole force in throwing up a cloud of earth, while the pieces remained in the crater.

According to Von Trotha, the slight effect of the Russian artillery was due to the distribution of the batteries along the general line instead of massing them; to opening frontal fire at very long ranges and making no attempt to use enfilade or oblique fire; to the fact that the frontal positions of the artillery rendered it necessary to suspend its fire almost as soon as the infantry attack commenced; to the failure of the batteries generally to follow up the infantry attack and support it; and, above all, to the fact that it was almost invariably used against infantry behind natural or artificial cover—a condition, it may be remarked, which had often been encountered in the War of Secession, but rarely in the Franco-German War.

Since the Russo-Turkish War, there has been no conflict of sufficient magnitude to bring into use any considerable force of field artillery; and practical experience in the tactics of that arm virtually ceases with the year 1877.

In considering the history of field artillery, it is evident that the development of that arm has been on the same lines as the development of infantry; namely, increased mobility and more effective fire action. The whole end and aim of artillery tactics has been to bring an overwhelming fire upon some part of the enemy's line at a critical period of the battle. In the early days of artillery, the

*"Russian Campaigns in Turkey," p. 454.

limited mobility of the guns rendered it difficult to assemble them in masses, and their short range made a concentration of the fire of many pieces quite impracticable. As their mobility increased, they were easily moved from one part of the field to another and massed in great batteries; and it became possible to have them in the right place at the decisive moment, while their increased range enabled a fire of many guns to be concentrated upon a single point. With the enormous range of the present artillery, the guns can turn their fire upon many parts of the hostile line without even changing their position; and their great mobility and the destructiveness of their projectiles have further added to their power to such a degree that it seems probable that field artillery will, in future wars, play a part compared with which even its greatest achievements in the past will seem insignificant.

CHAPTER IX.

ARTILLERY IN ATTACK AND DEFENSE.

"The artillery is the indispensable companion of the infantry. It makes room for the latter where it is not able to force its way single-handed. It prepares the way for the battle, shields the foot soldiery from unnecessary losses, when the best forces would be wrecked by too great impediments, and provides it with covering and defense when it is compelled to retire."—*Von der Goltz.*

General Theory of the Employment of Artillery in Attack.—To appreciate fully the part played by artillery in attack, let us first suppose an assault made by an army composed exclusively of infantry upon a position defended by infantry and guns. Long before the attacking force reaches

a position where it can use its rifles with effect, it is opened upon by the hostile guns, and the shrapnel dropping in the midst of the columns compels a deployment before the requirements of fire action demand such a movement, and while considerations of mobility make the retention of columns desirable. The advancing troops suffer from a fire which they cannot return; an instinctive impulse of self-defense causes them to open fire at long range; the enemy is encouraged by the ineffective volleys or wild individual fire of the assailants, and by the time the latter arrive within effective rifle range of the position, they are so shattered by the fire of the artillery, so out-of-hand by the long advance in deployed order, and so demoralized in fire discipline, that they fall an easy prey to the defender's infantry, even if they be not checked by the artillery fire alone. Artillery is, then, primarily necessary to oppose the guns of the defense, in order that the infantry may take up, at comparative leisure and in comparative safety, a suitable formation for attack. Afterwards, to protect the infantry from a fire which it cannot effectively return, the artillery must open such a cannonade upon the defender's batteries as to cause them in self-defense to turn their attention from the foot troops to the assailant's guns. This causes a duel between the opposing batteries, which is generally carried on at ranges varying from 3,000 to 2,000 yards, and continued until the guns of the defender are silenced or the assailing batteries find themselves unable to continue the contest. In the former case, the infantry advances as soon as the defender's guns are silenced.

Even when the assailant's artillery has demonstrated its superiority over that of the defender, a permanent silencing of the latter can hardly be hoped for; and, indeed, the cessation of fire may be due merely to a husbanding of ammunition for the more decisive stages of the fight. The infantry must, therefore, still expect in its advance to encounter the fire of hostile guns; and to prepare the

way for the attacking troops, the artillery must still be prepared to crush with a superior fire every hostile battery which opens upon the attacking infantry. But the infantry of the assailants, even if the fire of the defender's guns be entirely diverted from it, is still subjected to the fire of the hostile infantry, which, in a stationary position, protected by intrenchments, and firing at known ranges, can paralyze the advance of its opponent by the superior effectiveness of its fire. It is necessary, then, that the artillery should turn its attention to the infantry of the defenders, which it must endeavor to overwhelm with such a storm of shrapnel as to shake its *morale*, impair the accuracy of its fire, and neutralize the advantage which it would otherwise have over the infantry of the attack. The latter may thus be enabled to approach within effective rifle range before opening fire.

After the infantry is well committed to the assault, the artillery must continue to lend its aid to the attacking troops, part (when the nature of the terrain renders it practicable) continuing to fire upon the enemy over the heads of the advancing infantry, and part pushing ahead with the latter and engaging the enemy at short range, without, however, exposing itself to effective rifle fire. Thus the blows which the defender's guns would deliver upon the attacking infantry are warded off, as it were, by the assailant's artillery; the rain of bullets showered upon the defender is intensified by a storm of shrapnel; and the *morale* of the advancing infantry is strengthened by the support of its "indispensable companion."

If the attack be repulsed, the lines of artillery furnish a solid support upon which the infantry can rally. If the attack be successful, the batteries are quickly rushed forward to the captured position, in order that they may check with their fire the attempts of the enemy to recover the lost ground.

Starting with this epitome of the part played by the artillery in the attack, we may proceed to a more extended consideration of the offensive tactics of that arm.

FORMATION AND POSITION.

Simplicity of Artillery Tactics.—So far as formation and maneuvers on the field of battle are concerned, the tactics of artillery is much simpler than that of either of the other two arms; for artillery always fights in line, and the advance in column or route, the deployments therefrom, and the advance in line comprise all of its essential maneuvers.* The intervals between the guns in action should not be less than ten yards, in order that the battery may not present too dense a target to the guns of the enemy; nor should they be more than forty yards, lest the firing of the battery be beyond the observation and control of its commander. The guns may, however, be placed temporarily at considerably greater intervals when an extended line is to be held by a portion of the artillery pending the arrival of the rest. An accurate alignment of the battery is unnecessary, and is generally impracticable, as the position of the guns will depend upon the configuration of the ground; but no piece should be advanced so far as to interfere with the field of fire of the others.

Requirements of a Good Position.—The value of artillery depending solely upon the efficacy of its fire, the first requirement for a good position is a clear open range to the front and flanks to the limit of effective fire. Independently of the question of efficacy of fire, a clear view is necessary in order that the progress of the action may be observed and flank attacks detected and guarded against, either by a change of position or a demand for support. The general front should be perpendicular to the line of

*"Judging by my own experiences in war—and you will own that in matters connected with artillery they are fairly numerous—the only movements which are of use in the field are, the advance in column of route, deployments, and the advance in line."—Hohenlohe, "Letters on Artillery" (tr. by Walford), p. 188.

fire; and the position should be of sufficient extent to provide room not only for the guns which are to be immediately placed, but also for those which are to follow. Facility of movement to the front and rear are most important considerations, and lateral communication should be insured by making passages through, or over, all intervening fences, hedges, or ditches. There should be no cover that could shelter infantry skirmishers within 1,000 yards of the guns; but as few positions can be found that are free from this objection, care should be taken to secure, if possible, an effective fire upon the entrance and exit of such shelter.

The flanks of a line of guns are peculiarly weak points, and attacks upon them must be guarded against with great care. The ground on the flanks should be carefully reconnoitered before the guns occupy the position, and reliable non-commissioned officers should be stationed there in observation until the ground is occupied by supporting troops. It may sometimes be practicable to dispose the guns in echelon toward the flank, so as to make a prompt change of front to meet an attack from that direction; but this formation would limit the field of fire, and is not always permitted by the nature of the ground. An impassable obstacle, such as a river, marsh, or precipitous ground, furnishes complete protection for the flank of a battery, but limits its forward movement.

(A marsh, railroad cut, canal, sunken road, or ravine in front of the position destroys the effect of all the hostile shells which fall just in front of the battery, and, moreover, renders it difficult for the enemy to make such observation of the falling shells as to enable him to get the range; but such ground also impedes the forward movement of the guns.) For the position itself, marshy ground is extremely undesirable, as it renders difficult the movement of the guns by hand, which is often required. Clay, soft meadow, and plowed ground minimize the effect of the enemy's projectiles, but stony ground increases it. A stone wall

affords protection from infantry fire, but it would soon be knocked to pieces by artillery, the effect of the projectiles being, moreover, heightened by the splinters and fragments of stone.

A gentle slope of 1 in 100 is generally regarded as the most favorable ground in front of a position, though this is not so important now as it was in the days of smooth-bore guns, when so much reliance was placed upon ricochet, and especially upon rolling fire. It is still a very desirable slope, however, as it gives an extended dangerous area to the time shrapnel and facilitates the ricochet of the fragments. The advantages of a moderately steep slope from the position toward the enemy are, however, not inconsiderable, as such a slope enables the artillery to fire over its own advancing infantry, and renders the ricochet of the enemy's bullets ineffective. Opposed to these are the disadvantages that the plunging fire upon the enemy is comparatively ineffective, as the percussion fuses have much of their effect destroyed by too deep penetration into the soil, and the area of the time shrapnel is diminished by the high angle of fall. On the whole, a position as low as is consistent with command over the ground in front is the best. A position lower than that of the enemy's batteries should be avoided, as it would be difficult to find cover for the limbers and caissons. The most favorable ground in rear of the battery is that which presents sufficient level space to provide for the recoil of the guns, and then a short, *steep*, slope to cover the limbers and caissons. This rear slope should be steep, for protection is not obtained by mere concealment; on the contrary, if the rear slope be a gentle one, the limbers and caissons will catch more of the projectiles which miss the guns than they would if they were on level ground.* It is

*In his description of the great artillery duel at Gettysburg, General Hunt says: "I rode to the Artillery Reserve to order fresh batteries and ammunition to be sent up to the ridge as soon as the cannonade ceased; but both the reserve and the train had gone to a safer place. Messengers, however, had been left to receive and convey orders, which I sent by them; then I returned to the

often practicable to select a position slightly in rear of the crest of a ridge, the pieces being withdrawn as far as possible without losing command over the ground in front. A position on a very steep slope is especially disadvantageous in repelling an infantry assault, owing to the impossibility of depressing the guns sufficiently to sweep the immediate front of the position. (This was a great defect—perhaps a fatal one—in the position of the Confederate artillery at Missionary Ridge.)*

The position selected should not be in the vicinity of a conspicuous object. Von Dresky describes an artillery action near Santeau, in December, 1870, in which an "abtheilung" of horse artillery unlimbered at a conspicuous salient point of a wood, to which the range had been found by the French, whose very first shells fell in the midst of the German batteries with destructive effect. It is also of importance that the batteries should not have an immediate background, such as a wall, hedge, house, or grove, which would enable the enemy to see whether his guns were properly ranged by observing whether the shells burst short or over. A position on the crest of a slope where the guns stand out clearly against the sky-line is also objectionable, as furnishing too conspicuous a target. A position from 100 to 300 yards in rear of a hedge, wall, or line of trees, over which the guns can fire, is generally very

ridge. Turning into the Taneytown pike, I saw evidence of the necessity under which the reserve had 'decamped,' in the remains of a dozen exploded caissons which had been placed under cover of a hill, but which the shells had managed to search out. In fact, the fire was more dangerous behind the ridge than on its crest."—"Battles and Leaders of the Civil War," Vol. III., p. 373.

*"Bragg and Hardee were at the center, urging their men to stand firm and drive back the advancing enemy, now so near the summit—indeed, so near that the guns, which could not be sufficiently depressed to reach them, became useless. Artillerymen were lighting the fuses of shells and bowling them by hundreds down the hill."—"Battles and Leaders of the Civil War," Vol. III., p. 726.

Major Arthur MacArthur, Jr., U. S. A., who, as adjutant of the 24th Wisconsin Infantry, participated in the assault on Missionary Ridge, writes, in response to inquiries by the author: "I have never doubted that the Confederate defeat on that occasion was largely, if not entirely, due to the location of their batteries on the crest of a slope so high and steep as absolutely to preclude the possibility of effective fire."

desirable, as the exact location of the battery will puzzle the enemy; but the guns should in no case be immediately behind the screening object, to which the range could readily be found. When troops are posted on a ridge with spurs extending to the front, the guns would be more safely placed in the reëntering angles, the protecting infantry being at the salients; but, the most effective use of artillery requiring an extended field of fire, it would generally be better to place the batteries at the salients and protect them by posting infantry skirmishers down the slopes.

A perfect position can hardly be hoped for under any circumstances; and nothing better than one having a considerable number of advantageous qualities and but few defects can be expected. On the defensive it is often practicable to select positions for the artillery with great care and deliberation, and to strengthen them by artificial means; but on the offensive it is generally necessary to decide quickly, and to be content with a position that will admit of an effective fire upon the enemy; to this essential requirement all considerations of cover, and, indeed, everything else, must be subordinated. It should also be remembered that while it is most desirable to be able to move the guns freely in every direction, and to have good lines of retreat, the effective position of the batteries and facility of movement to the front are the only *indispensable* conditions to be sought. At Spicheren (August 6, 1870) the Germans succeeded, by enormous efforts, in bringing two batteries up narrow, steep, paths to the summit of a heavily-wooded hill, where they really had no line of retreat at all; but they were used with such good effect that their withdrawal was unnecessary. At Mars-la-Tour (August 16, 1870) Col. von Dresky placed his entire regiment of corps artillery (III. Corps) in front of a marshy ditch, over which there was but a single small bridge; and the effective use made of his batteries justified the selection of the position. Hohenlohe says that three-fourths of the German artillery

positions in 1870-71 were of the same nature--effective positions admitting of free movement to the front, even when all other considerations had to be sacrificed. X

Successive Positions Occupied in Attack.—To profit fully by the great power of artillery, it should be brought into action as early as possible. On the march, it is accordingly placed near the head of the column; being preceded by only so much infantry as may be necessary to protect it while marching and in its first position. In the first stage of the action, the proportion of artillery to infantry is, therefore, very great, and it is often further increased by the artillery pushing forward at a more rapid pace than the infantry can take. At St. Privat (August 18, 1870) the artillery of the Prussian Guard was in action with fifty-four guns (all the corps artillery and the guns of one division) before the foremost infantry soldier had come within range of the French shells; and at Sedan a German battery of 200 guns was for several hours under the protection of a single regiment of cavalry. Such cases are, however, more likely to be the exception than the rule in future; for the Germans were so superior to the French in *morale*, in the efficiency of their cavalry, and in everything pertaining to the service of security and information, that they could act with a degree of aggressive confidence that would not be justified in the presence of a more vigilant, confident, and powerful foe. The artillery must, however, be up in time to protect the infantry from the fire of the hostile guns and cover its deployment; and in the first stage of the fight it can, therefore, expect but slight protection from the other arms. A small body of infantry on the flank nearest the road by which the advance is made, and a force of cavalry on the opposite flank sufficient for reconnaissance and to prevent a surprise, are all that can usually be on hand early in the action.

The first position may be termed the *reconnoitering position*, and its selection will depend upon many different

circumstances. It should, if possible, be so occupied as to be unseen by the enemy until fire is opened from it. It will generally be practicable to take such a position somewhere near the outer edge of the first zone; but circumstances may compel the choice of a place much farther away. With a clear field of fire, the guns of the present day have an effective range of more than four miles. "At this range," says Hohenlohe, "half of the shells fired will fall on a space fifteen paces wide. Thus if, for example, a battery of the defenders stands in the prolongation of a road which is fifteen paces wide, it could, at a range of more than four miles, fire on troops which might be marching on that road, with such effect that it would not be advisable to permit them to continue to move thereby. In this case the assailant would be obliged to commence his artillery fight at a very long range, in order to disengage his marching troops; and it may thus happen that the fire of artillery will be received and answered, and even an artillery fight may be begun, before the heads of the infantry columns on either side have come in contact, whereas up to the present time, in most cases, the first rifle shots from the advanced antennæ have opened the ball."* Such long ranges for the reconnoitering position may, however, be regarded as quite exceptional. Generally between the ranges of 5,500 and 3,000 yards it will be possible to find suitable positions which may be approached unseen, especially as the batteries of the assailant will always be favored by distance of view, generally by cover, and sometimes by fog, snow, or rain. In general terms, it may be said that the position selected should be as near the enemy as possible without incurring great danger of an attack by a force of hostile infantry too large to be repulsed by the guns and their escort alone. A cannonade at long ranges should generally be avoided; but if the enemy opens with effect, he must be answered. Preparatory to the occupation of the recon-

*"Letters on Artillery."

noitering position, a rendezvous position should be selected directly in rear of the place where the guns are to come into action, and on the flank of the line of advance of the other troops, so as not to interfere with their deployment.

From the reconnoitering position, fire is opened by the artillery upon the enemy, under cover of which the infantry deploys, and during which the commander selects his point of attack and matures his plans as the position of the enemy becomes more and more disclosed by the fire of his guns. Every attempt is made to gain a superiority over the hostile guns; and as the enemy endeavors also to crush the batteries opposed to him, the artillery duel begins at the reconnoitering position. The decisive duel generally demands, however, closer ranges; and as soon as infantry detachments can be pushed forward for their protection, the batteries advance to their second position, which is generally about 2,000 yards from the enemy's artillery, and may be termed the *duel position*. At this range the fire, if accurate, should be very destructive. This position should always be at such a distance from the enemy, and of such easy access, as to present no difficulty in reaching it promptly when the batteries leave the reconnoitering position.

From the duel position a fire is kept up against the enemy's artillery until it is silenced. The guns then, generally without changing their position, cannonade the selected point of attack to prepare the way for the infantry assault. As the assault progresses, part of the guns (generally the corps artillery) remain in the duel position and fire over the advancing infantry as long as they can safely do so; the rest (generally the divisional artillery) push on and take a new position about 1,000 yards from the enemy, which may be termed the *supporting position*. This position varies in its distance from the enemy from 1,200 to 800 yards; but is rarely less than 1,000 yards, unless the enemy's infantry is itself under an effective infantry fire. *

The three positions of field artillery in attack are, then,

* { the *reconnoitering position*, generally about 3,000 yards from the enemy's artillery; the *duel position*, generally about 2,000 yards from the same objective;* and the *supporting position*, in which the artillery moves up to about 1,000 yards from the enemy's infantry, or as much closer as possible. These distances are all subject to many variations, and intermediate positions are frequently necessary. The first position should be omitted if the second can be safely occupied at once; the reconnoitering and duel positions in that case becoming identical. The nature of the terrain may also often necessitate or render desirable a combination of the duel and supporting positions at a distance of some 1,500 yards from the enemy.

In battles lasting more than a single day, the batteries should be pushed forward at night, under cover of the darkness, and protected by intrenchments in positions whence they can open fire at close range upon decisive points of the defender's position.

Occupation of the Successive Positions.—The commander of the army corps or division having indicated the general position for the artillery, the chief of artillery of the corps or the senior artillery officer of the division selects the place for the artillery of his command in compliance with his general instructions, and gives orders accordingly to the commanders of groups of batteries or captains of batteries acting independently. Upon receipt of these orders, each of these officers turns over his command to the next senior, whom he directs to prepare it for action, and rides forward, accompanied by one or more orderlies, to reconnoiter the position and select proper emplacements for the guns.

To prepare the battery for action, it is divided into three echelons or lines, known as the *first line*, the *reserve*, and the *train*. The first line, or "fighting battery," consists

*It should be noted that, as the enemy's infantry is often somewhat in advance of his artillery, the distance of the artillery from the hostile infantry at the reconnoitering and duel positions may be from 150 to 500 yards less than the distances given above.

of all the guns and the three caissons belonging to the right pieces of the platoons, if in line, or the leading pieces of the platoons, if in column. The reserve consists of the remaining caissons (six), one pair of harnessed wheel horses, the unharnessed spare horses, and all the spare men for whom places can be provided on the reserve caissons and spare horses for rapid movements. The train consists of the remaining spare men, the battery wagon and forge, the store wagon, and the authorized supply wagons.* A battalion of artillery is prepared for action in a similar manner, each battery being subdivided by its commander, and the reserves and trains being consolidated into a battalion reserve and train.

As the fighting batteries move forward, the reserve follows at a slower pace, so as to increase the distance more or less according to the cover afforded by the ground, and is established under the best natural cover that can be found, not more than 1,000 yards from the guns. There should be easy communication between the fighting battery and the reserve, as the latter is required to supply the former with ammunition and make good its losses in men and horses. The reserve follows the battery if it moves forward or by the flank, and precedes it if it moves to the rear, always conforming to the pace of the battery.

The commander of the train keeps up communication with the battery by means of mounted men, follows it as closely as he can without undue exposure to hostile fire, and without interference with the movements of troops, and rejoins the battery at the end of the action, or at the close of the day's operations.

In reconnoitering the position, the artillery commander dismounts before reaching it, and leaves his orderlies under cover some distance to the rear. He selects the rendezvous position as close as possible to the reconnoitering position, and sends back an orderly to direct the batteries to it. When

*U. S. Artillery Drill Regulations, par. 1066 *et seq.*

the batteries have arrived at the rendezvous position, their commanders report to the chief on the reconnoitering position, dismounting before reaching him, and keeping under cover as much as possible. The chief then points out to them the general target, and apportions it among them, gives them a brief outline of the plan of operations, gives instructions as to the kind and rate of fire, and indicates the general alignment of the batteries on the position.

In the meantime, the guns in the rendezvous position are carefully inspected, loaded, and placed in readiness for immediate action. Each battery commander, as soon as he has received the instructions of his chief, proceeds to the ground assigned to his battery and signals to his rangefinder, chiefs of section, and gunners, who fall out, dismount, and approach on foot, keeping under cover as much as possible. The battery commander designates the ranging point, states the elevation for the first round, gives such other information as he may deem necessary, and when the requisite preparation has been completed, signifies the same to the artillery commander, who, when all the battery commanders are ready, gives the signal for the batteries to advance. The batteries then move forward rapidly, and occupy the position simultaneously, the guns are at once laid at the elevation ordered, and fire is opened without delay.

This method of occupying a position is based on that used by the Germans, and is founded on the belief that the object to be attained is not merely to rush into action and blaze away at the very first moment, but to open an *effective fire* as soon as possible. "It has been objected," says an accomplished artilleryman, "by those accustomed to the old dashing method of coming into action, that the above proceedings are lengthy and a waste of time. This, however, is not the case. At ranges of 2,500 yards and upwards the position of the batteries is not generally disclosed, if reasonable precautions are observed, until they open fire—or perhaps, some-

times, until their simultaneous appearance on the firing position—and then the sooner they open fire the better; and they are likely to do it quicker if they have been previously instructed rather than if these instructions are only communicated to them when they are in position. Considering the terrible ordeal of the artillery duel in which they are about to engage, and that ‘the choice of the first artillery position will frequently be decisive of the advance’ (German Field Artillery Regulations), it would be a piece of criminal carelessness if every possible step were not taken to insure success before they are committed to the combat. No one can deny that it is easier to communicate detailed instructions to a small group in close proximity than to a battery at full interval, that has, perhaps, already drawn and is standing under the fire of the enemy, and ‘it must be well understood that regulations can only be quietly and accurately carried out so long as one is not under fire’ (Von Rohne). The eight or ten minutes employed in giving these instructions is but a small percentage of the time taken up by the artillery duel, and is really a saving of time, since, as all ranks come into position with a full knowledge of what is required of them, they are enabled to proceed to work more quickly and with greater confidence, and are thus likely to arrive at an effective fire much sooner than if they were hustled into a position without being aware of the business before them.”* The importance of a rendezvous position cannot be overestimated. The moral and physical effect upon the enemy is greater, and the control of the fire is better, when the batteries are deployed together under cover immediately in rear of the position and brought simultaneously into action, than when they come into the position successively. When all the batteries cannot be brought into position at once, as many as possible should come into action together. When the ground is such as to

*Captain W. L. White, R. A., on “Field Artillery Fire,” in *Proceedings of the Royal Artillery Institution*.

render a deployment of the batteries in rear of the position impracticable, when the advance guard is dangerously pressed, or it is necessary to employ the artillery immediately upon issuing from a defile, the batteries may come into action separately; but in all cases every attempt should be made to bring the guns of at least one battery into action simultaneously. Unless compelled to do so by the nature of the ground, artillery emerging from a defile should never take position by simply forming line to the front, if there are other troops following; for by so doing, the enemy's fire would be drawn upon the defile, and the troops therein would suffer. If possible, the batteries should, therefore, move to a flank before coming into position.

The necessity for changes of position to the front has already been shown. Lateral changes are made for the purpose of reinforcing important points, to unmask a fire in rear, or to assist in turning movements. As artillery is useless while in motion, and as each change of position necessitates the establishment of a new range, unnecessary movements should be avoided. The great range of modern artillery has rendered changes of position less frequent than in the past, as it is now often sufficient merely to change the direction of their fire, where a change of position would formerly have been imperative in order to reach the new target. It was found that the guns used by the Germans in 1870 (which were much less powerful than those of the present day) were able, when posted in the center of the front of an army corps, to lend their aid to the action of any part of the corps by merely changing the direction of their fire, without altering the position of the batteries. As a result of this increase of power, the artillery not only has a much wider zone of efficiency than it formerly had, but it is no longer out of the hands of the general from the moment it is pushed into action.

But although changes of position are less frequent and less imperative now than they were with the weakerartil-

lery of the past, they cannot be avoided; and the three principal positions mentioned above will generally be the least number that will be taken up by the batteries in the course of a battle. The fire is generally kept up from each until there is but little risk in pushing forward to the next, though the guns should advance to the duel position with the least possible delay.

The duel and supporting positions cannot be taken up as deliberately as the reconnoitering position, nor is it generally advisable to attempt to change the position of all the batteries at once. The position in advance having been reconnoitered as well as may be, the groups of batteries move forward to it by successive echelons, the echelon in rear protecting by its fire the advance of the first, and moving forward in turn under cover of the fire of the latter from the new position. The echelon next to the infantry advances first, as it would be more likely than the other to be masked in the old position by the advancing troops. Batteries separated by wide intervals, but having a common objective, also change position in the same manner; but a single battery is not echeloned in advancing to a new position. The formation of the advancing batteries should conform to the nature of the terrain, and should be such as to admit of utilizing cover to the best advantage, and enable the movement to be executed with the utmost celerity. The lateral dispersion of the enemy's shell and shrapnel being small in comparison with the depth covered by them, all deep formations should be avoided. Whenever practicable, the advance should be made in line at full intervals; but when the ground is obstructed, or the movement is not direct to the front, a line of platoon or section columns at deploying intervals would probably be better. When the position to be occupied is to a flank of the line of advance, the batteries should be kept in column of sections or column of platoons until the change of direction to the flank. The pace in a change of position to the front should be the most

rapid possible, consistent with keeping the batteries well in hand. The horses need not be spared, as the distance covered in the forward movement is not great, and, unlike those of the cavalry, the artillery horses rest while the men are in action. The change to the front should never be less than 500, and can rarely be more than 800 yards. In changing position to the front, the artillery commander rides rapidly forward in front of the first echelon, and after hastily reconnoitering the position, he, as a rule, returns to meet the batteries, and conducts them into position. He at once causes a reconnaissance to be made to the front and flanks, and sends such orders to the officer in command of his "reserve" as will insure a prompt supply of ammunition. In changes to the rear, he remains with the rear echelon, and, for moral effect, the movement is made at a walk.

If it be practicable to move across the fields, the roads, if under fire, should be avoided by the batteries in their change of position; for the range of different points on the road will almost surely have been ascertained by the enemy, the artillery will offer a distinct mark, and it will present a target of great depth when moving in column on a road. When the roads are not exposed to fire, they should, of course, be used as a means of facilitating prompt movement.

The advance from the duel position to the supporting position is made by a single movement, if possible, though two movements, of about 500 yards each, are generally required. The corps artillery covers with its fire the advance of the divisional batteries, which in this case advance together, if practicable, instead of by echelon. The advance to the supporting position will be considered further in connection with the support of the infantry attack.

Position Relative to the Infantry.—When the advance guard encounters such resistance as to render it necessary to deploy for action, its battery usually takes position at one side of the line of advance of the infantry, and not far from it. The artillery can thus retain its place in column

up to the time of going into action, and its flanks can be easily and quickly protected by the infantry.

As the action develops, the artillery of the main body is hurried forward and brought into position on the right or left of the battery of the advance guard, according to the orders of the division commander, which will be based upon the probable direction of the deployment of the main body. As a general rule, the artillery is placed somewhere near the center of the front which the division will occupy, and between the advance guard and the main body. If the battery of the advance guard be on the flank to which the deployment is made, the concentration of the divisional batteries is at once effected; if it be on the other flank, the division commander must, if practicable, unite the batteries in positions taken up subsequently in the course of the action.

The center is almost invariably the best place for the divisional artillery when the division is operating alone. A position on the flank would require more maneuvering and would be taken up with greater difficulty. If, moreover, the divisional artillery on coming up to the front were sent to some distance to the flank of the advance guard, it could at first be protected only by cavalry, and its flanks would be exposed to attack before the main body could arrive. To take up such a position with the object of turning the enemy's flank would be to expose the artillery to flank attack in turn. By placing the artillery in the center of the line, the batteries reach their position by the shortest road without flank marches, and as quickly as possible. The guns are more secure, being protected by the other arms in their proper positions, and special escorts are, therefore, unnecessary. Above all, they can direct their fire with equal effect to either flank.

In the case of an army corps, the positions of the artillery vary considerably. When the corps marches by a single road, the batteries of the leading division march

near the head of the column, the corps artillery marches just in rear of the artillery of the leading division (or at farthest in rear of that division), and the artillery of the following divisions is generally concentrated and marches near the head of the second division. When the corps marches by two roads, the artillery of each division is near the head of the division, the corps artillery being just in rear of the artillery of the leading division of the larger column. When the divisions advance by separate roads the artillery of each marches near the head of the column, and the corps artillery marches just behind the artillery of that division (generally the center one) which is accompanied by the corps commander. In the first case, the batteries of the leading division and the corps artillery usually come into position on that flank of the advance guard which is nearest the center of the line which the corps will occupy. The batteries of the other divisions are brought into action near the center of their respective divisions, or else near their outer flanks. In the second case the divisional artillery of one column and the divisional artillery of the leading division of the other take position on the outer flank of their respective advance guards—that is, the extremity of the whole line to be occupied by the corps—and the corps artillery and the artillery of the remaining division are brought into action near the center. In the third case the divisional artillery of the flank divisions is brought into position near their outer flanks, and the divisional batteries of the center division and the corps artillery are brought into position on that flank of the center advance guard which is nearest the center of the line to be occupied by the corps. It is to be observed that these positions will be within supporting range of each other, and that each will be occupied by a group of batteries consisting of from twenty-four to seventy-two guns. These positions may be varied by many combinations according to the nature of the terrain and the circumstances of the action. It may be

desirable to unite all the artillery of the army corps in one continuous battery, in which case the corps artillery should ordinarily be kept together, being flanked on one side by one battalion and on the other by two battalions of divisional artillery. Such a great battery, aggregating, as it would in the case of an army corps, some 120 guns, is, however, rarely formed. In regard to such a consolidation of all the artillery of an army corps, Von Schell says: "The artillery of an army corps occupies a very large front, and the nature of the ground seldom permits of its being formed in a continuous line; besides which, such lines have their weak points. They offer an immense objective for attack, are difficult to supervise and move, and sometimes it is not easy to protect them properly by means of infantry. We may reasonably expect, however, that any attacks on them will be defeated, if the enemy advances directly upon them without having first subdued their fire. It is preferable, we think, to distribute the guns throughout the whole front, taking care always not to split up the divisional and corps artillery groups. The concentration of fire of such separated groups will not to any extent be impaired, and a flanking fire at a range of 3,000 meters and more will have considerable effect."* But, although the concentration of the entire artillery of an army corps into one continuous battery is not often either desirable or practicable, the separate groups should be so situated as to support each other, and each should consist of *at least* one battalion. When several battalions of artillery are united in action, it is well to have intervals of at least 100 yards between each two; small bodies of infantry being posted therein, in order that the artillery may be able to devote itself exclusively to its proper function of preparing the attack, without being compelled to concern itself about its own protection from the enemy's infantry. Such intervals were formerly necessary to prevent the battalion from being incommoded by the

*"The Tactics of Field Artillery."

smoke of its neighbors, but this consideration may now be ignored. It may be well to repeat that "massing guns does not consist in deploying them in a well-dressed line as at a review, but in keeping large numbers together under unity of command, and with a common object, and posting them according to the facilities afforded by the features of the ground." Whenever practicable, the groups whose fire is concentrated on the same objective should be under command of the same officer.

In the early stages of the action there will be little or no difficulty in withdrawing the guns and changing their position in accordance with alterations which may be made in the plans of the commander as the enemy's position is more fully developed. The advance guard may often make a mistake in the direction of its attack, but such error can generally be discovered before the divisional and corps artillery come into action, and the guns can be placed in position in another part of the field, troops being hurried to their support, and the advance guard being withdrawn as speedily as practicable from the false direction to which it has been committed.

In the first zone the most favorable positions are given up to the artillery, which, in the early stages of the battle, is the principal arm. In the second and third zones, the infantry becomes the most important arm; and as everything must be subordinated to its effective action, the artillery must be so posted and handled as to assist it and conform to its movements. In all cases, the positions of the batteries should be so chosen as to avoid needlessly drawing upon the other arms the fire of the enemy's guns, and so as to enable the artillery to continue its fire as long as possible without being masked by its own infantry.

Firing over Infantry.—Artillery should avoid firing over the infantry of its own army unless circumstances render it necessary to do so. Such action must, however, be regarded as an unavoidable incident to almost every combat

in which the two arms are engaged; for however desirable it may be to have the batteries posted on the flank of an advancing body of infantry, the limited extent of front will generally compel an overlapping, as it were, of the infantry and artillery. The entire artillery of an army corps (twenty batteries) will occupy a front of some 4,000 yards, and often the fighting front of the entire corps cannot exceed this distance. Indeed, at St. Privat, and again at Sedan, the fighting front of the Prussian Guard Corps was only about 3,800 yards. The artillery must, therefore, often be required to fire over the infantry, as the only alternative to being altogether silent at a time when its services are most needed.

The real danger to the infantry from the artillery firing over it is, under proper conditions, nothing at all. If the troops be too near the guns, a shell accidentally breaking in the bore of a piece may occasionally fall among them with something of the effect of canister; and if they be at too great a distance, they may be mistaken for the enemy, and receive a destructive fire from the rear. In either case, and especially the latter, the effect is demoralizing in the extreme.* By firing over them with artillery, raw troops are rendered nervous and are badly shaken in *morale*; but this effect diminishes as the men become war-seasoned, and finally disappears altogether. When the horizontal plane passing through the position of the guns and the objective of their fire is just above the ground over which the in-

*"Nothing has such a demoralizing effect upon troops as receiving the fire of others of their own troops in their rear, while they are engaged with the enemy in front. I have met with this circumstance in two different battles. The men, it is true, did not think of flying, but they bowed under a resignation which paralyzed all activity—such, indeed, as gains possession of men when they have to say, 'It is all over!' One of my officers commanding a battery once even gave the order: 'Open fire to the rear,' and wanted to return the fire. You may imagine what a terrible confusion would have arisen if he had done this. By good luck I heard the order and prevented its being put into execution. When I, remembering the impressions which I then felt, picture to myself the case of attacking infantry which is engaged in very hot close fighting against the enemy's infantry, perhaps even in the last stage of an assault on a village, and which receives a destructive fire of shrapnel from its own artillery, a catastrophe appears to me to be inevitable."—*Hohenlohe*, in "*Letters on Artillery*."

fantry must move to the attack, the following are given by Major Eden Baker, R. A.,* as the distances over which the infantry can advance without incurring loss from the artillery firing over them:—

Ranges from gun to object.	Limits of distance of infantry from gun.
YARDS:	YARDS:
1,200	300 to 800
1,700	200 to 1,300
2,000	200 to 1,600
2,500	150 to 2,000
3,000	150 to 2,500

Hohenlohe, on the other hand, says that 500 yards in front of the guns seems to be the minimum distance at which artillery can safely fire over the heads of its own infantry. Major Baker's figures evidently relate to actual physical danger, while the German artillerist takes moral effect into full consideration.

When the distance from the battery to its objective is less than 1,200 yards, the artillery should not attempt to fire over the infantry, as the trajectory would be too flat. When the guns and the objective of their fire are considerably above the ground over which the infantry moves, the artillery, especially at the shorter ranges, may continue firing longer than in the cases given above. In all cases, arrangements should be made by which the infantry commander can signal to the artillery commander to cease firing.†

*"Preliminary Tactics," London, 1892.

†"Almost at the crisis of the battle—just before the advance of Meagher and Sickles—the gun-boats on the James River opened their fire with the good intention of aiding us, but either mistook our batteries at the Malvern house for those of the enemy, or were unable to throw their projectiles beyond us. If the former was the case, their range was well estimated, for all their shot landed in or close by Tyler's battery, killing and wounding a few of his men. Fortunately members of our excellent signal-service corps were present as usual on such occasions, and the message signaled to the boats, 'For God's sake, stop firing!' promptly relieved us from further damage and demoralization of a 'fire in the rear.'"—*Gen. Fitz-John Porter, on "The Battle of Malvern Hill," in "Battles and Leaders of the Civil War."*

In all cases, when firing over infantry, the artillery should employ percussion fuses, as a defect in time fuses, or an error in cutting them, would result in loss and demoralization to the infantry.

COMMAND AND FIRE TACTICS.

In the odd but forcible expression of Hohenlohe, "The artillery must in the first place *hit*, in the second place *hit*, and in the third place *hit*. In this is included all that has to do with the most correct service of the guns, the most accurate observation of the fire, and the most exact correction of the elevation and deflection." Accepting the dictum of this celebrated artillerist, we may, then, define fire tactics, as applied to artillery, as the art of hitting the enemy. A discussion of the various subjects which combine to form this art demands a preliminary consideration of the important question of command.

Command.—The functions of the chief of artillery of an army have already been described.* He is primarily an inspector of artillery and the adviser of the commanding general in everything pertaining to that arm, and he exercises actual command of the artillery in battle only when so directed by the general commanding. In a small army such command by him would probably be habitual; but in a large army, the highest actual artillery command would generally be that exercised by the chief of artillery of a corps.

During the reconnaissance of the enemy's position, and, generally speaking, until the artillery is brought into action, the chief of artillery of an army corps accompanies the corps commander to receive such orders, instructions, and information in regard to the approaching action as may be necessary. As soon as the plan is decided upon, and the batteries come into action, he assumes command of the corps artillery and such part of the divisional artillery as may be assigned to him, and exercises especial supervision

*See p. 28 *ante*.

over the concentration and distribution of fire. The divisional artillery is detached from the divisions only by the orders of the corps commander; when thus detached it is not returned to the division except by the same authority. After assuming command of the artillery in action, the chief of artillery is kept informed by the corps commander of his plans and intentions, and he promptly communicates to the latter everything of importance concerning the position and action of the artillery. The corps commander gives the necessary orders for the movement of the artillery from one part of the line to another, and for the beginning of each stage of an offensive battle; but he should not interfere with the immediate command of the batteries when once they are engaged. If, however, he should see fit to do so, his authority is unquestioned; for no independence of the artillery can be assumed on the ground of a possible lack of technical training on the part of the corps commander.*

The senior artillery officer of a division holds the same relation to the division commander that the chief of artillery of a corps does to the corps commander. When not detached, the divisional artillery is under the command of the general commanding the division, and is *not* under the control of the chief of artillery of the corps; but the latter may, and often should, give advice or suggestions in regard to its employment, so that, while performing its functions as divisional artillery, it may cooperate with the artillery under his command. Such suggestions should always be

*"But you may perhaps say, 'Supposing that the general knows nothing about artillery?' I will ask you: 'Supposing he knows nothing about infantry, being a cavalryman?' No instructions can be grounded on such exceptional cases, any more than they could be founded on the case where, like the unfortunate Kaminskoy in 1806, the general might suddenly go mad, or in the case where the general is a raw, ignorant butcher, as was the Jacobin Legendre in the war against La Vendée at the time of the French Reign of Terror. The case where a general knows nothing of artillery, infantry, or cavalry must be an exceptional one, since divisions and corps will not be intentionally intrusted to generals who know nothing about the employment of the three arms.'"—*Letters on Artillery.*'

sent through the divisional commander, should receive careful consideration, and should be followed unless forbidden by the tactical objects or situation of the division.

The commander of each artillery battalion must keep in mind the tactical situation, so that his command may best work in harmony with the other arms. It is his duty to select and reconnoiter the positions for his battalion, to designate and change, from time to time, the target for each battery, according to the varying phases of the fight; to prescribe the method to be used in ranging, and to control the expenditure and renewal of ammunition. His *rôle* is essentially *tactical*, and he should not interfere with the technical details of the conduct of a battery in action, unless the fire of a battery should be so wild or ineffective as to demand his investigation.

The *rôle* of the battery commander (except where the battery is acting independently) is, on the contrary, purely *technical*. He must not concern himself with tactical considerations, but should devote his entire attention to the service of the guns, finding the range, observing the effect of the shot, and, in general, to delivering an effective fire upon the target designated as his objective.

Objective of Fire.—Without a definite objective for its projectiles, the fire of artillery would be well-nigh worthless; depending, as it would, merely upon the effect of chance hits and the moral influence of the noise of cannonading. To obtain from artillery the enormous effect of which it is capable, the first requisite is, therefore, a definite target upon which to direct its fire.

*“As a general rule, the fire of artillery is directed against that arm of the enemy which at the time is predominant, or which is capable of inflicting the greatest loss on the infantry or cavalry that the artillery is supporting.”**

The application of this rule usually makes the enemy's artillery the objective in the first zone, and his other arms

*U. S. Light Artillery Drill Regulations.

the objective in the second and third. When the artillery of the assailant is much superior to that of the enemy, part of his guns may devote their fire to the artillery and part to the infantry of the defense; but unless there is a decided superiority, the guns of the assailant must, at first, all be concentrated upon the opposing batteries.

When the line of hostile guns is continuous, it should be divided as a target into as many parts as there are batteries in the attack, each battery being assigned to the part most nearly opposite it. When the fire has had an appreciable effect upon the enemy's artillery, the fire of two batteries may be concentrated upon one part of the enemy's line, the parts of which are thus silenced in turn. When the enemy's batteries are separated, two batteries of the attack should, if practicable, concentrate their fire upon one of the defense, and thus seek to crush them in succession. If opposed to infantry in extended order, a battery should select as a target the most conspicuous group in the first line, upon which it should concentrate its fire until the group is annihilated or paralyzed, when the fire should be immediately turned upon another group. When the firing line (as is often the case) does not present a practicable target to the artillery, the latter should turn its attention to the supports and reserves. When the first line is checked, objects should be selected in the second line, or even in the third, when a target of suitable size is presented. In preparing for assault, the point of attack is made the target for all the guns that can be brought to bear upon it. In assigning portions of the enemy's line as objectives of fire, his flanks are designated, and the guns in his batteries are numbered, as he himself would designate or number them.*

At very long ranges (beyond 3,000 yards), only very large targets, such as villages or camps, are practicable.

*This is the rule prescribed in the U. S. Light Artillery Drill Regulations. When the English, in designating and numbering the enemy's flanks and guns, use the terms "right" and "left," their own right and left, and not those of the enemy, are understood. This would seem to offer less chance of mistake than our own method of designation.

The artillery should not waste its fire upon objectives which do not offer a prospect of profitable results; and it should accordingly avoid the error of "shelling the woods" upon the mere chance of finding them occupied by the enemy. The other arms, and especially the cavalry, should feel deeply disgraced if they have to delegate to the artillery the duty of reconnaissance. Cannonading unimportant objects was a serious fault in the early part of the War of Secession. "The quantity of ammunition expended was generally out of proportion to the good accomplished. Brigade and division commanders always wanted their batteries to fire whether their positions enabled them to do so with effect or not: and battery commanders, themselves, desirous of not being backward, accepted the situation without question."*

Exceptional circumstances may, however, render it desirable, or even necessary, to open or continue artillery fire when it is evident that the material results will be insignificant; for the moral effect of artillery support greatly strengthens the fighting power of the infantry. Sir Augustus Frazer says of the action of Bull's howitzer battery at Waterloo, "The howitzer troop came up, and came up handsomely; their very appearance encouraged the remainder of the division of the Guards, then lying down to be sheltered from the fire." At Gettysburg, General Hancock insisted upon his batteries continuing their fire, in opposition to the wishes of General Hunt, because he feared that the *morale* of his infantry would be impaired if the artillery seemed to have been overpowered. It has been truly said, that, even when the physical effects of its fire are slight, "an artillery that blazes away cheerily at least rejoices the hearts of the men."† The exceptional cases which justify the use of artillery for its moral effect alone, are, however, mere ex-

*"Artillery Service in the Rebellion," by General Tidball, in *Journal of the Military Service Institution of the United States*.

†May's "Tactical Retrospect."

* (ceptions to the general rule that artillery should not be used except against a definite target, upon which its fire can be directed with a good prospect of effective results.

* { *Kinds of Fire.*—The different kinds of fire with reference to the vertical and horizontal planes (direct, indirect, high-angle, frontal, oblique, enfilade, reverse, and cross) have already been described.* In the frontal fire, the line of fire makes an angle of 90° with the enemy's front; and as this angle decreases, the effect of the fire is increased, reaching its maximum when the angle is zero, or the line of fire coincides with the enemy's front. One of the most striking illustrations of the effect of an enfilade fire by artillery is furnished by the experience of Mercer's battery at Waterloo. This battery had been used with enormous effect against the French, and was still doing excellent work to its front, when suddenly it received a fire from a French battery which had, unperceived, gained a flanking position about 400 or 500 yards away. The effect of this fire was fearful. In a short time the British battery was reduced to a wreck, 140 of its horses were slain or so mangled as to be useless, and there remained scarcely men enough for the service of three guns.

Artillery fire is classed, according to the rate of fire, as *slow*, *ordinary*, and *rapid*. In slow fire there is no specified interval between the firing of the guns, but each is discharged in succession by the command of the battery commander. The rate of slow fire is variable, but is generally from thirty seconds to one minute to each shot. Slow fire is used in ranging, and is also habitually employed in the early stages of the action, when the ranges are usually long and it is desirable to economize ammunition for the fighting at shorter distance. It is used in conducting a delaying action, and, in general, whenever the range and target are not such as to justify any but a limited expenditure of ammunition.

*See p. 60 *ante*.

Ordinary fire is at the rate of from fifteen to twenty seconds between each discharge, and is the fire habitually used. Rapid fire is at the rate of seven seconds to the round. It is used against artillery in movement; by one echelon of artillery in covering the advance of another; when the decisive infantry attack is about to take place; to repel infantry at close range; and, generally, when the opportunity for an effective fire is very fleeting, or there is an extremely favorable target presented. A great moral effect may often be produced upon the enemy by the opportune employment of this kind of fire. Formerly the smoke was a great inconvenience in rapid firing, especially when several batteries were together and the smoke of the windward batteries was blowing across the front of the others. At Königgrätz the Austrian batteries opposed to the artillery of the Prussian Guard used rapid fire, under cover of the smoke of which the Prussian skirmishers advanced through the high grain to within point-blank rifle range, overwhelmed the cannoneers with a sudden fire, and captured sixty-eight guns. This inconvenience will probably be entirely eliminated by the introduction of smokeless powder; but the consumption of ammunition will always be great in rapid fire, and it should be remembered that it is much easier to shoot ammunition away than it is to replace it.

The Order of Firing.—Generally the order of firing is by piece in each battery. Firing by piece from one flank of the battalion to the other may be used in exceptional cases in ranging, or to husband ammunition. A fire by platoon may be used when from any circumstances it is more easy to observe two shots than one, or to increase the interval of time between successive discharges without diminishing the amount of fire.

Salvoes may be used in ranging when the target is so obscured that the effect of one or two shots may not be perceptible, but the simultaneous explosion of six shells may

be observed; and they are sometimes used instead of rapid fire to take advantage of fleeting opportunities. They are open to the objection that the simultaneous discharge of all the guns leaves the battery temporarily defenseless, and that an instinctive haste to remedy this leads to carelessness in loading. Moreover, if a mistake in observation has been made, all the rounds of a salvo are lost, whereas in rapid fire some of them will be effective. When firing over one's own infantry, rapid fire should never be used.

A fire at will may become necessary in defense at short ranges, but it is to be avoided if possible, as the battery is likely to get out of hand and the firing to become wild. A fire at will is generally an indication that the battery using it is suffering or demoralized.

Ranging.—The range is ascertained, whenever practicable, with the range-finder; if this be impracticable, it is carefully estimated. A round is then fired with the proper elevation for this range, and the burst of the shell on striking is carefully noted. If the first round fall short, the elevation is increased to correspond to about one-tenth of the range if estimated, or one-twentieth if taken with the range-finder; and if the next shot fall short, the elevation is again increased by the same amount, the operation being continued until a round is observed to burst beyond the target. The two consecutive rounds falling short of and beyond the target give what is termed the *long bracket*. If the first shot bursts beyond the target, the long bracket is obtained by corresponding successive diminutions of the elevation, until a shell bursts short of the target. The long bracket having been found, its mean is then taken, and a round fired with a corresponding elevation. Then the mean of this range and the one of the long bracket on the opposite side of the target from it is taken, and a shot fired with a corresponding elevation, and so on until the target is enclosed between two consecutive rounds only fifty yards apart, which constitute the *short bracket*. A

verifying group of rounds from all the guns in the battery is then fired at the elevation corresponding to the mean of the short bracket.* If the target be a horizontal one, and one-third to one-half of the verifying group be observed to fall short, or if the target be a vertical one and one-fourth to one-third fall short, the proper range has been found. Otherwise, another group is fired with an elevation corresponding to a difference of not more than twenty-five yards from this range. This should give the proper range. One verifying group will generally be sufficient.

The great advantage in using the range-finder is that the principal errors which arise in judging distance are avoided. But the range-finder will not always enable the correct elevation to be taken at once, owing to variations in the trajectory due to the effect of climatic and atmospheric conditions upon the powder, the force and direction of the wind, and the nature of the ground as influencing the "jump" of the gun.† When the range-finder is used, the short bracket can, however, generally be obtained by the first two rounds. It is almost always practicable to use the range-finder at the first position taken up, and it can often be used in subsequent positions. While at the first position, the range-finding party should take the range not only to the target designated, but also to all other points in the field of fire that may possibly become subsequent targets.

Ranging the battery for a movable target is much more difficult than in the case of one that is stationary. The most difficult case is that of an objective moving straight towards the battery from the front, the difficulty increasing with the rate of movement. In this case, the battery com-

*This is the English method. In Germany and France the lower of the two elevations of the short bracket is taken.

†The discharge of the piece gives the gun and carriage a slight motion tending toward a rotation upwards and backwards. The effect of this movement is to make the angle of departure slightly greater than the elevation given by the sights. This difference is called *jump*, and slightly increases the range corresponding to the elevation given by the sights.

mander designates his windward platoon as the ranging platoon, and directs the rest of the guns to prepare for shrapnel, the ranging platoon using shell. The first round from the ranging platoon should be fired at a range considerably less than the estimated distance of the enemy, and it is well to make a considerable pause before the first shrapnel are fired, in order that the men should have a good opportunity to observe the target and to be impressed with the fact that it is not moving with such rapidity as to necessitate extraordinary haste in loading. The ranging shell (at, say, 2,000 yards) being observed to fall short of the estimated distance, and it being thus evident that the enemy is not yet within that distance, the shrapnel platoons are given an elevation for a range fifty yards less (say 1,950 yards). The ranging platoon continues to fire at intervals, without change of elevation, until the shell falls just over the enemy and it is accordingly evident that he is just within the given range. The command is then given to the shrapnel platoons to open rapid fire from the right or left. Three or four rounds per gun can usually be fired, each gunner dropping fifty yards in the range for each shot, the fuse of each round having been set correspondingly. The ranging platoon, the instant its shell is observed to fall beyond the enemy, reduces its range 200 yards; and the shrapnel platoons make a corresponding reduction the moment the rapid fire ceases, again opening fire at the proper moment. In the above case, the advancing objective is supposed to be infantry. When the moving target is cavalry, the method is the same, except that each reduction of the range is 400 instead of 200 yards, and not more than two rounds per gun can be fired at each range. When the range has been found beforehand to different points which the enemy must pass, the guns are ranged for those points and rapid fire is opened when the enemy reaches them. In this case the matter is very simple.

When the enemy is retiring, the range is found in a

similar manner, the first ranging shell being fired beyond the object. When the target is moving across the front of the battery, aim is taken at the head of the column if it be moving slowly, or some distance in front if it be moving rapidly. The subsequent rounds are pointed sufficiently in front to permit the guns to be fired deliberately as the target crosses the line of sight.

In ranging a battery, it is of the utmost importance that all the guns should be laid on the same point with exactly the same elevation.* It is well, therefore, for the captain of each battery to direct one of the officers or non-commissioned officers to verify the aim of all the guns after they have been pointed. Any round in regard to which there is the slightest doubt must never be taken into consideration, but another round must be fired at the same elevation; otherwise, the whole operation may have to be repeated. In finding the range, percussion shells are habitually used. When these projectiles are not available, percussion shrapnel should be employed. When a battery unlimbers near another already engaged, and opens fire at the same target, it should ascertain the range at once from the latter.

Observation of Fire.—Observation of fire is inseparably connected with the operation of ranging, and is a necessary element of the effective service of the battery in action. The observation of fire is made by the battery commander, who stands far enough to the windward flank to obtain a good view of the target, but remains sufficiently near his battery to enable his orders to be plainly heard. As a rule, it is only possible to observe whether the shell strikes in front or behind the target; actual hits being perceptible only on parapets or precipitous heights, when ammunition chests are blown up, when the enemy's ranks are visibly thrown into confusion, or at very short ranges. In ranging, the guns should be aimed at the windward flank of an oppos-

*An exception to this rule is often found in firing at intrenchments where, as the shots can be easily seen, the fire may be distributed.

ing force, so that it may be readily seen whether the smoke of the bursting projectile passes in front or in rear.

The observation of the fire is affected by many things, such as defective eyesight, distance of the target, smoke, fog, twilight, the direction of the light, the nature of the ground on which the objective stands, the number of batteries simultaneously in action, and disturbing elements due to the effect of the enemy's projectiles. To provide for defective vision on the part of the battery commander, as well as for the interference of the duties of command with those of observation, a trained assistant, who may be either an officer or non-commissioned officer, is generally posted on the windward flank of the battery, and, if possible, somewhat in advance of the line of guns. To overcome the difficulty occasioned by the distance of the target, a field-glass should invariably be used, unless it be possible to use a telescope on a tripod, which is more advantageous, as, unlike the field-glass, it can be left laid upon the object, thus rendering it unnecessary to seek the target again whenever the eye has been removed from the glass.

The inconvenience caused by smoke has been very great in the past, but it will be very slight in future. As smokeless powders are, however, still scarcely beyond the experimental stage, and black powder cannot yet be said to have disappeared altogether from the field of battle, the effect of smoke should still be considered. To avoid the smoke caused by one's own guns, the leeward batteries should be pushed forward in echelon, so that the smoke of the windward batteries may pass in rear of them. If this formation should be prevented by the nature of the ground, or if it should cause the leeward batteries to offer too plain a target against the background of smoke, the effect of the smoke may be modified by having the battalion fire by piece, beginning at the leeward flank; or a fire by battery or platoon may be resorted to. Another expedient is to divide the mass of artillery into pairs of batteries, and

make the space between the pairs as great as possible, even though the intervals between the guns and batteries have to be diminished. When several battalions of artillery are massed together, as large a space as possible is left between them on account of smoke, or they may sometimes be advanced by echelon of battalions from the leeward flank. When the smoke blows from the rear and hangs in front of the guns, or in case a heavy fog, a rainstorm, or darkness obscures the enemy, auxiliary targets must be used.

When the position of the enemy is hidden by his smoke blowing in our direction, the range of the near edge of the cloud of smoke should be obtained, and a salvo of shrapnel fired at a corresponding elevation. The range should then be increased 100 yards, another salvo fired, and the operation repeated until the ground behind the curtain of smoke is swept for a distance of 500 or 600 yards. Then the operation is reversed by corresponding reductions in range until the original elevation and fuse are reached. This sweeping back and forth is continued until the diminution or cessation of the enemy's fire shows that the proper range has been obtained. This method can also be often used with effect when the enemy is sheltered by a wood or the reverse slope of a hill.

The direction of the light is a matter of importance. When a bright sun is shining from the direction of the enemy, light objects on a dark background may become very indistinct; when it is shining from the rear of the battery upon the enemy, the same may be said of dark objects on a light background. At Colombey a Prussian battery came into action against some French artillery at an estimated range of 800 meters. The sun being directly in the eyes of the Prussians, who were at the same time under a hot fire from the French, they had great difficulty in observing where their shells struck; and, as a result, they wasted many rounds before they discovered that their range was fully 200 meters short.

The difficulties of observing the fire owing to the nature of the ground in the vicinity of the objective, such as marshy ground, a ravine, or hedge in front of the position, have already been considered incidentally in connection with the requirements of a good position. When several batteries are firing at once on the same target, it is very difficult for the observer to distinguish the shots of his own battery from those of his neighbors. Salvoes may, consequently, have to be resorted to for correct observation.

The difficulties attending the observation of fire in action are graphically described by Hohenlohe as follows: "The captain of the battery may stand with his field-glass to his eyes on the windward flank of the battery. If we suppose this to be the left flank, he knows that every burst of a shell which shows to the right of the target was produced by a short shot, while any which show on the left of the target must have burst over it. This is all very simple and easy. But even in time of peace it sometimes happens that the gun is laid on the wrong target, when the enemy is represented by a line of guns, and when one of our guns has taken the wrong one of the enemy's guns as its mark; in this case the observer will be deceived and will judge from false premises. But in war many other disturbing elements come in. The smoke from one of the enemy's guns may envelop that of our shell, so that the latter cannot be observed. If the enemy is being fired on at the same time from many directions, it is possible that a shell from another battery may be mistaken for one of our own, and from this a false conclusion may be drawn, leading to the waste of many rounds. After some time it is observed that we are trusting in a faulty observation, and then we have to begin to find the range anew. But in the meantime the enemy's fire will also have become more lively, and he will have succeeded in finding his range. You try to observe a shot, but the smoke from the burst of one of the enemy's shells passes over your field-glass, obscures the

view, and perhaps dirties the glass. You clean it with your glove and order another shot to be fired. At this moment your horse shies at a shell which passes close to him, and instead of observing the shot, you congratulate yourself on not having lost your seat. Then a shell falls into the middle of the team of a limber and bursts there, and the horses break loose and rush at you, just as you want to observe your shot. The enemy's shells fall thicker and thicker. Your detachments begin to hurry. The elevation is not given or corrected so carefully as it was, and thus any observation becomes valueless."*

SPECIAL FUNCTIONS OF ARTILLERY IN ATTACK.

The Artillery Duel.—The great object of the artillery of both the assailant and defender is to shatter the opposing infantry, and thus to facilitate the attack on one hand, or definitely check it on the other. The opposing artillery is a hindrance to the attainment of this object; for if either artillery were to devote its attention exclusively to the enemy's infantry, it would be itself crushed by the undisturbed fire of the enemy's guns. (To perform its ultimate functions in battle, it is necessary; therefore, that the artillery should first gain a mastery over that of the enemy.) If this mastery be quickly gained by the assailant, the success of the attack is generally assured; if the guns of the defender gain the superiority, the assault is almost certainly doomed to failure.

The duel begins at the reconnoitering position, which, as we have seen, is generally at the outer edge of the first zone, but may be at a much greater distance from the enemy. When circumstances compel the beginning of the duel at very great ranges, the preliminary cannonade is necessarily of long duration, as a position not more than 3,000 yards from the hostile artillery must be gained before a really effective action can begin.

*"Letters on Artillery."

The first object being to get speedily the upper hand of the enemy's artillery, all the batteries must be promptly brought into action, and the error made by the Confederates at Malvern Hill must be avoided. In his official report of this battle, General D. H. Hill says: "Instead of ordering up one or two hundred pieces of artillery to play on the Yankees, a single battery was ordered up and knocked to pieces in a few minutes; one or two others shared the same fate of being beaten in detail. The firing from our batteries was of the most farcical character." General Lee claims that the obstacles presented by the woods and swamps made it impracticable to bring up a sufficient force of artillery.* The artillery of the defender must be engaged along its entire front, the portion opposite each division being assigned to it as a target. Otherwise, though a part of his batteries could be overwhelmed, the rest, being undisturbed, would make good practice upon the guns of the assailant, and probably more than neutralize the crushing of a few of the batteries of the defense. As the assumption of the offensive implies a superiority of force on the part of the assailant, it will generally be practicable to concentrate a superior artillery fire upon parts of the enemy's line from the first; but without such preponderance of guns, it is generally a mistake to undertake to concentrate the fire at the beginning. When the assailant has surplus guns available, they may often be employed to outflank and enfilade the position.

The decisive engagement between the opposing forces of artillery can be fought to a conclusion only within decisive shrapnel range; in other words, from the duel position, which is not more than 2,000 yards from the enemy. At this range, every attempt should be made, while paying attention to all parts of the enemy's line of guns, to concentrate an overwhelming fire upon each part in turn. The cannonade from this position will probably be of comparatively short duration; and, owing to the destructive effects

*Official Report.

of modern artillery fire, it is not improbable that the artillery duel may often result in the permanent silencing of most of the batteries of the defense, and that the assailant's artillery, unless greatly superior to its opponent, may be so crippled by the destruction of its horses as to be unable to advance to the assistance of its infantry at close ranges.

In the duel, the artillery should seek to crush its opponent by destroying his *personnel*, for the damage to *matériel* is generally insignificant. (In the battles around Metz, in the Franco-German War, the German artillery lost 1,853 men and 2,630 horses, but only *four* of its guns were sufficiently damaged by the enemy's projectiles to be unserviceable.) Owing to the general use of shrapnel, and its increased power, the disproportion in the destruction of *personnel* and *matériel* will certainly be much greater in future battles. In almost every case, the cessation of fire on the part of the artillery is due to the loss of men or exhaustion of ammunition; and a reinforcement of the former or a new supply of the latter may again put into vigorous action a battery which seemed to be definitely silenced.

The cessation of fire on the part of the defender's batteries may, moreover, be a mere ruse (such as that of Gen. Hunt at Gettysburg or the French at St. Privat) to invite an assault and use the guns at close range. The artillery of the assailant has more than once been deceived in this respect. General Sheridan, in his description of the battle of Gravelotte, says: "The headquarters were located on high, open ground, whence we could observe the right of the German infantry advancing up the eastern face of the ravine. The advance, though slow and irregular, resulted in gradually gaining ground, the French resisting stoutly with a stubborn musketry fire all along the slopes. Their artillery was silent, however; and from this fact the German artillery officers grew jubilant, confidently asserting that their Krupp guns had dismounted the French batteries and knocked their mitrailleuses to pieces. I did not

indulge in this confidence, however; for with the excellent field-glass I had I could distinctly see the long columns of French troops moving to their right, for the apparent purpose of making a vigorous fight on that flank; and I thought it more than likely that their artillery would be heard from before the Germans could gain the coveted ridge. The Germans labored up the *glacis* slowly at the most exposed places; now crawling on their bellies, now creeping on hands and knees, but, in the main, moving with erect and steady bearing. As they approached within short range, they suddenly found that the French artillery and mitrailleuses had by no means been silenced—about two hundred pieces opening on them with fearful effect, while at the same time the whole crest blazed with a deadly fire from the Chassepôt rifles. Resistance like this was so unexpected by the Germans that it dismayed them; and first wavering a moment, then becoming panic-stricken, they broke and fled, infantry, cavalry, and artillery coming down the slope without any pretence of formation, the French hotly following and pouring in a heavy and constant fire as the fugitives fled back across the ravine toward Gravelotte.”*

Though in the artillery duel the enemy's artillery is emphatically the target of our own, if large bodies of hostile infantry or cavalry appear on open ground, a portion of the guns must be turned upon them. The fact must never be lost sight of by the artillery that the enemy's *infantry* is its ultimate object, and that it endeavors to crush his artillery because it is an obstacle in the way of reaching his foot troops. The artillery duel, great as its importance is, must, therefore, be regarded as a preliminary operation, and not as the chief end of the artillery.

Preparation for the Infantry Attack.—Owing to the fact that infantry on the defensive is now habitually sheltered

*“Memoirs,” Vol. II, p. 374.

with hasty intrenchments, and that the range and destructive effect of its fire-arms enable it to subject the assailant to more severe and long-continued fire than formerly, the preparation of the way for the attacking infantry by artillery fire has become more necessary than ever. It is not only imperative that a mastery should be gained over the artillery of the defense, but the superiority of the infantry on the defensive must also be overcome by ruining its shelter, and inflicting such severe losses upon it as to shake its *morale* before it is encountered at shorter ranges by the attacking infantry.

Recent wars have been fruitful of instances which demonstrate the necessity of artillery preparation for infantry attack. At St. Privat the attacks of the Prussian infantry were unsuccessful until the French position had been battered to pieces by a long and furious cannonade; and the bloody failure of the assaults of the Russians on the Turkish positions at Plevna was mainly due to a lack of proper preparation by their artillery. On the other hand, a concentrated fire of eighty-eight guns upon the village of Ste. Marie-aux-Chênes so prepared the way for the Prussian infantry that they were able to push entirely through the position without check and occupy its farther limits. At Sedan the effect of the artillery preparation was still more striking. The attack of the Prussian Guards upon the Bois de la Gareñne was prepared by a remarkably effective fire by ninety guns, and the attack which followed is thus described by Hohenlohe: "Our infantry, starting from Givonne, began to climb the hill. We were in a state of feverish expectation; every eye was fixed on the forest; we asked ourselves if the capture of the edge of the wood would cost as many lives as had that of St. Privat. But this time the resistance met with was almost *nil*. At most points the French, utterly discouraged, advanced to meet our troops crying, 'Mercy! Mercy! We can do nothing; we are crushed

by the fire of your artillery.' Only in the interior of the forest did they try to fight at certain points, and even there the resistance was not stubborn."*

As soon as the enemy's guns have been silenced in the artillery duel, or our own artillery has at least gained a marked superiority over that of the enemy, a heavy fire is turned upon the point of attack, the number of guns devoted to this objective depending upon the extent to which the defender's guns have been silenced. In every case, as many guns as possible should be turned upon the point of attack, only a sufficient number being retained against the hostile artillery to insure a superiority over it.

In the engagement of so large a force as an army corps, the preparation for the infantry attack is generally completed by the time the attacking force is deployed. This is especially true if the defender's artillery has been silenced and the point of attack has been for some time cannonaded by a large number of guns; which implies an early deployment and a vigorous use of the artillery, as well as its marked superiority over that of the enemy. With a small force, the deployment of the infantry will be effected some time before the preparation by the artillery is completed. When circumstances demand that the attack should be of the nature of a surprise, the fire of the artillery may be withheld from the point of attack, in order to keep the enemy in doubt as to the place selected, until the assault actually begins, when every gun that can possibly be brought to bear should at once support the attack with its fire.

Supporting the Attack.—As soon as the order is given for the infantry to advance, the artillery commanders should be immediately notified, and should prepare at once to support the assault. All the guns, without changing their position, and regardless of the fire of the enemy's artillery

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still remaining in action, are at once directed upon the point of attack; for the hostile infantry now becomes the arm with which our own has to deal, and which is capable of inflicting upon it the greatest loss. It is not sufficient for the artillery to remain in its position, however effective its fire may appear to be therefrom. Part at least must push on with the infantry, ignoring all consideration of losses, and seeking only to gain a new position whence it can assist the assault by a fire at close range, shatter the enemy's reserves, overwhelm the fresh batteries which he may bring up, be enabled to distinguish friend from foe in the crisis of the battle, and, above all, lend to the attacking infantry the moral support of its close coöperation. "It is," says Hohenlohe, "not very encouraging to the infantry, that their artillery should remain at a distance of a mile from the enemy, while they themselves go in until they can see the whites of their eyes. There is something very encouraging and comforting to the infantry when, at such critical moments, they hear their own guns thundering close at hand. Only those who have heard the cheers with which, at such moments, the infantry receive the batteries, can fully form an opinion as to the moral influence which artillery fire exercises on its own infantry."*

The artillery commanders should not be hampered with instructions as to the time when they should move forward, it being assumed as a matter of course that the batteries will accompany the infantry at the proper time without specific instructions. Though the corps artillery may be, and generally is, left in the duel position to keep up a fire until unable to distinguish friend from foe, it should be a part of the gospel of the divisional artillery *always* to push on with the attacking infantry, unless the nature of the terrain absolutely forbids a forward movement. Von Trotha claims that a single battery which fires with annihilating effect from an advanced position for five

*"Letters on Infantry."

minutes—or even one minute—and is then lost, contributes more to the general success than ten batteries which, from a retired position, keep up a well-aimed, but in the end ineffective, fire for a whole day. As a rule, the batteries, which at the beginning of the assault are usually about 2,000 yards from the enemy, should limber up and advance when the second line of the infantry comes abreast of them, and should come quickly into position midway between the support and firing line. If the advance of the firing line masks the batteries, they must move up and come into position on that line. When the second line again comes abreast of the artillery, the latter again, if possible, limbers up and pushes forward to a point between the support and firing line. The first move should bring it to the supporting position, from which it should be able to keep up an effective fire until the end of the attack. When the enemy is demoralized or of an inferior quality, the artillery may, however, advance with the infantry to the position itself, as at Tel-el-Kebir, where the British batteries pushed their way across the parapet, and swept the trenches with their fire. As a rule, however, the artillery cannot be expected to go beyond the ordinary supporting position, nor indeed could it gain much by doing so. The fire of artillery at a range of from 1,200 to 800 yards is practically annihilating, and from this position the fire can generally be kept up until the last moment.

As the infantry draws near the hostile position, coolness and good judgment are necessary on the part of the commander of the supporting artillery. If the fire be suspended too soon, the enemy's troops, already falling back under shrapnel fire, may return and oppose a good front to the infantry. If, on the other hand, the fire be continued too long, the artillery may ruin the attack by firing into its own infantry. Perhaps the best rule in most cases is to keep up the fire upon the enemy's main position until the final charge begins, and then throw shrapnel far

enough back to strike the hostile reserves or the enemy's troops in their first movements in retreat. At St. Privat the German artillery kept up its fire after the Guards and the Saxons had penetrated the French position, and many German soldiers were killed or wounded by the shells of their own friends.

When the position is carried, the batteries must be hurried up to assist in a further advance, or check a counter-attack. It is, as a rule, advisable for a portion of the batteries to limber up and advance at a rapid pace when the charge is in progress. If the attack fails, the advancing batteries halt and come into action to cover the withdrawal of the infantry. Even if the guns should fall into the hands of the enemy, they would probably first pay for themselves many times over in the protection afforded to the defeated infantry.

The solidity, so to speak, which it gives to the attack formation, is not the least valuable feature of the support afforded by the artillery. The difficulty of exercising proper control over large bodies of infantry in extended order, in the tumult and danger of battle and the fluctuations of the infantry fight, as success here and repulse there cause the contending lines to sway backward and forward, necessitates solid points of support. These are supplied by the artillery, which, remaining steadily in action, can baffle the advancing enemy and furnish a protection behind which the infantry can rally. The enormous defensive power of modern artillery renders it possible to use it to close the open ground between the attacking columns of infantry, and enables it to rely upon itself for protection from front attacks. The artillery occupies a great portion of the general line, which is thus stiffened at many points. At Wörth the Crown Prince's artillery occupied an aggregate line equal to one-third of his whole front of attack; and at the close of the battle of Gravelotte the space covered by the artillery of the Germans was two-fifths of their entire front.

Artillery in Flank Attack.—The flank attack should be prepared by a concentrated fire of all the guns that can be brought to bear upon the point of attack. To place these guns on the outer flank of the attacking force would give them a more free field of fire, but would expose them dangerously to counter-attack, though horse artillery may (owing to its great mobility) often be thus employed. As a rule, most of the guns are placed on the pivot flank; but as their fire from this position is soon masked by the attacking troops, a sufficient number of the nearest batteries should be detailed to accompany the attack.* When the second line of the attacking infantry comes abreast of these batteries, they limber up and come into action about the center of the attacking force, between the supports and the firing line. The guns remaining on the pivot flank continue their fire upon the point of attack as long as possible, and when their fire becomes masked, advance, if practicable, to closer positions.

ARTILLERY IN DEFENSE.

General Theory of the Employment of Artillery in Defense.—The nature of the defensive use of artillery having been considered incidentally in the discussion of the use of that arm in attack, a further consideration is necessary only of the principal features of the artillery defensive.

If the assailant were allowed to effect an undisturbed deployment of a superior force of artillery within effective range, the guns of the attack would quickly gain the upper hand of those of the defense to such a degree as to lend irresistible aid to the infantry assault. The first object of the defender's artillery is, accordingly, to open the most effective fire possible on the batteries of the attack. The ease with which both natural and artificial cover can be utilized by the defense, and the greater facility of finding

*In the case of a division making the flank attack, four batteries would generally be thus detailed.

the range, especially when the position is deliberately taken up, largely compensate for the preponderance in artillery on the part of the assailant which the assumption of the offensive implies; and if the attacking batteries be roughly handled from the first, the conditions of the fight will be equalized, even if the advantage be not altogether given to the defender. As long as the artillery of the defense holds a superiority over that of the assailant, an infantry attack is not probable; but if the attacking batteries once gain the upper hand, it becomes a certainty. Every available gun must then be turned upon the advancing troops, upon whom a fire should be kept up until the assault is repulsed or the position has to be abandoned. In the former case, the artillery either takes part in a counter-attack or continues to fire upon the retreating infantry until the latter gains the shelter of its own line of guns. In the latter case, it continues in action until the last moment, to cover the retreat of its own infantry.

FORMATION AND POSITION.

The general requirements of a good artillery position have already been described. The position in defense, even more (if possible) than in the attack, demands a clear view to the front and flanks, in order that the enemy's intentions may be quickly discovered. As the flanks are essentially weak points of the defense, they must be supplied with artillery, in order that a hostile force engaged in a turning movement may be compelled to deploy at a distance, and thus give the defender time to execute such changes in his dispositions as may be necessary to meet the attack.

As the terrain does not often permit the guns to command all the ground in their front, provision must be made for a flanking fire by distant batteries. Guns should also be so posted as to flank, and if possible fire over, all advanced posts, and command the exit from the same in case they fall into the enemy's hands; but no artillery should be

stationed in such posts. This refers, of course, to advanced posts which are beyond effective infantry fire. When such posts are within a few hundred yards of the main position, they constitute salients which should, by all means, be occupied by artillery, the position being well flanked by infantry fire.

The defender being obliged to meet every possible contingency that may be developed by the attack, his artillery is necessarily more disseminated than that of the assailant. Part of the guns must be so posted as to cover weak points, and part to compel the deployment of the enemy at a distance; but the main artillery force should not be placed in position until the general features of the attack are developed. Herein lies a matter of much difficulty. It is of great importance not to unmask the position until it is necessary to do so, in order that the enemy may be compelled to operate in the dark and perhaps commit his troops to a false line of attack; but, on the other hand, the enemy's infantry should never be allowed to cross the first zone without being subjected to such a fire of artillery as at least to compel him to deploy, and the advanced posts should be so protected by the fire of artillery as to make it impossible to carry them without heavy loss. The batteries should, therefore, be brought up near their positions, and held under cover until the proper moment for bringing them into action.

Cover.—Natural cover should, if possible, be utilized; and, time permitting, gun-pits should be prepared. Cover is a necessity for the defense, as its guns will generally be opposed by a largely superior force. It is often less important, and generally more difficult, to provide cover against the direct fire of the enemy than to take up a position such as to screen the battery and deceive the enemy in regard to the range. The effect of a hedge, wall, or line of trees from 100 to 300 yards in front of the guns, but not obstructing their fire, has already been considered. (When

gun-pits are constructed, the freshly turned earth should, if possible, be concealed with sods, brushwood, etc., as in the case of infantry shelter trenches. (See p. 157.) In constructing artificial shelter, it should be remembered that the damage to *matériel* is slight, and that to *personnel* great. It is accordingly most important to provide cover for the detachment, and then for the horses, the protection of the gun itself being a matter of less urgency. The horses may be unhitched from the limbers, and kept some distance to the rear, behind such natural cover as may be available. The necessity of haste in changing position is but rarely so great as to forbid this, and the mobility of the battery is thus often preserved when it would otherwise be ruined by the destruction of the horses.

When many guns are massed, the question of shelter must often be comparatively ignored. On this subject, Von Schell says: "We are far from denying that in small actions full attention should be paid toward providing carefully prepared cover for each gun, but not so in the case of a large number of guns, or in the formation of a mass of artillery. Here the nature of the ground does not form anything like so important a factor as in small affairs, and it would be a great mistake to attach too great importance to it. For when artillery is being massed, part of it must unavoidably be placed in a less favorable position than the rest; but it would be very wrong to reject a position for the artillery which with reference to tactical considerations is a good one, because in itself it could not be called a good position for artillery. Other considerations have the upper hand here; the most suitable position for the artillery is one which best adapts itself to the intended employment of the other arms, and the features of the ground must be a consideration secondary to this. Other troops are constantly compelled to make the best use of unfavorable ground, and in the same way the artillery will have to put up with unfavorable positions and make the best it can out of them."*

*"The Tactics of Field Artillery."

It has been recommended by respectable authorities that shelter be obtained by withdrawing the guns slightly down the reverse slope of the crest and directing their fire by means of pointing rods either in front or in rear; but the practicability of this measure in action is doubtful. Hohenlohe, whose ideas are based on his own experience in three great wars, says that "this complicated plan may be all right in peace, but in the hurly-burly of battle it will come to grief."*

Position Relative to the Infantry.—As in the attack, the position of the infantry is at first subordinated to that of the artillery, the latter being the principal arm in the early stages of the battle. The position is accordingly occupied at first "in skeleton," the most important points being held by the artillery, part of the batteries being in position to compel an early deployment of the enemy, while the rest are held in readiness under cover. Small bodies of infantry and cavalry are pushed out, not farther than the near edge of the second zone, to baffle the reconnoitering parties of the enemy. As the attack develops, these parties are withdrawn; but skirmishers are kept out about 500 yards in front of the artillery to protect it from the skirmishers of the enemy.† These skirmishers will keep those of the enemy back 500 yards more, and thus, by occupying them and keeping them at a distance from the guns, relieve the latter from all anxiety from this source.‡

When a division alone is engaged, a battery is usually

*"Letters on Artillery."

†This distance may vary from 300 to 600 yards.

‡In his account of the cavalry battle at Trevilian Station, General M. C. Butler, C. S. A., mentions the following instance of the effective use of skirmishers against field artillery: "I had placed two brass howitzers of Thomson's battery just in the rear of our line, not far to the right of the angle in the open field. As there was no protection to the men who served the guns, they were picked off and shot by Sheridan's sharpshooters as fast as they could take their positions. I consequently directed Major Chew, commanding the artillery battalion, to have the survivors withdrawn to a place of safety, and had to rely upon Hart's and Thomson's guns stationed farther to the right."—"*Battles and Leaders of the Civil War*," Vol. IV., p. 238.

posted on each flank, so as to command the approaches in front as well as on the flank. The other two batteries are habitually held in rear of the center, if there be suitable cover, until an opportunity offers for their effective use against the enemy, which will generally be when he begins to bring his guns into the reconnoitering position. In the case of an army corps, the artillery is usually divided into three groups, one for the center, and one for each flank. The center group should consist of the corps artillery and the artillery of the center division; the artillery of each flank division being posted on the flank. The artillery of the center division may be combined on the flank with that of one of the other divisions when such combination seems necessary. Guns on a flank need not be at the extremity of the line, nor are they generally so posted; it is sufficient that they be near enough to the flank to sweep with an effective fire the ground over which the enemy must approach in a flank attack. The different artillery units should not be mixed. Thus, when the corps artillery is combined with that of a division, the latter should be placed on a flank of the former, and not inserted between its batteries. Similarly, when the artillery of two divisions is united, the battalions should be placed side by side. The exigencies of battle may indeed demand sometimes that batteries should be hastily thrust into position wherever they may be able to find room; but to avoid confusion and difficulty in command, the general rule of not mixing units should be carefully observed when it is possible to do so.

Occupation of the Position.—The chief of artillery accompanies the commander in his reconnoissance of the position, is informed of the general plan of the defense, and is given general instructions as to the positions to be occupied by the artillery. He then examines the position, accompanied by his subordinate artillery commanders, and selects the emplacements for battalions of artillery, or, in the case of a small force, those for batteries. The number of em-

placements selected should be greater than the number that can be actually occupied, provision being made for presenting a front of artillery to an attack from every possible direction. The chief of artillery gives to his subordinate commanders such information in regard to the troops of their own army, such intelligence in regard to what is known of the enemy, and such information about the plans of the commanding general as he may deem it necessary or judicious to impart. The battery commanders, under direction of their battalion commanders, then reconnoiter the ground to the front and rear, and find the range of all prominent objects in the line of every possible approach of the enemy. The chief of artillery determines the extent to which artificial cover is to be used, but the battalion commanders attend to all the details of their construction.

It is not necessary in the defense that the batteries should come into action simultaneously. As a rule, each is brought up by its captain and unlimbered, under cover, in rear of its emplacement, and the guns are, at the proper time, run into position by hand. It has already been stated that in the defense the batteries are generally more disseminated than in the attack, but the necessity of mutual support and of concentration of fire must not be overlooked in the selection of artillery positions by the defender. The separation of the batteries does not take them out of the hand of the artillery commander as it would in the attack; for there is generally more time to consider before issuing the orders, which are also more easily transmitted, as the position of the guns practically remains unchanged. The artillery of the defender has, in fact, a great advantage over that of the assailant in its stationary position. The guns of the attack must make a number of changes of position, in executing which they present an unresisting target to those of the defense, and at each change the range must be found anew; while the defender, especially when he has occupied the position deliberately, already knows the range to every suitable artillery position which his adversary may occupy.

Mobility is, however, a necessity on the part of the artillery of the defense as well as that of the attack; for changes of position by the defender's batteries, though generally few, have to be provided for, and must be executed with celerity. The nature of the terrain sometimes makes movements of the defender's artillery necessary. The summit of a hill from which the duel can be admirably conducted often does not command the ground over which the enemy's infantry must advance; and the position of the guns of the defense must, therefore, be changed as the attack progresses. Again, the action of the defender being contingent on the plans of the assailant—the former playing, as it were, to the latter's lead—it follows often that artillery massed to meet an expected attack must be quickly moved to meet one which has been unforeseen. Finally, in the counter-attack, the defender's artillery must be ready to push forward promptly to support the offensive movement of the other arms. In changing position, the guns are generally run by hand to the rear and limbered up under cover.

As a rule, the positions of batteries must not be changed from flank to center or the reverse, nor must fire be discontinued without authority from the commanding general; and a withdrawal from action should *never* be made without his order.

Objective of Fire.—When a defensive position has been deliberately taken up, and the ranges to the front have accordingly been clearly ascertained, an effective fire is practicable by the defense at distances that would be quite out of the question on the part of the assailant. It is but rarely, however, that a fire at a range of more than 3,000 yards is worth the ammunition which it costs; and, as a rule, fire is not opened by the artillery of the defense until the enemy's guns or infantry appear at the farther edge of the first zone. Fire is then begun by batteries of the defense specially designated; but the main body of the artillery does not occupy its emplacements until the assailant

has reinforced the artillery of his advance guard. All guns should be in action as soon as the attack is developed.

The same general rule for the target of the artillery fire of the attack is applicable to that of the defense; and accordingly the assailant's artillery is the chief target in the first zone, and his infantry the main objective of fire in the second and third. The heaviest possible fire should be directed upon the enemy's batteries while they are changing position. Part of the batteries of the defense (generally the center batteries of each battalion) fire upon the moving echelon of the enemy's artillery, while the rest endeavor to keep down the fire of the echelon which remains in position.

The Artillery Duel.—The overpowering or neutralizing of the assailant's artillery being a most important element in a successful defense, it follows that, as a rule, every available gun should be brought to bear upon the attacking batteries in the artillery duel. It must not be forgotten, however, that the chief end and aim of artillery in action is to batter the enemy's infantry, and that circumstances may accordingly render it advisable to conduct the duel with only a part of the artillery, or even to decline it altogether. Thus, when the position is so strong that the assailant's artillery cannot appreciably injure it, or when the nature of the terrain is such as to force the attacking batteries to come into action to support the infantry at a very long range, it is scarcely more than a waste of ammunition to engage the enemy's artillery. So too, when the defender's artillery is relatively very weak, it is folly to pit it against that of the assailant in a serious duel; it should rather be held under cover and reserved for effective work against the attacking infantry. It is evident, however, that the cases in which the duel can be declined by the defender are exceedingly rare.

The artillery of the defense may, however, slacken its fire, or cease firing altogether, if that of the assailant begins to gain an advantage over it, in order that the enemy's batteries may, in their confidence, rush too far to the front and

receive a destructive unexpected fire at close range; or the fire may be suspended for the purpose of luring the hostile infantry into a precipitate and unprepared assault, as in cases already considered. A suspension of fire may also be necessary, as the lesser of two evils, when scarcity of ammunition renders it necessary to reserve the fire for the infantry combat at decisive range. If the artillery of the defense be overpowered in the duel, or if it voluntarily suspend its fire, it will usually be sufficient to withdraw the guns a few yards from the crest; and all the batteries should reoccupy their emplacements, or move up to other positions designated for close defense, as soon as the infantry attack takes place. If the batteries have been completely overmastered by those of the assailant, it may be impossible to move back to the emplacements from which they withdrew; in this case, they must retire to a rallying position in rear.

Resisting the Infantry Attack.—When the assailant's infantry becomes actively engaged in the assault, the fire of the defender's artillery is devoted entirely to it, regardless of the action of the hostile guns; for if the enemy's infantry be not checked, any damage to his artillery will be of no value in deciding the action, while if his infantry be completely shattered at the crisis of the fight, his artillery may be safely ignored. If the enemy be repulsed, the defender's guns continue their fire from their position unless a counter-attack is made, when they advance to support the infantry. Their action in this case is that of artillery in attack.

Withdrawal from Action.—When the enemy's artillery has gained such an ascendancy in the duel as to compel a withdrawal from the position, or when it becomes necessary, in compliance with the general plan, for the defender's artillery to take up a new position in rear, the batteries should, if possible, withdraw in line at full intervals, moving deliberately at a walk, for at least 100 yards, and avoiding every indication of haste or compulsion. For manifest reasons, the artillery should not all be withdrawn at once.

Generally a part of the batteries are sent back to a rallying position in rear, occupied by the second and third lines of infantry, the batteries being established at the points where their fire will be soonest unmasked. The remaining batteries cover the movement, and are withdrawn in turn under cover of the fire of the batteries in the new position. If the enemy press too closely, the artillery must endeavor to check him, and then resume the withdrawal during the temporary suspension of the attack. When the retiring batteries are beyond the enemy's range, they should break into column, and if the retreat is to be continued, they should take up the indicated direction.

To withdraw in good order, the dispositions must be made before the hostile infantry has advanced to the attack. Otherwise, the artillery must seek safety in its own fire, and stake its salvation upon the result of the fight at close quarters. Should the artillery endeavor to withdraw after the enemy's infantry has begun the attack, it would leave its own infantry in the lurch at the time when its support was most needed, and when the hostile troops afforded the best possible target. Moreover, the destructive fire of the enemy's infantry would probably kill or disable the horses to such an extent as to bring the retiring batteries to a halt and cause the loss of the guns. Whenever an order for withdrawal is not received before the enemy's infantry has begun the attack, every consideration of honor, efficiency, and even safety, requires that the artillery should unhesitatingly accept a fight to the bitter end, and give no heed to the possible, or even probable, loss of part or all of its guns. The U. S. Light Artillery drill book says: "The loss of well-served guns in the defense of a position, or in close support of the other arms, is honorable;" and the German regulations inculcate the same principle in even stronger language: "Steadfast endurance up to the last moment may be required, and it is then in the highest degree honorable if this be carried to the length of losing the guns. *Resist the enemy without any regard to the loss of guns.*"

An artillery which allows itself undue anxiety about the loss of its pieces cannot be efficient. It is said that the Emperor Nicholas of Russia, who was a great admirer of Wellington, and who was impressed with the fact that the British general had never lost a gun in battle, caused it to be clearly understood that any artillery commander losing pieces in action would fall under the imperial displeasure. As a result, the Russian artillery, in the early part of the Crimean War, almost invariably shunned close action, even when it might have been used therein with decisive effect; for it thought more of saving its guns than it did of injuring the enemy. An artillery officer should merely take care that each lost piece is well paid for by the enemy; and he should be able to repeat the gruesome pleasantry of the battery commander who said, "I lost my guns, but I took the enemy's receipt in full *in red ink*."*

Even if the enemy be not definitely repulsed, he may suffer a severe check, and while the hostile infantry, staggered by its losses, is awaiting reinforcements for the next onward surge, the artillery may be able to withdraw without serious molestation. As a rule, however, when the artillery remains in its position until the infantry attack begins, it must stake its existence upon successfully repulsing the assault.

A gallant withdrawal of artillery in the face of the attacking enemy was that of Bigelow's 9th Massachusetts Battery on the second day of the battle of Gettysburg. It is described by General Hunt as follows: "The breaking in of the Peach Orchard angle exposed the flanks of the batteries on its crests, which retired firing, in order to cover

*Captain Warren P. Edgerton, Battery E., First Ohio Light Artillery, at the battle of Stone River. Edgerton's guns did excellent work, and paid for themselves well; but such were the mistaken views that were held at that time in regard to the loss of guns, that he seems to have been censured for losing his battery rather than complimented for his gallant action. With the true spirit of an artillerist, Edgerton reported, "I deemed it my duty to stay with my guns so long as a single shot could be fired, or a chance exist of their being supported or retaken" (Official Report), and in reply to some criticism about the loss of his battery, he made the remark quoted above. Edgerton afterwards served as Sheridan's chief of artillery, in the Army of the Cumberland. ★

the retreat of the infantry. Many guns of different batteries had to be abandoned because of the destruction of their horses and men; many were hauled off by hand; all the batteries lost heavily. Bigelow's 9th Massachusetts made a stand near the Trostle house in the corner of the field through which he had retired with prolonges fixed. Although already much cut up, he was directed by McGilvery to hold that point at all hazards until a line of artillery could be formed in front of the wood beyond Plum Run. This line was formed by collecting the serviceable batteries and fragments of batteries, that were brought off, with which, and Dow's Maine battery fresh from the reserve, the pursuit was checked. Finally some twenty-five guns formed a solid mass, which, unsupported by infantry, held this part of the line, aided General Humphreys' movements, and covered by its fire the abandoned guns until they could be brought off, as all were, except perhaps one. When, after accomplishing its purpose, all that was left of Bigelow's battery was withdrawn, it was closely pressed by Colonel Humphreys' 21st Mississippi, the only Confederate regiment which succeeded in crossing the run. His men had entered the battery and fought hand-to-hand with the cannoneers; one was killed whilst trying to spike a gun, and another was knocked down with a handspike whilst endeavoring to drag off a prisoner. The battery went into action with 104 officers and men. Of the four battery officers, one was killed, another mortally, and a third, Captain Bigelow, severely wounded. Of seven sergeants, two were killed and four wounded; or a total of twenty-eight men, including two missing; and sixty-five out of eighty-eight horses were killed or wounded. As the battery had sacrificed itself for the safety of the line, its work is specially noticed as typical of the service that artillery is not infrequently called upon to render, and did render in other instances at Gettysburg besides this one."* It is to be observed that in this case the artillery repulsed the Con-

*"Battles and Leaders of the Civil War," Vol. III., page 309.

federate infantry before the latter could reach the new position; otherwise, the guns would probably have all fallen into the hands of the assailant.

Retreating artillery once successfully withdrawn from its position has more to fear from the enemy's artillery than from his infantry; for a hot pursuit cannot long be kept up by the latter. The force most to be dreaded is one composed of cavalry and horse artillery combined, in which the latter arm can inflict losses with its fire, and the former can take advantage of any confusion thus created. As a rule, the retreating artillery should take up successive positions from which it can check the pursuers until some degree of order is restored in the retreating troops, and a rear guard can be formed.*

ARTILLERY AGAINST INFANTRY.

Every battle presents instances of the engagement of artillery with the enemy's infantry, generally in conjunction with the other arms, but occasionally unaided and alone. It is well, therefore, to consider what artillery can and cannot do when opposed to hostile infantry.

Boguslawski asserts that in the Franco-German war the cases were rare indeed in which the advance of the German infantry was sensibly delayed by artillery fire; but all authorities are agreed that the French infantry was repeatedly brought to a standstill by German artillery masses, and often at a distance of upwards of 1,600 yards. At Gravelotte, an attack made by the French infantry from their position near Amanvillers came under fire of the Prussian guns at a range of 1,900 yards; but the French continued to advance resolutely until within 900 yards of the battery, when they broke and fled before a storm of shell impossible to withstand. The attack was repulsed by artillery fire alone. Similar, and even more bloody, repulses of the French infantry occurred at Mars-la-Tour and Sedan, and impressed

*For the conduct of artillery with the advance guard and rear guard, see "The Service of Security and Information."

General von Dresky with the belief that "a line of artillery cannot be beaten or broken by a front attack "

These unsuccessful attacks were, however, generally made in columns, and always in close order. When the infantry attacked in extended order, the artillery was confronted with a more difficult task. The capture of sixty-eight Austrian guns by Prussian skirmishers at Königgrätz has already been mentioned. At Sedan the Saxon corps artillery, which repulsed the columns of a French infantry division with enormous loss, was unable to hold its ground when a much smaller force of infantry subsequently advanced against it in extended order. At Gravelotte nine batteries of the Prussian IX. Corps, which were pushed forward without adequate infantry support against the portion of the French line extending from Amanvillers to La Folie, suffered so heavily from infantry fire that one battery was completely wrecked and five of the others were withdrawn with great difficulty. On the other hand, Hohenlohe kept his whole line of artillery (fifty-four guns) constantly in action at St. Privat, for nearly four hours, though it was continually under the fire of a thick line of French skirmishers, at a range of 900 to 1,000 paces; but in this case the Prussian batteries were supported by infantry skirmishers. In the course of the whole war, German batteries were rarely driven off by the French infantry fire, and Hohenlohe emphasizes the statement that "artillery cannot, generally speaking, ever be driven back by infantry, if it refuses to leave its ground."

On the whole, it may be confidently asserted that, on open ground, artillery can defend its own front from the attacks of infantry or cavalry. As a rule, the longer the line of guns, the greater will be the security of the artillery; as the front of each part of the line can be covered by the fire of other portions, and ground can thus be swept which is not directly commanded from the front.

Thus far we have considered only the capability of the

artillery to defend itself from the enemy's infantry. Its offensive use against that arm is quite another matter. Two facts stand out prominently in the tactical lessons of recent wars; namely, that infantry cannot carry a strong position unless its attack has been prepared and supported by artillery; and that artillery alone cannot by its fire drive a resolute enemy from his line of defense. Rare instances of a *coup de main* by infantry, such as the storm of Kars, or the capture of a Turkish redoubt at Telis by shrapnel fire alone, are merely exceptions marking the general rule. Even when such magnificently effective use was made of artillery as at St. Privat and the Plateau of Floing (at Sedan), where the artillery crushed the enemy with a veritable hail of iron, the positions were not abandoned until the infantry carried them. In a number of instances in the Franco-German War, the French infantry holding the edge of a wood or village was compelled by the German artillery to suspend its fire, hug cover, and not infrequently to draw back from the border; but the advance of the German infantry so generally found the French infantry back in its position to receive the attack, that Von Dresky, one of the ablest of the Prussian artillerists, declared, "with artillery fire alone, good infantry cannot be driven out of a position under cover."

The experiences of the Franco-German war are not, however, an entirely safe guide for the future, owing to the great changes which have since been made in projectile weapons. With its improved guns, artillery is more than ever impenetrable to direct assault; and with its torpedo shells enabling it to demolish intrenchments or seek out infantry behind cover, it may yet, perhaps, completely belie Von Dresky's dictum. On the other hand, it will probably have more to fear from the enemy's skirmishers than ever before. A battle-field rarely affords artillery positions which cannot be approached under cover by the enemy's skirmishers, whose presence will no longer be betrayed by puffs of smoke, while the artillery will present a clear target. It

seems probable that artillery will in future be a more necessary, and a more powerful, aid to infantry than it has ever been in the past, and that in turn it will have more need of the protection of infantry skirmishers.

When engaged in a fight with infantry, artillery should endeavor, if unsupported, to keep at a range at which its own fire will be effective and that of the infantry comparatively harmless. It should accordingly, when practicable, open fire at a range of about 2,000 yards; but, if unsupported, it should not undertake a fight with infantry at a closer range, except when acting purely on the defensive.

ARTILLERY AGAINST CAVALRY.

The action of cavalry against artillery has already been described. (See p. 241.) Its success depends wholly upon surprise, and it may be said of cavalry, even more than of infantry, that, on open ground, artillery cannot be beaten or broken by its front attack. But with an enterprising hostile cavalry in the vicinity, artillery must indeed be vigilant, for an unexpected attack on its flank or rear, or while in the act of limbering or unlimbering, would be disastrous.

ESCORTS.

Artillery should, as a rule, rely for its protection upon its own fire and the action of the troops in its vicinity. When well posted, it should ordinarily need no special force for its protection; but to obtain its full power, it is necessary that it should occupy the most effective positions, and this sometimes deprives it of the immediate support of the other arms. In such a case, a special escort of infantry or cavalry becomes necessary, to guard it while moving to its new position, to secure it from flank attacks, and to protect its front when the ground is broken and irregular. If the new position is to be taken up quickly, the escort should, if practicable, consist of cavalry, which should be relieved by infantry as soon as it is expedient to do so. While the

artillery is moving, the escort is generally on the side toward the enemy, several hundred yards from the column, or it may partake of the nature of an advance guard or rear guard or both. The two great objects of the escort are to protect the artillery from surprise, and to keep the hostile skirmishers at a distance.

When the artillery is in position, the escort is, as a rule, on the flanks; slightly in front if composed of infantry, and somewhat in rear if composed of cavalry. Dismounted cavalry should be posted as infantry. The escort must not only guard the flanks, but it must vigilantly watch the front as well. In a long line of guns, detachments of infantry may be posted between the artillery battalions, or sometimes (as with the artillery of the Prussian Guard at St. Privat) between the batteries. Frequently the main body of the escort is on one or both flanks, while a chain of skirmishers, over which the artillery fires, covers the front.

The commander of the escort reconnoiters the position to be occupied, sends out scouts to the front and flanks to guard against surprise, and when there is ground in front which might shelter the enemy's skirmishers, he endeavors either to occupy it with skirmishers of his own, or to take up a position from which his fire can make it untenable. When the artillery is without support, a few mounted artillerymen should be sent out to each side to watch the front and flanks.

The *rôle* of the escort is purely defensive, and a prime requirement is that it must not mask the fire of the guns. If the escort be composed of cavalry, and its defensive functions require the temporary assumption of a local offensive, it should accordingly wait until the last moment, and then attack the enemy on the flank. At Sapignies, in 1871, two batteries of German artillery were attacked by French infantry in a heavy skirmish line, which had come within a hundred yards of the muzzles of the guns, when it was charged in flank by the cavalry escort and compelled to retreat.

A permanent special escort should never be assigned to a force of artillery. Such a measure would often have the effect of tying down a body of infantry or cavalry to a duty in which it would be superfluous, and it would deprive the artillery of the spirit of self-reliance essential to its efficiency. Whenever special protection is necessary, the artillery commander applies at once to the commander of the nearest troops, who should immediately furnish it. The commander of the artillery controls everything pertaining to his own arm, and gives the escort commander all information in regard to the movements and objects of the artillery that may be necessary for a proper performance of the escort duty. The escort commander should ordinarily be junior in rank to the commander of the artillery, though he is not under the orders of the latter, unless so placed by direction of their common superior. The escort commander is responsible that suitable measures be taken for the security of the guns; but the presence of a special escort for the artillery does not relieve the neighboring troops from responsibility for its safety.

When a force of artillery is in position and doing effective work, but is exposed without an adequate escort, it may sometimes be practicable to support it with another body of artillery. At the battle of Sedan eighty-four guns, pushed boldly forward, had been formed in a great battery near St. Menges, before a sufficient infantry force for its protection had arrived. In order to add to its defensive power, General von Kirchbach, commanding the V. corps, unhesitatingly sent ten more batteries to its support, and the great line of guns successfully held its ground, though it had an escort of only a few squadrons of cavalry.

The suggestion has been made by respectable authorities that machine guns be attached to batteries, to take the place, under ordinary circumstances, of an infantry escort; but the suggestion hardly seems practicable. The machine guns would present to the opposing artillery almost as good

a target as a field-piece would, and they could not conduct an equal fight in the open against skirmishers under cover. Moreover, it may be doubted whether the bullets of the machine gun could do anything that modern shrapnel can not. Still, the machine gun has not yet undergone a good war test, and its merits and demerits are largely a matter of conjecture.

THE SUPPLY OF AMMUNITION ON THE FIELD.

Necessity and Source of Supply.—A constant supply of ammunition is of even more importance to artillery than to infantry; for while the latter is emasculated by the exhaustion of its ammunition, the former, possessing no power of shock action, is deadened altogether. Hohenlohe truly says: "Artillery with open ground in front is invincible, if it has ammunition; without ammunition, it is a burden to its friends preparatory to becoming a trophy for its enemies."

The battery depends for its ammunition, first, upon its own limbers and caissons; then upon the ammunition column; and finally upon the ordnance train.

Position of the Limbers and Caissons.—When the battery comes into action, the limbers are, if practicable, placed on the flanks of the battery, on a line with the guns; when space does not permit of this, they are placed under the best obtainable cover in the vicinity. Each of the three caissons belonging to the "fighting battery" is placed in rear of its platoon, in the most convenient location for supply, and sheltered as much as practicable. The teams are habitually unhitched and removed, and the caissons and limbers are faced to the front, in order to furnish as much shelter as possible to the men issuing the ammunition. The remaining six caissons are with the reserve.

The Ammunition Column.—The ammunition column has already been described. (See p. 22 *ante*.) It habitually marches in rear of the combatant troops, just behind the ambulance train. When the army on the march becomes engaged

with the enemy, the corps commander designates a station for the ammunition column, at least three miles from the front line of battle, and his chief of artillery gives the necessary orders for halting it in the specified place. When the ammunition column takes up its designated position (which should be near, but not on, a road leading to the front, and should have free communication in every direction), its commander at once notifies the chief of artillery, and maintains communication with him. In the absence of orders, the ammunition column, when the sound of the guns indicates that a battle is on, halts four or five miles in rear of the front line of battle, and its commander at once reports its position to the chief of artillery.

The ammunition column is generally subdivided, each divisional section reporting to the commander of the divisional artillery to which it belongs, and the corps section to the commander of the corps artillery. The commander of the column remains with the chief of artillery of the corps, unless otherwise ordered. When the ammunition column is kept consolidated, the commanders of the corps and divisional artillery should be promptly and carefully informed in regard to its position and the safest and most direct route thereto. When the division columns carry the reserve ammunition for the infantry (as they almost invariably do), their position should also be reported by the chief of artillery of the division to the brigade commanders. The commander of the ammunition column when it is consolidated, and the commander of each section when it is subdivided, must keep informed of the movements of the artillery; should carefully examine the communications leading to the batteries which he is to supply, and, if necessary, should see that guides are posted to show the way. When the ammunition column is consolidated, it is under the orders of the corps commander, from whom all orders for changes in its position must come; when subdivided, the divisional sections are under the orders of the division commanders, and

the corps section is alone under the immediate orders of the commander of the corps.

When the battle is progressing favorably, the ammunition column should be brought up closer to the line of battle; but when the action is doubtful or unfavorable, it must keep at a distance, except only such caissons as are absolutely necessary to keep the guns supplied. When a retreat becomes necessary, the ammunition column must be sent far enough to the rear to prevent it from interfering with the movements of the troops.

Method of Supplying from the Limbers and Caissons.—There are two methods of supplying ammunition: first, from the limbers, which are then refilled from the caissons; and, second, supplying from the caissons direct, the ammunition of the limbers being kept as a last reserve. The first method is open to several objections. There is a waste of labor in transferring the ammunition from the caissons to the limbers; and to prevent the supply in the limbers from running dangerously low, some of the caissons must frequently be driven up to the limbers, and thus be exposed, not only in moving forward and retiring, but, still worse, at a halt while refilling the limbers.

The second method is the one adopted in our service, and is, by all means, the better one. The supply in the limbers being kept to the last, it is available after the destruction of horses has rendered it impracticable to obtain a supply from the rear, and the battery is not out of ammunition until it has exhausted the last round carried with it. The caisson can be sent back sooner than if the supply from the limbers were first exhausted and then replaced from the caissons. The limbers and their teams can take full advantage of cover in the vicinity, and in the case of an advance, the battery goes forward with a supply of ammunition immediately at hand. This method was used by the Germans in 1870, and its advantages are shown by the fact that when the Prussian batteries, after their long cannonade,

advanced to occupy St. Privat, they moved forward with limbers completely full, and were at once ready to repel any counter-attack by the French.

The first shots in ranging, and those required for rapid fire, may be, and usually are, taken from the limbers, being replaced at the first opportunity; but as soon as the caissons of the fighting battery are in position, the ammunition is habitually taken from them. When a caisson is nearly empty, its remaining contents are carefully deposited on the ground, and it starts back to the reserve at a trot, carrying with it such wounded men as may be able to stand this method of transport. If desirable to remove the dead from the battery, they may also be sent back on the empty caissons. The place of the empty caisson is at once taken by a full one from the reserve, which should, if possible, reach the battery before any demand has to be made upon the limbers for ammunition. As soon as the empty caisson reaches the reserve, it is immediately sent back to the ammunition column, its place being taken by a full caisson sent forward to the reserve, while it remains with the column to be filled. When a great battle or a series of actions has exhausted the contents of the ammunition column, it is sent back to the ordnance train, often many miles in rear, where it is reloaded, and sent back without delay to the corps to which it belongs.* In the case of horse artillery with cavalry, the fighting battery consists of pieces alone, and the ammunition is accordingly taken from the limbers. As soon as a limber is emptied, it is replaced by the limber of its caisson, and is sent back to be refilled from the rear chest of the same.

During an action, no opportunity of replenishing the ammunition of the batteries should be neglected, and the limbers and caissons should be filled to their utmost capac-

*The ammunition column of the Prussian Guard, after the battles around Metz, had to go back to the Prussian fortress of Saar-Louis to refill. It rejoined before the battle of Sedan, one of the sections having made 200 miles in ten days, including the time consumed in refilling.

ity. The end of the artillery duel is generally a good time for replenishing ammunition, and all lulls in the combat, and all other favorable moments, should be made use of for the same purpose. It should be remembered that the opportunities are fleeting, for at any moment the battle may assume such a phase as to demand a heavy expenditure of ammunition, and at the same time present no opportunity for replenishing it.

In spite of all that can be done to prevent it, a battery may find itself on the line of battle with its ammunition exhausted and no immediate supply available. In such a case, however, it must not withdraw, but must remain in position while waiting for a new supply to come up. It should be part of the creed of a battery commander never to withdraw except in compliance with the orders of a superior. To withdraw because out of ammunition, or to refit, should not be considered for an instant; for the moral effect of the withdrawal is often bad upon the other troops, and the reason assigned for retiring may be suspected of being a mere excuse inspired by faint-heartedness.* Generally the battery can be refitted, at least in part, without any necessity for withdrawal. Hohenhole gives the following striking illustration of an apparently disabled battery which is really fit for action: "Picture to yourself what it means when a gun or a battery is disabled. No. 1 gun has had all its horses killed—one effective round of shrapnel has sufficed to do this damage; No. 2 gun is on the ground with both wheels of its carriage broken; No. 3 gun has been hit on the muzzle by an enemy's shell, and is so dented that no projectile can be fired from it; No. 4 gun has had

*The author remembers hearing the late General Upton mention the case of a battery at Gettysburg which withdrew because it was out of ammunition, though it had been engaged only a short time. Investigation showed that the artillerymen had dumped a large part of their ammunition on the ground as a speedy means of getting rid of it. The battery was quickly sent back, and did not receive complimentary mention in orders for its conduct on the occasion. Had it been forbidden to withdraw, it might have done much better, and could not possibly have done worse.

its limber blown up; No. 5 has had its tangent scale shot away, and cannot be laid; No. 6 gun has had its breech-block demolished. Certainly this battery has been put thoroughly out of action. It must retire, they said in 1866. But if it be ordered to remain in position, what will it do? It gives No. 1 gun four of the horses of No. 3. As for No. 2, you can send for the spare wheel from the caisson—obviously the latter must be near at hand—or you may give it the wheels of No. 3. No. 3 will give its limber to No. 4 gun, and its wheelers also, to replace those killed by the explosion; it will give its tangent scale to No. 5, and its breech-block to No. 6 gun. In less than ten minutes the battery will be able to open fire with five of its guns. If another comes up on its flank to reinforce it, instead of relieving it, there will be eleven guns in action, which will hold their ground far more easily than would six of the second battery alone. Only No. 3 gun will remain permanently disabled.”*

The batteries draw upon the ammunition columns for men and horses to replace their losses in action; the necessary orders for such supply being given by the commanders of the divisional or corps artillery, as the case may be. The fighting battery draws immediately upon the reserve for men and horses, whose places are taken by those brought up from the ammunition column.

HORSE ARTILLERY.

* The distinguishing characteristic of horse artillery is its great mobility; and it is upon this quality that its value chiefly depends. The rapidity with which it can be moved from place to place as the exigencies of battle demand renders it peculiarly useful as a part of the corps artillery, and makes it a powerful auxiliary of the cavalry in attack and defense. The duties of horse artillery may accordingly be classified as those pertaining to its functions as a part of

*“Letters on Artillery.”

the corps artillery, and those which it performs as a component part of a cavalry division.

As Corps Artillery.—As a part of the corps artillery, horse artillery is especially valuable in extending a line of battle, in supporting flank attacks, in rapidly reinforcing threatened points, in the timely occupation of important tactical positions, and, in brief, in all cases where the guns have to move quickly into position.* So marked is the value of horse artillery with an army corps, that Hohenlohe declares that an ideal corps artillery would consist entirely of horse batteries.

As a Part of the Cavalry Division.—But great as is the value of horse artillery as a portion of the artillery of a corps, it is as a part of the cavalry division that this peculiar arm finds its greatest use and its chief *raison d'être*. When

*These special uses of horse artillery had many exemplifications in the War of Secession, from which the following may be selected:

General Cox, writing of the battle of Antietam, says: "Our officers were deceived in part as to the extent and direction of the enemy's line by the fact that the Confederate cavalry commander, Stuart, had occupied a commanding hill west of the pike and beyond our right flank, and from this position, which, in fact, was considerably detached from the Confederate line, he used his battery with such effect as to produce the belief that a continuous line extended from this point to the Dunker Church."

At Chancellorsville, Stuart detached his horse artillery to hold a point on the Orange turnpike, within a few hundred yards of where Howard's right flank rested, until Stonewall Jackson's corps could come up and make the attack. Notwithstanding the heavily timbered and generally unfavorable terrain, several of the guns were able to keep up a continual fire from the beginning of the attack until the Confederates reached the position in which they finally halted for the night.

At the battle of Cedar Creek (October 19, 1864), Taylor's battery, which belonged to the cavalry command, reinforced the infantry, and aided greatly in defeating the Confederate advance.

In the battle of Trevilian Station (June 12, 1864), Williston's battery was pushed forward, a good position having been gained on the right. "Right gallantly," says General Merritt in his official report, "did the battery come up in the midst of a heavy musketry fire, we being at the time so close to the enemy that their shells all flew far over us. Planting three guns of the battery in this position, where they dealt the enemy heavy blows, Lieutenant Williston moved one of the brass 12-pounders on to the skirmish line; in fact, the line was moved to the front to allow him to get an eligible position, where he remained with his gun in the face of the strengthened enemy—who advanced to its very muzzle—dealing death and destruction in their ranks with double loads of canister."

the cavalry is used as cavalry pure and simple, the horse artillery supplies it with a fire action that would otherwise be entirely lacking, and prepares the way for the charge, much as field artillery assists the infantry in attack. When, on the other hand, the cavalry is used in dismounted action, the horse artillery lends it precisely the same support and assistance that is rendered to infantry by the "indispensable companion" of the latter. In the pursuit of the defeated enemy, or in covering a retreat, the horse artillery is an invaluable auxiliary of the cavalry. The history of all recent wars shows that horse artillery gives to a cavalry force an enormous element of strength; and in our service a battalion of horse artillery, consisting of at least three batteries, is officially declared to be an integral part of a cavalry division.*

As a rule, the battalion of horse artillery is kept intact when the cavalry division is acting as a united body, and it is an error to assign a battery permanently to each brigade. When, however, a brigade is detached from the division, a battery of horse artillery should always be assigned to it, except when the brigade is to execute a reconnaissance in which celerity of movement and concealment from the enemy are paramount considerations, or when it is required to make a sudden dash in which success depends solely upon the element of surprise. In these cases, the artillery might, perhaps, be more of a hindrance than a help; but ordinarily no considerable body of cavalry should be detached without a horse battery. A battery should *never* be broken up by detaching a portion of its guns, except in case of most imperative necessity.

On the March.—When the cavalry division is advancing by a single road, and is not in immediate proximity to the main force of the enemy, one battery generally marches with the reserve of the advance guard, and the others march in rear of the leading regiment or squadron of the

*U. S. Light Artillery Drill Regulations, par. 1094.

main body. When a serious engagement seems probable, the battalion should be united, and march in rear of the leading squadron of the main body. It might, however, be expedient to have the entire battalion march immediately in rear of the reserve of the advance guard, if its immediate use seemed likely to be urgent, and the advance guard were well protected from surprise by numerous bodies of scouts spread out far to the front and flank; the commander of the advance guard holding in hand a compact small body of cavalry for the immediate protection of the guns. This might be the case, for instance, if a brigade constituted the advance guard of the division. This position of the artillery, which would be inexcusably rash in the case of an infantry division, is not really a very dangerous one in the case of cavalry, owing to the celerity with which support can come up from the main body. This disposition might be advisable when the path of the cavalry is barred by small bodies of infantry, or by partisan troops, and it is desirable to clear the way quickly and without subjecting the cavalry to unnecessary loss in making an attack. As a rule, however, not more than one battery marches with the advance guard, the rest being held in hand by the commander, or all being retained by him when a serious action seems imminent. When the division marches by several roads, a battery may be attached to each column consisting of a brigade or more, but habitually the entire battalion marches with the central column.

As a rule, all the caissons of each battery form a part of the battery reserve, the "fighting battery" consisting of guns only. The battery reserves, consolidated, march in rear of the main body.

In Reconnaissance.—In a reconnaissance in force or a special reconnaissance* horse artillery is usually a valuable adjunct to the cavalry. It assists the latter in driving in the outposts, and is of great aid in developing the

*See "The Service of Security and Information," p. 89.

hostile position. A few shells dropping among the enemy's troops will generally provoke him to open fire, and thus cause him to betray the position which it is the object of the reconnaissance to discover. This use of horse artillery does not, however, imply a justification of "shelling the woods," or of opening a cannonade on the mere chance of discovering something. It is only to develop the enemy's position when his presence is known.

In Action.—In the preliminary phases of a battle, horse artillery is especially useful, not only in developing the enemy's position, but in forcing columns of hostile infantry to deploy prematurely, and in hindering their advance. In an engagement of cavalry, which so frequently marks the beginning of a battle and its close, and which so often takes place on the flanks of the general line in the course of the conflict, its fire is used to pave the way for the attack of its own cavalry, or to break up the cohesion, and thus diminish the shock, of a hostile charging force.

The course of a cavalry combat is so rapid, and the phases of the fight change so quickly, that horse artillery must have not only a higher mobility than field artillery, but it must possess also the highest degree of efficiency and training, must use simple tactics, and must exercise the greatest skill in quickly ascertaining the range.

Position.—The division commander communicates his plans to the commander of the horse artillery, indicates to him, as far as possible, where the encounter is likely to occur, and points out the general position for the batteries. Much discretion is necessarily left to the artillery commander, who must exercise judgment in posting his guns so that they will be able to assist the cavalry to the utmost with their fire, and, at the same time, not interfere with its movements. Unlike the artillery engaged in supporting the infantry, the horse artillery, from the rapid movements of the troops which it supports, is usually able to occupy only one position, which should be either directly or

obliquely in front of a flank, according to the contemplated direction of the cavalry attack, and as close to the enemy as the terrain and the circumstances of the action will permit. This position would not ordinarily be more than one third of the distance between the cavalry and the object of its attack, and should be about 300 yards to one side of the expected point of collision of the opposing forces.

The guns are generally posted while the cavalry is forming for attack, and they are placed habitually on that flank which is least protected by the features of the terrain, and on which an attack by the enemy might imperil the line of retreat. The artillery thus furnishes a secure pivot for the maneuvers of the cavalry, and occupies a position in which it can longest remain in action.

That the horse artillery should habitually be posted on a flank is quite generally conceded; but Von Schell, whose opinion on all artillery subjects is entitled to the highest respect, is of the opinion that it is often simpler and better to push the artillery direct to the front against the enemy, and, by skillful maneuvers, to conform the cavalry movements to it. In this case the enemy's squadrons, inclining to meet the shock, will expose themselves to enfilade fire.

Objective of Fire.—The objective of the fire of horse artillery and the time of opening fire will depend upon circumstances. In any case, fire should be opened as soon as either the friendly or the hostile cavalry begins to move to the attack. If the enemy's cavalry be not in sight, the fire should be directed upon his artillery. As the hostile cavalry moves to the attack, it is of the greatest importance to shatter its first line, after which the fire is turned upon its support and reserve. When the two arms are properly placed in regard to each other, and the artillery is sufficiently to the flank of the scene of the *mêlée*, it will be able to fire with effect upon the enemy's reserve after the other parts of his force are engaged. If the enemy's artillery fire be employed with effect against our own cavalry, part of the

horse artillery, generally the battery on the outer flank, must turn its attention to the opposing artillery; but the rest should continue to fire upon the hostile cavalry, which must always be the principal objective of their fire. The fire of the artillery always produces a more or less demoralizing effect upon the charging column of cavalry. In the battle of Rummel's Farm (near Gettysburg, July 3, 1863), the repulse of the charge made by Hampton's and Fitzhugh Lee's cavalry brigades was in no small degree due to the guns of Lieutenants Pennington, Chester, and Kinney,* which fired shrapnel, and then canister, into the charging column, with deadly effect, until it was struck in counter-charge by Custer.

In order that it may act with effect in the fleeting moments of the charge, the horse artillery, as soon as it takes its position, should ascertain the range to points over which the opposing cavalry is likely to pass. If during the charge there be no opportunity of firing with effect upon the enemy without endangering their own cavalry, the horse batteries remain in position with guns loaded, and sometimes limbered, and await the result of the *mêlée*.

When the enemy's infantry is the object of the cavalry attack, it should first be well shaken by the fire of the horse artillery, which, without changing position, should continue to support the attack until the collision with the enemy takes place, or the cavalry masks the fire of the guns.

During the *mêlée* the commander of the horse artillery is confronted with a difficult question—whether to push forward to complete the victory, or stand to check the pursuit—which he must be prepared to answer promptly the instant the *mêlée* indicates, by direction of its breaking, the result of the charge. If the charge be successful, the batteries gallop forward to join in the pursuit, or at least to open fire upon the enemy to prevent him from rallying:†

*Battery "E," 1st U. S. Artillery, and Battery "M," 2d U. S. Artillery.

†In his report of the cavalry fight near Trevilian (June 11, 1864), General

If the charge be unsuccessful, one battery—generally the one on the outer flank—immediately takes up a position in rear from which to cover the rallying of the division. The other batteries continue their fire as long as possible, and if unable to check the enemy, they then join the other battery in the new position.

The most embarrassing position for the artillery is found when the cavalry, defeated in the charge, is driven straight back on the guns, the enemy mingled with it in pursuit. "The only chance of safety," says Von Schell, "is then to fire indiscriminately into the confused mass which is surging toward us." It is a sad alternative to have to fire alike on friend and foe, but here the instinct of self-preservation overrides all other considerations, and there is always, besides, the possibility by so doing of disentangling the mass, and forcing the enemy to loose his grip and to bring him to a standstill. Other means there is none." It is impossible to subscribe fully to this cold-blooded recommendation. Nothing but imperative necessity can justify it; and it would generally be better for the horse artillery to retreat at highest speed, under whip and spur, to a position where it may hope to make a stand. Such a mode of action as that recommended by Von Schell may, in rare instances, be unavoidable; but the necessity of the step probably would not be appreciated by the troopers who were fired upon by their own friends, and a bitter feeling would be engendered between the cavalry and the artillery which would be destructive of cordial support in the future.

In a General Engagement.—When the cavalry division participates with the rest of the army in a general battle, the position and duties of the horse artillery will depend upon circumstances. When the cavalry division is employed in guarding a flank of the army during the battle,

Merritt says: "The enemy's retreat finally became a rout; led horses, mounted men, and artillery all fled together in the wildest confusion. Williston, with his battery, did excellent practice with his guns, planting shells in the midst of the confused mass of the enemy."

its commander retains the horse artillery, for he may have occasion for its fullest employment. When, on the other hand, the cavalry division is held in reserve, its batteries should not stand idle, but should be sent to reinforce the general artillery line. This can be safely done, for the cavalry division, in this case, is called upon to charge only when the infantry and artillery have prepared the way for it. The horse batteries drawn from the reserve cavalry divisions may be well utilized on the flank of the general line, where they can engage the enemy in front, guard the flanks from his turning movements, or support the cavalry in the engagements which it is likely to have with the cavalry of the enemy.

In case of victory, the horse artillery habitually accompanies the cavalry in pursuit; but if the cavalry be held back, the horse batteries should not be kept inactive, but should advance and join in the artillery combat which almost invariably marks the concluding phases of a battle.

Escorts.—Unlike field artillery, horse artillery should always have an escort detailed for its protection. In the words of Von Schell: "Let us picture to ourselves a cavalry battle, the various phases of which are passing with lightning rapidity on one flank of the artillery, and we shall see how difficult it is for the officer commanding the whole to keep an eye on his different lines and detached portions and on the ground also on his other flank. His attention will be pinned where the collision takes place and passes with the celerity of lightning, and he will too easily overlook what happens on the other flank of his guns. Does it not seem far better to protect this flank against sudden attack from small bodies of the enemy than to compel the artillery itself to look after the safety of its exposed flank and thus impair its coöperation in the decisive attack? In an infantry engagement it is different entirely. There are far fewer movements, and the position of the guns with regard to the infantry in itself secures the safety of the former. On

the contrary, in a cavalry engagement there is nothing but movement, and the position of the cavalry with regard to the guns changes momentarily, thus causing the necessity of an escort for the latter. The cases in which the nature of the ground renders it unnecessary are so few and far between that we may lay it down as a rule that an escort should always be furnished." The strength of the escort will depend upon circumstances, and cannot be definitely stated, but generally one or two troops of cavalry will be sufficient for the horse artillery of a cavalry division. The duties of the escort consist chiefly in scouting and reconnoitering in front and on the exposed flank of the batteries, though it may be compelled, and should be ever ready, to engage the enemy, either in shock action or in dismounted fire action, as circumstances may require.

In moving into position the cannoneers may be deployed in single rank between the guns; and the battery, presenting at a distance the appearance of cavalry, may thus escape the hostile artillery fire which it would otherwise draw. By means of this ruse, the artillery may often take up its position without molestation, whether with or without an escort.

THE EFFECT OF SMOKELESS POWDER ON ARTILLERY TACTICS.

Some of the probable effects on artillery produced by the introduction of smokeless powder have already been incidentally touched upon, but there are others which remain to be considered. The distinctness of the target is a matter of the greatest importance to artillery, as the value of this arm depends altogether upon its ability to hit the object aimed at; and it is in regard to this important matter that the influence of smokeless powder is altogether due. Bodies of troops in the open can now be more plainly seen than formerly, and infantry and cavalry will no longer be able to make sudden dashes on the artillery under cover of the

smoke of the guns. On the other hand, troops under cover will be more easily concealed, and a thin firing line of infantry, which was formerly plainly marked by puffs of smoke, will now be scarcely visible. As a result, the batteries engaged in supporting the attack, being no longer able to fire over the heads of the firing line from a distance, will either have to push well forward or suspend their fire at a time when their assistance is most urgently needed by the infantry. It is, therefore, more necessary than ever that the artillery should accompany the infantry in the attack.

The smoke no longer marking plainly the position of the guns, artillery will now often be able to remain in action for a considerable time without being discovered; and the necessity of taking up a preliminary position is consequently not so marked as it was formerly. The laying of the guns being no longer disturbed by the smoke of their neighbors, the intervals between the batteries, and between the guns of the same battery, may be considerably diminished, and the aggregate front of the artillery may thus be reduced; though it must be borne in mind that the diminution of the intervals still results in presenting a more compact and better target to the enemy, and one which may be more plainly seen by him than it could under the former conditions. The inconvenience of smoke in rapid firing no longer exists, and the interruption of the firing of a battery, which was formerly often rendered unavoidable by the smoke, will no longer be required; nor will it be necessary, in choosing a position, to consider the direction of the wind.

When the nature of the terrain is such as to admit of it, the batteries may now be placed in tiers, one behind another, and the effect of the fire may thus be enormously increased, though the difficulty of supplying ammunition to the foremost batteries will be greatly enhanced.

As both the target and the striking of the projectile can be seen at the ordinary ranges more plainly than when black powder was used, the artillery should be able to make

better practice than it could under the old conditions. But at the longer ranges, and in the early stages of the battle, the difficulty of ranging has doubtless been greatly increased; for while the annoyance caused by the smoke has been reduced to a minimum, or practically removed altogether, a new evil appears in the indistinctness of the target, for the hostile batteries are no longer outlined by a cloud of smoke. The flashes of the hostile guns must now be watched with great care, and it will often be necessary to locate the enemy's artillery by the direction of the furrows made by its shells and shrapnel bullets. The position of the enemy once ascertained, auxiliary targets may be used.

RÉSUMÉ OF GENERAL PRINCIPLES GOVERNING THE EMPLOYMENT OF ARTILLERY IN BATTLE.

- I. Artillery should be brought into action at the very beginning of the battle, and should be actively employed as long as an enemy remains on the field.
- II. It should be employed in masses, and should concentrate its fire; but it must be remembered that massing guns does not consist in posting the batteries ★
★ contiguously, but in keeping them together under unity of command, so as to admit of mutual support and the direction of their fire on a common objective.
- III. It should take up a position as close to the enemy as it can without incurring unnecessary and ruinous losses.
- IV. It should not feel called upon to blaze away the moment it comes into position, but it should endeavor to open an *effective* fire with the least possible delay.
- V. It must never be forgotten that the value of artillery depends upon the accuracy of its fire.
- VI. Artillery should always fire at a definite object, and should avoid "shelling the woods," or engaging in any other ineffective cannonade.

- VII. Every opportunity should be taken to replenish ammunition. The supply must not be allowed to fail, especially at critical moments.
- VIII. The principal task of the artillery is to crush the enemy's infantry. It turns its attention to his artillery only as a means of getting rid of an obstacle to its attempts upon his infantry, or as a means of protecting its own infantry from the fire of the enemy's guns. In a cavalry battle, the cavalry is the objective of the artillery fire.
- IX. When the attack is successful, the artillery must push forward to secure the captured position.
- X. In case of defeat, the artillery must be prepared to cover the retreat, and, if necessary, to sacrifice itself for the safety of the rest of the army.
- XI. It should never abandon a position unless ordered to do so. The loss of guns is highly honorable when, by remaining in action until the last moment, they have inflicted serious loss on the enemy.

CHAPTER X.

THE THREE ARMS COMBINED.

* "If we must admit that, next to the genius of the general, the infantry arm is the most valuable instrument in gaining a victory, it is no less true that most important aid is given by the cavalry and artillery."—*Jomini*.

* { The use of the three arms combined implies the employment of a large command—never less than a division or a detached brigade—and a consideration of the proper handling of such a force requires a discussion of the general subject of the battle.

THE OFFENSIVE.

The Plan of Battle.—When an army comes in contact with the enemy, and the strategical operations are about to culminate in a tactical decision, its commander must first decide whether to attack or stand on the defensive. If the decision be in favor of the offensive, he must next determine whether to attack the enemy in front, to combine front and flank attacks, or to attempt to pierce some point of the hostile line. Having settled upon the method of attack, he must next decide upon the points of the opposing line upon which the attack should fall. These matters determined, he must provide for the combination of the several arms so as to obtain their most efficient mutual support and concerted action, and make the best use of the terrain. These decisions and arrangements constitute the plan of battle.

RELATIVE ADVANTAGES OF THE OFFENSIVE AND DEFENSIVE.

The relative advantages of the offensive and defensive have already been discussed in their relations to infantry tactics,* and but little remains to be added. The question of the offensive or defensive is generally settled by circumstances, rather than by the deliberate design of the commander. The advance guards of the two opposing forces meet, and the stronger generally forces the weaker into a defensive attitude. As reinforcements come up, the defensive may be changed to the offensive, or the reinforcements may find their utmost efforts necessary to maintain the fight even on the defensive. In the case of large armies, each will often be at the same time on the offensive and defensive on different parts of the field, the battle surging to and fro, according to the relative strength of the opponents at different points.

Where the choice of the offensive or defensive rests with

*See p. 160 *ante*.

the commander, he should weigh carefully the questions of terrain, the composition of the army, the relative numbers of the opposing forces, the *morale* and characteristics of his troops, his own temperament, and that of his adversary. The terrain may be such as to give the defense an enormous advantage, or, on the other hand, it may peculiarly favor an attack; an army largely composed of cavalry naturally seeks the offensive, while one whose strength rests mainly in its artillery assumes the defensive quite as a matter of course; relative numbers may justify or forbid an assault; veteran troops whose *morale* has been raised to a high pitch by a succession of victories may undertake with confidence an assault which would be madness with inferior soldiers; and raw levies, or troops which have been defeated in the open, may sometimes be successfully used on a pure defensive behind intrenchments, when they could not be relied upon to act well in the open field. Jackson, after repulsing the British with great slaughter at New Orleans, was wise enough to reject all suggestions of a counter-assault upon the position of the defeated army; and Pemberton, after having been repeatedly and heavily defeated in the field by Grant, successfully resisted all attempts of the latter to carry the Vicksburg intrenchments by assault.

* { The temperament of the commander may be such that he can act at his best only when he aggressively forces the fighting; or his genius may be of a defensive order, like that of Wellington or Lee. In either case, he will naturally seek that mode of action which is most in accord with his inclination and ability, unless the other be thrust upon him by circumstances. A knowledge of the temperament of his adversary may also have a great influence upon a commander in deciding his course of action. When Johnston was in his front, Sherman knew that offensive action, combined with vigilant guarding against a counter-thrust, was necessary; but as soon as Hood was placed in command of the Confederate army, the Union general at once

prepared to meet aggressive action on the part of his new adversary.* The national characteristics of the troops should also be considered. British soldiers have made many gallant assaults, and French troops have often conducted an heroic defense; yet the former have performed their greatest achievements on the defensive, and the latter, on the offensive.

A commander assuming the defensive should seek every opportunity to resort to the offensive whenever the enemy's assaults have been checked with loss; but a general whose aggressive movements are progressing favorably should *never* voluntarily change to the defensive. When Hooker, after his brilliant passage of the Rappahannock and the Rapidan, advanced upon Lee, a great victory was practically within his grasp; but his sudden and unnecessary change from the offensive to the defensive threw away the enormous advantages he had gained, gave Lee time to concentrate his army, and was the first step toward a defeat which should never have been incurred.

DIRECTION OF THE ATTACK.

Frontal Attack.—The frontal attack, or “attack all along the line,” is the least skillful, and generally the least decisive, mode of assailing the enemy. When he is covering his line of retreat, such an attack merely drives him back toward his base, and generally results at best in a barren victory. Still, frontal attacks may be expedient when the enemy's flanks rest upon impassable obstacles, and it is

*In his “Memoirs,” General Sherman says: “One of General Thomas' staff officers brought me a citizen, one of our spies, who had just come out of Atlanta, and had brought a newspaper of the same day, or of the day before, containing Johnston's order relinquishing the command of the Confederate forces in Atlanta, and Hood's order assuming the command. I immediately inquired of General Schofield, who was his classmate at West Point, about Hood, as to his general character, etc., and learned that he was bold even to rashness, and courageous in the extreme; I inferred that the change of commanders meant ‘fight.’ Notice of this important change was at once sent to all parts of the army, and every division commander was cautioned to be always prepared for battle in any shape.”

impossible to maneuver him out of his position; when a reconnoissance in force is necessary to develop the hostile position or to seek out a weak point in an adversary's line; or when the line of battle of the opponent is parallel to, or coincident with, his line of retreat. In the last case, a frontal attack may push him entirely off his line of retreat, rupture his communications with his base, and result in his destruction.*

* To be successful, a frontal attack requires a greatly superior force on the part of the assailant; for the prime requirement for success in battle is a preponderating force at some point. In an attack all along the line this condition is impossible unless the assailant greatly outnumbers his adversary; and even then many of the advantages of the initiative are abandoned. (The frontal attack made by Gen. Grant at Cold Harbor (June 3, 1864) is an undeniable blot upon the reputation of that great commander.) The result was a repulse with terrible slaughter, while the losses of Lee were insignificant. Gen. Grant, in commenting upon this battle, says frankly: "I have always regretted that the last assault at Cold Harbor was ever made. . . . No advantage whatever was gained to compensate for the heavy loss we sustained. Indeed, the advantages, other than those of relative losses, were on the Confederate side. Before that, the Army of Northern Virginia seemed to have acquired a wholesome regard for the courage, endurance, and soldierly qualities generally of the Army of the Potomac. . . . Indeed, they seemed to have given up any idea of gaining any advantage of their antagonist in the open field. They had come to much prefer breastworks in their front to the Army of the Potomac. This charge seemed to revive their hopes temporarily. . . . The effect upon the Army of the Potomac was the reverse."†

*A striking illustration of this is afforded by the decisive defeat of the Sardinians by the Austrians at Novara, 1849. See Hamley's "Operations of War," p. 64.

†"Memoirs, Vol. II., p. 276."

Flank Attacks.—Frontal attacks being rarely decisive and generally impracticable when the armies are nearly equal in size, some other method of overthrowing the enemy must be sought; and the one most often adopted is the combination of attacks on front and flank. Flank attacks have already been discussed,* and the necessity of combining such attacks with a front attack, to prevent the enemy from turning his whole attention to the flanking force, has also been considered. The increased range and power of modern weapons has, in fact, led naturally to this form of attack; for, every effort being made to bring a converging fire upon the enemy, and, at the same time, to cause his fire to diverge, an extension of the line, and an attempt to overlap the enemy, are brought about naturally. Such a movement, which would formerly have been dangerous in the extreme, as tending to a fatal weakening of the line, is now rendered practicable by the enormously increased power of the local defense conferred by modern weapons and the use of hasty intrenchments, which enable the weakened portion to resist counter-attacks.†

Unless the assailant has a great superiority of force, he can throw a preponderating weight upon one of the enemy's flanks only by reducing the strength opposed to the other portion of the hostile line. While acting aggressively with the reinforced portion, it is accordingly necessary to protect the other part from the assaults of the enemy, for it is not impossible that both commanders may form the same plan, as at Stone River, where Rosecrans and Bragg each

*See p. 141 *ante*.

†The increased power of local defense conferred by hasty intrenchments, even before the introduction of breech-loaders, was more than once shown in the War of Secession, and notably at Chancellorsville. In that battle, Hancock covered the front of his division with a line of skirmishers, with intervals of about three paces, protected with slight rifle-pits having an abatis in front. The skirmishers, consisting mainly of three regiments [57th, 64th, and 66th N. Y. Vols.] under Colonel (now General) N. A. Miles, held their position so successfully against repeated heavy assaults by the Confederates, that the enemy was not once able to reach Hancock's line of battle. (See official report of General Hancock.)

★ sought to attack the other's right flank. The protection of the weakened part may be effected by "refusing" (or withholding) it, in which case it is protected by distance; by intrenching it and holding it on the defensive, in which case it is protected by its power of local defense; or by making feints with it, such as to deceive the enemy as to the real point of attack. The means to be adopted will depend upon circumstances, but, generally speaking, the third method is altogether the best, as it keeps the enemy in doubt as to the point upon which the brunt of the attack is to fall, whereas the other dispositions might betray to the enemy the plan of attack.

Generally speaking, an attempt should never be made to attack simultaneously the flanks of an equal force, for in order to throw an overwhelming force upon both flanks, the assailant must so weaken his center as to expose it dangerously to a counter-attack by the enemy. An illustration of this is afforded by the battle of Austerlitz, where the Allies, attempting to turn Napoleon's right, and at the same time to drive back his left, found their own center pierced and the battle hopelessly lost. A successful attack upon both flanks of an enemy implies, therefore, a great numerical superiority (or the occupation by the assailant's center of a position so strong as to be impregnable against counter-assault). Thus, at Dresden, Napoleon won his last great victory by attacking simultaneously both flanks of an army whose numbers exceeded his own, but his center was so strongly posted as to be absolutely secure.

★ *Piercing the Enemy's Front.*—An attack which pierces the enemy's front is the most decisive of all, for it generally results in cutting off a portion of the hostile army from its line of retreat, and causing either its surrender or its annihilation. Thus, at Austerlitz, Napoleon, having pierced the center of the Allies, cut off their right (consisting of about 30,000 men), which he threw back upon the marshy lakes, where most of the fugitives who escaped capture perished by drowning.

An attempt to pierce the enemy's front is, under modern conditions, generally hopeless, unless the enemy has himself invited it by an undue extension for the purpose of overlapping both flanks of the assailant; for the attacking force, obliged to encounter the fire of the enemy's artillery masses from the moment of its first forward impulsion, and subjected to the concentrated fire of infantry weapons having at least five times the effective range of those of the Napoleonic era, would probably be annihilated before it could reach the hostile position. When the enemy's front is pierced, it is necessary to support the penetrating force promptly, or the enemy will envelop it in a counter-attack by his reserves, or will establish a new line in rear. Thus, at Gettysburg, Pickett's division actually succeeded in penetrating the Union line; but the supporting troops having been repulsed, the assaulting column was overwhelmed and practically annihilated.*

ORDERS OF BATTLE.

By the term "order of battle" is meant the relative tactical position of the opposing forces in preparation for battle or during the encounter. The subject has been treated by some military writers with a wealth of diagrams and an infinitude of pedantic detail calculated to make a scientific matter out of a subject which really pertains to plain common sense. Orders of battle must exist from the very nature of things, and with small and highly trained armies, such as those of Epaminondas or Frederick, when preparations for battle were made with deliberation, and the chief reliance was placed upon shock-action, the order of battle assumed in preparation for the encounter was a matter of the greatest importance. Now, however, when battles are generally those of *rencontre* rather than deliberate preparation, the whole matter is generally decided in accordance with the circumstances of the action, and the order of battle is more likely to be adventitious than premeditated.

*See p. 152 ante.

When an attack is made "all along the line," the parallel order of battle exists naturally. So too, when an attack in front is made in combination with a flank attack, the assailant assumes a reëntering order of battle; and this order is also produced when an army engaged with an opponent in front is reinforced from such a direction that the reinforcements strike the enemy on the flank, as at Waterloo or Königgrätz. When the defender refuses a portion of his force to meet a flank attack, he naturally assumes a salient or "crotchet" order. When an attempt is made to turn both flanks of the enemy, the assailant's order of battle is necessarily concave. If, on the other hand, the assailant attempts to pierce the enemy's front, the dispositions made to support the attacking column naturally give rise to a convex order of battle. If the defender then throws forward his flanks to envelop the assailant, the order of battle assumed by the former is a concave or enclosing one. When an attempt is made to strike the enemy on the flank and at the same time refuse the other portion of the line, the order of battle becomes oblique. This order requires for its success that the line should extend beyond the enemy's flank; for otherwise the assailant would practically expose his own flank to attack. The oblique order, which was the favorite order of battle of Frederick the Great, may now be regarded as practically obsolete, and the others may be broadly classed as *parallel*, *concave*, and *convex*.

We have already seen that the parallel order of battle can rarely be depended on to give decisive results. The concave order has the advantage of opposing a converging to a diverging fire. Its defects are that, unless it completely encloses the enemy, one or both flanks may be dangerously exposed to counter-attack; and that if too great an extension be made, the center may be so attenuated as to be pierced by a counter-assault of the enemy. It is usually much preferable to the convex order; and it may be said

that some variety of the concave order of battle is generally assumed by choice, and some form of the convex order from necessity. The latter is necessary, for instance, when an army crosses a river in the face of the enemy, and the commander is compelled to move a part of his force forward to cover the passage, and to push troops in on the flanks to protect the bridges from hostile attacks. An instance of the adoption of the convex order is furnished by Napoleon's passage of the Danube at Essling and Aspern, in 1809. It may also be expedient to assume this formation on the defensive under circumstances which will be considered later. The defects of the convex order are that the fire of the troops is divergent; that the enemy's frontal fire on one wing is likely to take the other wing in reverse; that if the line be pierced in front, both wings are, by the direction of the attack, at once taken in flank; and that if broken at either flank, in the case of an army covering the crossing of a river, the entire army is in danger of being cut off from its bridges. In general terms it may be said that any offensive plan of battle that does not contemplate the turning of a flank is faulty; and this condemns the voluntary assumption of the convex order on the offensive. Whatever the order of battle may be, the army must be prepared to follow up any successful attack, and prevent the enemy from accommodating his dispositions to the altered circumstances of the action.

POINTS OF ATTACK.

The determination of the point upon which the main attack is to fall rests upon both strategical and tactical considerations. If the sole object of the attack be merely to win a victory and gain possession of the field, tactical considerations alone need be entertained; but if the object be to gain the greatest results from the battle, strategical questions cannot be ignored in determining the points of attack.

Strategical Considerations.—When the hostile army is connected with its base by one flank, the attack should fall upon that flank, so that the enemy may be cut off from communication with his base, and thus be deprived of supplies and succor. In 1864-5, when Grant and Lee confronted each other on the Richmond-Petersburg line, Grant's attacks were directed against Lee's right, as that was the flank by which the Confederate army drew its supplies from the South. Operations against Lee's left might, perhaps, have resulted in the capture of Richmond, but they would not have cut him off from the district from which he obtained his supplies, nor prevented his junction with Johnston.

When the hostile army is connected by a flank with another army, a fortress, or any important strategic point, the attack should fall on the connecting flank. Thus Napoleon aimed his attacks against Wellington's left, at Waterloo, that being the flank by which the British maintained their junction with the army of Blücher. At Gravelotte, Bazaine was connected by his left flank with the fortress of Metz, while it was only by his right that he could maintain his communications with Paris and effect a junction with the army of McMahon, then at Châlons. An attack upon Bazaine's left would, if successful, result in the capture of Metz, but would leave his line of retreat intact, and would not prevent the junction of the two French armies; while a successful attack upon his right would cut off his retreat and drive him back upon Metz. Von Moltke accordingly made his principal attack upon Bazaine's right, defeated him, shut up his army in Metz, cutting it off from its base of supply, and completely separating it from McMahon.

When the line of retreat lies obliquely in rear of one wing, that wing should be the object of attack, in order that the enemy's escape may be cut off. To drive back the other flank would merely cause the enemy to assume a position perpendicular to his line of retreat, and thus rectify his

position. At Antietam the Confederate line of retreat (from Sharpsburg to Shepherdstown) lay in rear of their right flank; and McClellan accordingly ordered Burnside to make a vigorous attack upon Lee's right as soon as the attention of the Confederate commander was occupied with the attack made on his left by Hooker and Sumner. Then with the Confederate line of retreat in his grasp, the Union commander intended to throw his center forward and crush Lee, whose defeated army would find escape impossible. Had Burnside obeyed his orders promptly and with energy, the battle would probably have resulted in a decisive victory for McClellan. At Friedland, Napoleon, observing that the Russian line of retreat across the Alle lay in rear of their left, directed his attacks upon that flank, and, seizing the bridges, destroyed or captured nearly half of Benningsen's army. *

When the attacking army is connected by a flank with an allied army, with its base, with a fortress, or any important strategic point, the attack should be made from that flank; for this being the point to be especially guarded, the preponderance of force necessary for an attack will naturally be found there. At Ligny, Blücher, being connected by means of his right with Wellington, reinforced that flank and attacked with it, thus guarding his communication with his ally while assailing the enemy.

It is thus evident that strategical considerations often enter with great force into the question of selecting the point of attack; but tactical considerations are, nevertheless, generally paramount, as the great object is, above all, to make sure of beating the enemy; for no victory can be so barren as to be unwelcome.

Tactical Considerations.—Among the tactical considerations influencing this important element of the plan of battle are the following:

The enemy's advanced posts must be captured, unless they are so far apart that the attack can be made between

them, beyond the effective range of either; and this, owing to the range of modern weapons, is generally impossible, unless the advanced posts are very few, and the hostile line very long. When the advanced posts are strong and supported by each other and the main position, their capture is imperative, in order that the attacking force may not be caught between two flank fires while subjected to a fire in front. The advanced posts of Hougomont and La Haye Sainte, at Waterloo, extended forward from the British position like the bastions of a fortress; and from the nature of their situation their fire could take in flank all troops endeavoring to penetrate between them to Wellington's main line. They were accordingly the objects of persistent and determined attacks by Napoleon.

When a strongly fortified post exists *in* the line of battle, the attack should fall upon points where the line can be more easily penetrated, and from which the post can be assailed in flank or rear. At Wörth the fortified village of Fröschweiler resisted the efforts of the entire German V. Corps to carry it by frontal assault, but it was captured when attacked on the right and rear. But when a fortified post or some natural feature in the enemy's line secures his line of retreat or commands the other parts of the field, it must be made the object of attack and captured as soon as possible. Thus, at Gettysburg, "Round Top rose like a huge sentinel guarding the Federal left flank, while the spurs and ridges trending off to the north of it afforded unrivaled positions for the use of artillery." (It was accordingly assaulted in a most determined manner by the Confederates, early in the action, and had they succeeded in capturing it, they would probably have won the battle.) The mere fact of ground commanding much of the field does not, however, render it necessarily a decisive or key point. "At the battle of Bautzen the left of the Allies rested upon the steep mountains of Bohemia, which province was at that time rather neutral than

hostile; it seemed that, tactically considered, the slope of these mountains was the decisive point to be held, when it was just the reverse, because the Allies had but one line of retreat upon Reichenbach and Gorlitz, and the French, by forcing the right, which was in the plain, would occupy the line of retreat and throw the Allies into the mountains, where they might have lost all their *matériel* and a great part of the *personnel* of their army. This course was also easier for them on account of the different features of the ground, led to more important results, and would have diminished the obstacles in the future.”*

When one of the enemy's flanks rests upon an impassable obstacle, the other extremity of the wing thus situated will offer a tempting point of attack, for if the enemy's front can be pierced, the troops thus cut off may be thrown back upon the obstacle and either captured or destroyed, as in the case of the Allied right at Austerlitz. If the penetration of the enemy's line be impracticable, the exposed flank should be chosen as the point of attack, with a view to throwing the enemy's entire army back upon the obstacle. Such an opportunity was offered at the battle of the Alma, in regard to which Hamley makes the following comment: “At the Alma the sea-cliffs were on the Russian left and the Allied right. The Allies advanced in echelon from the right, close to the cliffs. The Russians, defeated, retired on Sebastopol with small loss, and hardly any captures were made. Had the Allies, leaving a wide interval between their right and the cliffs, advanced in echelon from the left, the victory might have been decisive of the campaign. And as to a counter-attack by the enemy between their right and the sea, it was evidently the step they should have most desired him to take. On the Russian right the river, too, was narrower, the heights lower and more gradual; the roads to the interior lay on that side—everything indicated it as the point of attack.”

*Jomini's "Art of War" (Mendell and Craighill's translation), p. 187.

In the preliminary stage of an action, any commanding ground which will afford a view of the enemy's general dispositions should be captured, even though it possess no other tactical merit.

FORMULATION OF THE PLAN OF BATTLE.

An intelligent plan of battle requires, above all, information of the numbers and position of the enemy. This information is gained in many ways;* but the most reliable information, because the most fresh, is that gained by reconnaissance, either in force, or by special bodies or patrols, acting either in close proximity to, or in actual contact with, the enemy. With a small force, the information in regard to the position and apparent plans of the enemy is generally gained by scouts; with a large body of troops, the reconnaissances made by scouting parties and officers' patrols are continued by the advance guard after it touches upon the enemy. Only in those cases where the position and intentions of the enemy are clearly understood beforehand, or where it is a paramount consideration to force him to accept battle without delay, does the advance guard attack seriously. Ordinarily it makes tentative demonstrations, or fights a delaying action while endeavoring to develop the hostile position and plans; the artillery of the advance guard occupying the reconnoitering position and opening at long range to cover the development of the reconnoitering troops and to compel the enemy to disclose the location of his batteries and the general outline of his position.

The General Order.—All information gained by the reconnaissance of the advance guard is immediately sent to the commander of the main body, who issues his orders as soon as he has gained sufficient information to enable him to formulate his plan. In the case of small operations or an unexpected encounter of the hostile forces, the orders would generally be verbal; but in the case of an army, they

*See "The Service of Security and Information."

should always be written, unless the urgency is such as to preclude the preparation of written orders. In the case of a large force, there should be a general order for all the subordinate commanders, and a special order for each. The general order should set forth clearly:

- I. The general situation of the opposing forces, and the position and probable designs of the enemy.
- II. The plan of action determined upon and the part to be taken therein by each portion of the attacking force; the strength and composition of which, with the names of the commanders, should be set forth in detail in the margin of the order.
- III. The preliminary position to be taken up by each distinct portion of the attacking force, and the objective of its attack.
- IV. The time when these positions are to be occupied, and the hour at which the attack is to commence from each.
- V. The positions of the field hospitals.
- VI. The positions of the trains of the different columns.
- VII. The position of the commander during the action.
- VIII. The strength and position of the reserves.

The Special Order.—The special order sent to each commander should set forth clearly the part he is to perform, but should not descend to matters of detail. If the subordinate commander be well qualified for his position, he may safely be entrusted with all matters of detail, and should not be hampered with unnecessary instructions. If he be incompetent, he should be relieved from command without delay, regardless of all considerations of personal bravery, past services, or exemplary character.

General G. K. Warren, who commanded the Fifth Corps in the Army of the Potomac, though gifted with an exceptionally fine intellect, and endowed with superb courage, and almost every quality of a great commander, seriously impaired the action of his corps, on at least one occa-

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* } sion (at Spottsylvania), by his unwillingness to trust his division commanders with the tactical details pertaining to their own commands. In commenting upon Warren's methods, Grant says: "After giving most intelligent instructions to division commanders, he would go in with one division, holding the others in reserve until he could superintend their movements in person also, forgetting that division commanders could execute an order without his presence."*

THE COMMANDER.

The position of the commander should, if possible, be upon an eminence, whence he can obtain a view of the entire field. He should not quit his position unless circumstances render it absolutely necessary for him to do so; and he should then leave an officer to direct to his new position all persons bringing reports. A neglect to observe this precaution may lead to disastrous, or at least embarrassing, results. At the battle of the Alma, Lord Raglan, after giving the order for the Second and Light Divisions to advance, pushed forward with a part of his staff at another part of the line, and actually occupied with a few officers a point well within the enemy's lines, where he could exercise no influence whatever on the course of the battle, as his position was too far from the scene of the main action, and was unknown to the army. Fortunately, the task of the attacking troops was a plain one, and no evil results arose from the erratic excursion of the British commander.

* } The successor of the commander in case the latter is killed or disabled should be designated beforehand to the subordinate generals, even though the succession fall naturally according to rank; and the general thus designated should be carefully informed of all the plans of the commander. At Chancellorsville, General Hooker, being disabled at the Chancellor House, left the front of the army without notifying his second in command, General Couch,

*"Memoirs," Vol. II., p. 214.

and without giving him any orders whatever. It was some time before the command was turned over to Couch, and in the meantime the Army of the Potomac, in a most critical situation, was fighting without a commander. *

(At Sedan the wounding of Marshal McMahon at the very beginning of the battle was a great calamity to the French; for he had not confided his plans to anyone, nor had he issued any instructions to his subordinates, who, as a result, were ignorant of the general situation and plan of battle. The Marshal had taken the precaution to designate General Ducrot as his successor, but that general was at a distant part of the field, and could not receive personal instructions from his wounded chief. To make matters worse, Ducrot was junior in rank to General de Wimpffen, who had just arrived, and who claimed and assumed the command, not only by virtue of his rank, but by authority of the Minister of War, who had directed him to exercise the chief command in case of any accident happening to McMahon. As a result, there was a second change of commanders while the battle was in progress, and as the views of Ducrot and De Wimpffen were at variance, and each put his own plans in execution the moment he assumed command, the situation of the French army, critical at best, was rendered desperate.

When a position cannot be found which will give the commander a view of the whole field, he should take a central position and detach reliable aids to keep him well informed of matters in those parts of the field which are beyond his own observation. Such staff officers may, or may not, be given discretionary power to issue orders in the name of the commander, according to the nature of circumstances and the degree of confidence reposed in the judgment of his aids by the commander. The necessity of having a staff officer at a distant part of the field was felt at Spottsylvania by General Grant, who says in his "Memoirs": *

"Burnside on the left had got up to within a few hundred

yards of Spottsylvania Court House, completely turning Lee's right. He was not aware of the advantage he had gained, and I, being with the troops where the heavy fighting was, did not know of it at the time. He had gained his position with but little fighting and almost without loss. Burnside's position now separated him widely from Wright's corps, the corps nearest to him. At night he was ordered to join on to this. This brought him back about a mile, and lost to us an important advantage. I attach no blame to Burnside for this, but I do to myself for not having had a staff officer with him to report to me his position."*

General Grant habitually took the most careful precautions to secure a full knowledge of his plans by his subordinates, at least to the degree to which each was affected by them. "It was his custom," says General Horace Porter, "when commencing a movement in the field, to have his staff officers understand fully the object he wished to accomplish, and what each corps of the army was expected to do in different emergencies, so that these officers, when sent to different points of the line, might have a full comprehension of the general's intentions, and so that when communication with him was impossible or difficult, they might be able to instruct the subordinate commanders intelligently as to the intention of the general in chief."†

A staff officer who undertakes the interpretation of the orders of his chief, or who assumes the responsibility of originating orders in the name of the commander, must be assured in his own mind that he thoroughly understands the views which he interprets, and that the orders which he issues are in complete harmony with the general plan of his chief, and in accordance with the requirements of the emergency under which they are issued. It is an authority not to be assumed lightly by a staff officer, who should remember that upon the result of his action may depend

*"Memoirs," Vol. II., p. 225.

†"Battles and Leaders of the Civil War," Vol. IV., p. 708.

not only the safety of the army, but his own professional advancement or ruin. But in cases of sudden emergency, when a subordinate general is unwilling to act on his own responsibility, any orders are better than no orders, and a staff officer should not hesitate to act.

THE RESERVE.

The commander should always provide a reserve, which he should hold under his own orders, for the purpose of giving a vigorous blow at a timely moment, either to clinch a success already gained or to check an advantage gained by the enemy. The question of the proportion of the force to be held in reserve cannot be definitely decided. The local reserves will vary according to the arm of the service, and will depend on the degree to which the troops are likely to become shattered, out of hand, or demoralized by the attack. Reserves are accordingly more necessary for cavalry than infantry, while artillery needs only a local reserve of men and horses, instead of batteries. The proportion of the force to be held in hand by the commander as a general reserve may often consist of one-fourth of the whole, a very possible division of the force being one-half for the front attack, one-fourth for the flank attack, and one-fourth for the reserve. In a great army the reserve may consist of several army corps. Thus, at Gravelotte, at 5 P. M., the VII., VIII., IX., Guard, and XII. Corps constituted the main line of the Germans, the I., III., and X. Corps being in reserve. The II. Corps, which came up later, was put into the main line almost immediately after its arrival. In the French army the II., III., IV., and VI. Corps formed the main line, the Imperial Guard being in reserve. The formation of the several German corps, at this period of the battle, varied; the XII. Corps, for instance, having a division in the fighting line, a brigade in the second line, and a brigade in the third; while all the Guard Corps was in the fighting line, except a small reserve near

Ste. Marie-aux-Chênes, about 1,900 paces in rear of the firing line.* The distances of the I., III., and X. Corps from the firing line were 5,000, 3,000 and 4,000 paces respectively. The French Guard was about 5,000 paces in an air-line from the firing line directly in its front, and about $5\frac{1}{4}$ miles from the right wing, where, as events proved, its support was most needed. These dispositions will explain the difference between the general reserve of a great army, and the "main reserve" or "third line," which a corps or smaller body often has.

The employment of the reserve must above all be timely. If it be used too soon, it will not be available for that moment of exhaustion usually found in every battle, when the victory will turn to the side which can first take the offensive. If used too late, the tide of defeat will have set in, and the enemy, flushed with victory, will be under such a headway of success that the reserve will be unable to do more than cover the retreat. In general terms it may be said that the reserve should be carefully husbanded until its employment becomes necessary; but a suitable time for its employment should always be found in the course of the action. To hold it unemployed merely to guard against possible unfortunate contingencies, is to discard a part of the strength of the army for no good end whatever. Probably the greatest mistake—one of the few mistakes—ever made by Napoleon was the withholding of the Old Guard at Borodino. On this occasion the most resolute of all commanders seemed to lose his nerve, and, saying that at a distance of 800 leagues from Paris he could not afford to employ his last reserve, lost the only opportunity presented during the whole campaign of giving a destructive blow to the military power of Russia. Similarly, at Antietam, when Lee was exhausted by his struggle

*It may be well to remind the student that in the German army the organization of the infantry was, four companies (250 men each) to a battalion, three battalions to a regiment, two regiments to a brigade, two brigades to a division, and two divisions to a corps.

against Sumner and Hooker on his right and Burnside on his left, McClellan had in reserve the corps of Fitz-John Porter, numbering 12,000 men, which he might have hurled against the Confederate center with decisive effect; but, overestimating the strength of his adversary, and fearing a counter-attack, McClellan let the "golden opportunity" pass, and with it passed the last chance of a decisive defeat of Lee on that field.*

THE THREE ARMS IN ATTACK.

Jomini well says: "It seems a waste of breath to say that the commander of a body of troops composed of the three arms should employ them so that they will give mutual support and assistance; but, after all, this is the only fundamental rule that can be established, for the attempt to prescribe for such a commander a special course of conduct in every case that may arise, when these cases may be infinitely varied, would involve him in an inextricable labyrinth of instructions." In the preceding chapters it has been seen that the infantry must protect and support the artillery; that the artillery must prepare the way for the infantry, support it in attack, and protect it in retreat; and that the cavalry must reconnoiter the enemy, protect the flanks of the army, support and gain time for the other arms by a vigorous charge when they are sorely pressed by the enemy, and reap the fruits of the victory by an energetic pursuit. These various functions of the three arms have been considered, and in discussing their combined action it now remains only to give a sketch of the ordinary course of an attack in which the three arms are engaged. The attack consists of the *preparation*, the *attack proper*, and the *occupation of the position* or the *withdrawal from action*.

*In considering the tactical errors which are at times made by even the greatest generals, the student should bear in mind that the circumstances and conditions of the battle which are presented in the light of history, and which can be discussed by the critic in the calm of the study, are never fully apparent to the general, who has to act upon uncertainty or imperfect knowledge and in the excitement of the battle-field. In nothing should criticism be more charitable than in the case of the errors of a general in battle.

The Preparation.—While making its reconnaissance, the advance guard endeavors to drive back the enemy until it encounters serious resistance, when it continues to fight a delaying action until it can receive reinforcements. From its mobility and its position near the head of the column, the artillery will be the first arm to arrive from the main body. It occupies the reconnoitering position,* whence it endeavors to develop the enemy's position by drawing the fire of his batteries, and begins the duel with his artillery. At this stage the proportion of infantry in action will probably be very small, and it will be engaged principally in protecting the guns; being mainly deployed as skirmishers in front of the artillery or held in more or less compact bodies on its flanks. The choice of position must be given up to the artillery, which is at this period the most important arm; and no serious attacks should be made, unless for the purpose of seizing some advantageous point or advanced post in front of the enemy's position. Such points when captured should be at once occupied with all the available strength of infantry and artillery, to prevent their recapture by the enemy. The infantry of the main body moves forward and takes position as the hostile line is developed and the plans of the commander are matured; it being placed under cover and concealed from the enemy as much as possible by the nature of the ground.

When the dispositions of the infantry are completed, the artillery is pushed forward, under protection of infantry supports, to the duel position,† where the guns are so posted that they will not soon be masked by the advancing infantry. All the guns should now be put into action if not already engaged; for it is from this position that the artillery duel, which has such an all-important bearing upon the rest of the battle, must be decided. During the artillery duel the infantry completes its preparation for attack, and moves forward to the third zone, where it comes within effective rifle

*See p. 316 *ante*. †See p. 316 *ante*.

range of the enemy. Up to this point, the plan of battle can generally be carried out as intended; but the attack once begun in earnest, the battle becomes dependent upon the action of the enemy and a multitude of fortuitous circumstances beyond the control of any one individual. "No battle," says Von der Goltz, "takes exactly the course that has been planned. Each has its surprises, and takes a course somewhat different from what has been intended." The termination of the artillery duel generally marks the end of the preparatory stage, and the infantry passes on to the real attack.

The Attack.—The infantry of the first line is now within effective range of the enemy, at a distance of about 1,000 or 800 yards, and its attack is directed upon designated points upon which the fire of the artillery has been concentrated.* The assault progresses according to the principles of infantry attack, the artillery concentrating its fire upon the points of attack, and the divisional batteries advancing to the supporting position† and pouring in a heavy fire upon the hostile infantry.

During the attack a portion of the cavalry is on the flanks of the attacking infantry, taking advantage of all sheltering features of the terrain to advance, and protecting the advancing infantry from attacks by the hostile cavalry. The cavalry reserve is held in rear of the general line, but not so far from the flanks that it cannot be brought up in time to reinforce the cavalry on the flanks in case the latter is repulsed or has difficulty in forcing back the enemy's horse.

Portions of the reserve are now ordered up to support and revive a flagging attack, or to check a counter-stroke by the enemy; reinforcements being always thrown in before the attacking troops are repulsed.

The attack finally culminates by the entire first line being merged in the firing line, opening a rapid magazine

*See p. 348 *ante*. †See p. 316 *ante*.

fire, and throwing itself upon the enemy with the bayonet; the second line usually joining it in the charge and the artillery supporting the movement with a rapid fire of shrapnel, until the attacking infantry arrives so close to the enemy as to render it impossible for the guns to fire upon him without endangering their own infantry.

RÉSUMÉ.

The special points to be considered in preparing and carrying out an attack by a force consisting of all three arms are :

- I. The clearest possible understanding of the nature and extent of the enemy's position.
- II. A definite object to be gained by the attack.
- III. A careful selection of the points of attack, and the formation of a plan of battle, which should not be changed unless circumstances absolutely compel an alteration therein.
- IV. The concentration of a powerful artillery fire on the point selected for attack.
- V. False attacks upon other points, to prevent the enemy from divining the real objective of the attack.
- VI. The support of the infantry attack by artillery, both in the duel and supporting positions.
- VII. Prompt use of the reserves at the decisive moment.
- VIII. Keeping a force of cavalry well in hand to guard the flanks, follow up a success, cover a defeat, or make a diversion.

The Occupation of the Position.—The attack generally causes an intermingling and disorganization of the first and second lines, which would leave them in a very poor condition to resist a sudden and determined counter-attack by the enemy's reserves;* and it is accordingly necessary to push forward the third line of the infantry (which should still retain its formation), to occupy the captured position without delay, and furnish a cover behind which the first

*See p. 108 *ante*.

and second lines may be re-formed. The artillery is also rushed forward into the captured position, where it takes the most advantageous positions for repulsing a counter-attack. Thus, at St. Privat, the Germans, after driving the French from the position, occupied it immediately with 138 guns. When a serious counter-attack seems imminent, or even possible, hasty intrenchments should be thrown up immediately.

When the enemy has been defeated and put to flight, the pursuit should be immediately taken up by the cavalry and horse artillery, supported as soon as possible by the third line and all available batteries, which should continue to fire upon the enemy as long as he is within range. The enemy should be driven completely from the field, and, in the language of Gneisenau at Waterloo, the pursuit should be "continued to the last breath of horse and man." It is here that the value of cavalry is especially manifest. It was the lack of cavalry that caused the victories of Napoleon at Lützen and Bautzen to be barren, and it was the presence of a large body of comparatively fresh Prussian cavalry that enabled the Allies to make the defeat at Waterloo an irreparable disaster for the French. *

In fact, without comparatively fresh troops, an immediate pursuit is generally out of the question. At Shiloh the retreat of the Confederates, who had suffered enormously in the two-days battle, might have been converted into a rout, and the victory rendered decisive, if Grant had been able to launch a considerable body of fresh troops in pursuit. But the Union army had itself been exhausted by the desperate struggle; and though Grant at first contemplated sending McCook's division in pursuit, he decided otherwise on considering the fatigued condition of that command, which had marched twenty-two miles the day before, over country roads deep in mud, had been in the rain all night without rest, and had been engaged in battle all day. Indeed, immediate pursuit was as plainly out of the ques-

tion in this case as it would have been at Waterloo, if Wellington had been compelled to rely upon his own exhausted troops to follow the enemy.

The commander of the attacking troops moves forward to the position as soon as it is occupied, and superintends the re-formation of the troops and the conduct of the pursuit.

Withdrawal after Repulse.—When the attack is unsuccessful, the infantry endeavors to withdraw by alternate bodies, the withdrawal of part being covered by the fire of the rest. The principal protection, especially if the infantry has been stubbornly engaged, must be furnished by the cavalry and artillery. The former should not hesitate to sacrifice itself in desperate charges, if by so doing it can gain time for the re-formation of the defeated infantry; and the latter should take up positions from which it can check the advancing enemy, and as long as its fire is effective, it should hold such positions regardless of any loss of guns.* These are the only rules that can be laid down for withdrawal after defeat. The manner of executing the details depends so completely upon the circumstances of the action and the nature of the terrain that it would be idle to undertake to prescribe any particular method of action.

THE THREE ARMS IN DEFENSE.

When a commander assumes the defensive, either from choice or through necessity, he should endeavor to occupy a position such as to guard securely his line of retreat, facilitate the tactical coöperation of the three arms, and enable him to change at an opportune moment from the defensive to the offensive. The first and second considerations are imperative; the third may be ignored when a purely defensive battle is intended. A purely defensive tactical action is rarely fought from choice, but circumstances may render such an action either sufficient or necessary. Thus, when the troops are too raw and uninstructed to be

*See p. 362 *ante*.

used in offensive operations, they may, perhaps, be able to give a good account of themselves on a pure defensive behind intrenchments. A rear guard generally fights a purely defensive battle to cover the withdrawal of the main body; and this method of action is also usually sufficient for an army covering a siege, an important pass, or its own embarkation. So, too, when an army has planted itself across the enemy's communications, it is necessary only to retain its position in order to ruin him, and a purely defensive battle may, perhaps, accomplish this result. As a rule, however, no defensive plan of battle is good unless it provides for an opportune change from the defensive to the offensive.

THE POSITION.

The consideration of a good defensive position embraces not only the position itself, but also the ground in its front and rear.

The Ground in Front of the Position.—The ground in front of the position should be such as to afford a clear field of fire, and such an unobstructed view as to prevent the enemy from approaching anywhere within effective range unseen. Time permitting, all obstacles in front of the position which would conceal or facilitate the enemy's attack should be destroyed, or occupied as advanced posts. Such defensible points as small woods, villages composed of stone houses, etc., may be occupied as advanced posts, provided that they are within easy supporting distance of the line of battle, and can be protected by it. As we have already seen, the enemy cannot penetrate between such posts without being subjected to a fire from flank and front; and as he cannot, therefore, pass them without first capturing them, they have the effect of isolating and breaking up his attacks. But it is an indispensable condition that the advanced posts should be strongly intrenched and capable of easy reinforcement. Thus, Hougomont, at Waterloo,

was an ideal advanced post, as it was strong in itself, had been further strengthened by engineering art, and was so situated as to enable reinforcements to be continually fed to it during the entire course of the battle. On the other hand, the Austrian advanced posts at Königgrätz were bad, because they lacked these essential conditions; and their speedy abandonment was prejudicial to the *morale* of the troops in the main position. Unless the advanced posts fulfill the specified conditions, and can accordingly be regarded as salients of the main line, it would be better to destroy them, or merely hold them with small forces for the sole purpose of preventing the unobserved approach of the enemy. Forces posted thus in observation should promptly withdraw without allowing themselves to be compromised in an engagement with the enemy. A serious mistake in this respect was made at the battle of Franklin, Tenn., where Wagner's division, ordered to hold an advanced position for the purpose of observing the enemy, and to retire on his approach, awaited the onslaught of the entire Confederate army, and was driven back in rout, the enemy entering the Union works on the heels of the fleeing soldiers, who acted as a shield from the fire of the unshaken troops in the main position.

A village in front of the position may be utilized by setting fire to it just before the attack, and thus covering a portion of the line with an obstacle through which the enemy cannot penetrate. The portion of the line in rear of the village can accordingly be held with a comparatively weak force, and the enemy will be compelled to separate his attacking columns. In this manner the Russians used the village of Bourliouk at the battle of the Alma. Such a conflagration is, however, open to the objection that it may be an obstacle to an offensive return on the part of the defenders.

★ A front covered by a river is not generally to be recommended. It will, to be sure, usually afford complete pro-

tection from a front attack, and if the enemy attempt to cross in the immediate vicinity, and his movements be clearly observed, such a position will enable the defender to throw superior numbers upon the first detachments of the hostile army which cross. But the assailant, screened by the river, will generally be able to make feints at different points up and down stream, and to effect a passage in spite of the occupation by the defender of a strong position at some point of the river front.

(An impassable obstacle, such as a river, marsh, or precipitous ravine, extending along part of the front of the position, may sometimes be very advantageous, as it enables the part of the line thus covered to be held by a small force, and is especially good for artillery, which can thus be protected in front, while its own fire is unimpeded.) Such a position is, however, open to the serious objection that it does not admit of a forward movement of the defender in making an offensive return; and the enemy can, consequently, throw his entire weight upon the uncovered portion without fear of counter-attack from the troops behind the obstacle. Thus, at Ramillies, Villeroi had "paralysed half his army" behind the Anderkirch and Gette rivers, and was unable to use it when Marlbrough threw his weight upon the other portion of the French line.

If the ground in front of the position be intersected by an impassable obstacle which ends just before reaching the position, it will be a great advantage to the defender, as it will compel the assailant to separate his forces, while the defender can throw his weight from one side to the other at will. Such a position was occupied by the Confederates at the battle of Port Gibson, Mississippi, where a deep and precipitous ravine in front of the position compelled General McClermand to divide his forces to attack, in such a manner that one flank could not reinforce the other. As a result, when Osterhaus, commanding the left, suffered a repulse, he could not be assisted by the forces on the right,

and was severely handled before he could be reinforced from the rear. At Cold Harbor the front of Gibbon's division was cut in two by a marsh, which, widening as it neared the Confederate position, constituted an obstacle to which the failure of the attack at that point was mainly due.

When time permits, the ground in front of the position may be covered with military obstacles, such as abatis, wire entanglements, small pits, etc.* Such a measure is rarely practicable except in the defense of fortified positions, but generally in preparation for a defensive battle the ground may be cleared in front and rude abatis constructed.† Fences and hedges found on the field may often be utilized with excellent effect. Such obstacles as a barbed-wire fence or a thick-set thorny hedge are peculiarly good. In his report of the battle of Franklin, General Cox says: "On reaching the Osage orange hedge in front of Stiles' left, they [the Confederates] first endeavored to force their way through it and pull it aside. The tough and thorny nature of the shrub foiled them in this, and they attempted to file around the hedge by the flank, and under a terrible, withering fire from Stiles' and Casement's brigades and the batteries on that flank. They soon abandoned this effort, and most of those remaining unhurt lay down behind the hedge, and, after keeping up a desultory fire for a time, straggled to the rear, singly and in small squads."‡

In general terms, the ground in front of the position should be such as to impede the enemy's progress, and break up and isolate his attacks, without interfering in any way with the defender's fire.

The Position Proper.—One of the very first requisites of a defensive position is that it should be suited in extent to the size of the force which is to occupy it. If the posi-

*For a description of these obstacles, see Beach's "Manual of Military Field Engineering," p. 37 *et seq.*

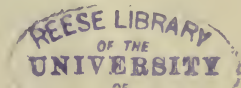
†See p. 155 *ante.*

‡Official Report of General J. D. Cox, Commanding 23d Army Corps.

tion be too extended, it must be too weakly occupied in some parts; while if its extent be too small, the force will be too much crowded for efficient action, and will be exposed to unnecessary loss. The number of men per yard for the suitable occupation of a position under the present conditions of war is a matter in regard to which the best authorities differ. For a battalion alone, about three men to a yard would be sufficient. In larger forces, including troops in reserve, the position would require at least five men to each yard of front, without making provision for any formidable offensive movement beyond the position. With large armies the proportion may be as high as twelve men to a yard on the defensive, and from twelve to fourteen on the part of the assailant. Generally about seven men to a yard may be regarded as ample for the defense of a position.* In many cases, however, the position must be held with less than the desired numbers or abandoned altogether. Thus, Werder, on the Lisaine, in January, 1871, in order to oppose with any prospect of success the larger army of Bourbaki, held his position with less than two men per yard of front. It is not to be supposed that the troops will habitually, or even often, be posted in equal strength along the entire front, especially if the front be of considerable extent. "A division," says Meckel, "may be over-dispersed by extending 2,000 yards if it has its troops posted in equal strength all along its front. It may, however, occupy a still greater front without incurring this reproach, if the main forces are concentrated on a front of 800 to 1,600 yards, and the remaining portion of the line is occupied with small, unimportant detachments."

As an approximate rule, the front of an army corps on the offensive may be taken at 3,000 yards, and on the defensive at 4,500 yards; the numerical proportion of the reserves being smaller in defense than in attack.

*Brialmont gives 63 men as an average, while Mayne gives the number required as "seven to ten."



An essential requirement for a good defensive position is that good cover should exist for the troops. This cover may be natural or artificial. Natural cover that will conceal the position of the reserves and the movements of troops from one part of the field to another may often, indeed generally, be found, if the commander understands how to utilize the terrain; but protection for the troops actually engaged in combat must generally be provided by intrenchments.

* As intrenchments compensate for a considerable numerical inferiority, they enable a commander to hold a part of his line with a comparatively light force, and thus to assemble the greater portion of his strength at another part for offensive movements. Brialmont divides the field into a defensive and an offensive zone. On the former the object is to hold the enemy in check as long as possible with the least number of men; to provide, in fact, for a pure defense. On the latter they are intended merely to shelter the troops until everything is ready for the attack, and, in case of repulse, to support them when driven back. On the former zone the intrenchments should be continuous; on the latter they should be constructed for only a part of the first line, with intervals through which the troops may advance. The intrenchments should never be so constructed as to constitute a serious obstacle to the advance of the defender when he decides to make a counterstroke. When Burnside made the famous assault upon the crater caused by the explosion of the mine at Petersburg, the Union breastworks, which were continuous, had not been prepared for the forward movement of the assaulting columns, which "clambered over them as best they could," and their ranks were thus broken at the very beginning of the attack.

* The intrenchments should not be constructed before some definite plan can be formed; and the commanders of the troops that are to occupy them should be clearly in-

structed as to the general plan of action and the part they are to perform. At Königgrätz, Benedek caused his engineers to construct elaborate batteries and breastworks for the supporting infantry; but the subordinate commanders were neither consulted nor notified, and the works were not occupied during the battle. It is always best to have the troops construct the intrenchments themselves; for the men are better satisfied with their own work than that which is done for them. In the United States service, the construction of field works by the troops that are to occupy them is not only desirable, but necessary, owing to the small number of engineer troops. At Fair Oaks, General McClellan desiring that the position of Seven Pines should be strongly held, Lieutenant McAllester, of the Engineers, was directed by the chief engineer, General Barnard, to fortify the ground. Selecting a suitable position, he began the construction of a redoubt, rifle-pits, etc., but, being unable to procure men enough to push the work rapidly, he could not complete the fortification before the battle.* At Fredericksburg the Confederate engineers constructed redoubts for the artillery, which failed to satisfy the troops detailed to occupy them. "Without delay, the men made the redoubts as snug as possible, and, finding the epaulements not to their liking, went to work with pick and shovel throwing the dirt a little higher, and fashioning embrasures to fire through." The engineers objected, and said they were 'ruining the works,' but the cannoneers said, 'We have to fight here, not you; we will arrange them to suit ourselves.'"†

Any strong points in the line itself, such as small woods, stone houses, etc., are very advantageous, especially as furnishing good points of support for offensive returns; but they must not constitute obstacles to the free movement of troops within the position. Fulfilling this condi-

*Webb's "The Peninsula," p. 100.

†"Battles and Leaders of the Civil War," Vol. III., p. 97.

tion, they should be strongly fortified and held; otherwise they should either be destroyed or the line should be so occupied as not to incorporate them.

Strong points are necessary for the proper protection of the flanks, which should be so secured as to render it very difficult for the enemy either to force or turn them. Impassable obstacles are not, however, always the best, as they prevent an extension for an offensive return; and, moreover, if the line be penetrated by the enemy, the troops on the flank may be cut off and thrown back upon the obstacle. Thus, at the battle of Blenheim (August 13, 1704), Marshal Tallard having rested his right flank on the Danube, his front was pierced by Marlborough, and his right hemmed in against the river, where it was compelled to surrender.

A flank is generally best supported by resting it upon a hill easily defended and difficult of access by the enemy; on a village which can be put in a good state of defense; or, best of all, on a strong fortification. When a flank has no such points of support, it may be practicable to protect it by hastily constructed field works mutually flanking each other with their fire. The flank should always, if possible, be so strongly posted that it cannot be easily carried by direct assault; nor turned by the enemy, except by making so long a detour as to separate his forces, and give the defender ample opportunity to meet the movement.

When it is impossible to rest the flank on secure points of support, it should at least be protected by holding a reserve immediately in its rear, so as to oppose a front readily to an attack upon the flank; or by refusing a part of the line, so as to form a crotchet. The latter expedient is, however, open to several serious objections, chief of which is that it presents a salient angle to the enemy, and thus exposes a weak point to attack. A flank unsupported—or, as it is generally termed, “in the air”—is a perilous defect in a defensive position, and one by which an

able and enterprising adversary is almost sure to profit. At Gettysburg the proper support of the Union left was the Round Top, on which, in fact, it eventually rested; but on the second day of the battle, General Sickles, commanding the Third Corps, on the extreme left, took up a position in front of the true line of defense, with his left flank unsupported. Two brigades were refused as a crotchet, and a salient was thus presented to the enemy, of which he quickly took advantage. A furious attack of the Confederates smashed in the salient, rolled up the Third Corps, and was finally checked with great difficulty by the Second Corps on the right, and the Fifth Corps, which had been hurried in on the left. The line of the Army of the Potomac was rectified during the night, and the great battle of the following day found Meade in the position which should have been occupied in the first place.

Perhaps the most serious defect of a defensive position is an impassable obstacle intersecting it; for in this case a part of the defender's army may be defeated before it can receive assistance from the portion on the other side of the obstacle. At Fair Oaks, McClellan's position was intersected by the Chickahominy, three corps being on the left bank and two on the right. No adequate means of communication existed between the two parts of the army separated by the river, and heavy rains had swollen the stream and seriously injured the few bridges that did exist. While the Union army was in this position, the two corps on the right bank were struck by the Confederate army under Johnston (May 31, 1862), were driven back with heavy loss, and were rescued from a great disaster only by the arrival of Sumner, who, by almost superhuman efforts, at last succeeded in getting his corps across a single dilapidated bridge, which threatened at every moment to give way under the weight of the troops crossing it. After the battle, numerous strong and good bridges were thrown across the stream.

The Ground in Rear of the Position.—The ground in rear of the position should offer a series of good defensive positions which can be taken up in the event of defeat; and, above all, the army should not have an impassable obstacle in its rear. A position with a river at its back is generally a bad, and sometimes a fatal, one; for, if defeated, the army will probably have but few bridges over the stream, across which it will be compelled to defile in all the confusion of retreat; and even these may, perhaps (as at Friedland), be seized by the enemy. Even if the bridges have not been captured by the victor, each constitutes practically a difficult defile in which the retreat may be seriously blocked.*

But in war, more than in anything else, there are exceptions to every general rule; and circumstances may make it advantageous for a commander to stand on the defensive with a river at his back. If the stream be crossed with many good bridges in rear of the position, it may be possible for the army to retreat across the river, and check the pursuit by the destruction of the bridges. Thus, at Königgrätz, the Austrians retreated over many bridges, which they destroyed after crossing, and the Prussian pursuit was so checked that Von Moltke lost all touch of the retreating army for three days. So, too, if the army be largely composed of raw troops, who cannot be depended upon, its fighting power may be stimulated by the knowledge that it has no chance of retreat. Gen. Morgan, having been criticised for taking up a position at The Cowpens (January 17, 1781), with a river at his back, replied: "Had I crossed the river, one-half of the militia would have abandoned me. Had a swamp been in rear, they would have made for it. . . . As to a retreat, I wished to cut off all hope of one." General Sam Houston adopted similar

*In his official report of the battle of Bull Run, Colonel (afterwards General) Burnside says: "The enemy opened fire upon the retreating mass of men. Upon the bridge crossing Cub Run, a shot took effect upon the horses of a team that was crossing. The wagon was overturned directly in the center of the bridge, and the passage was completely obstructed."

tactics, with success, at the battle of San Jacinto, where his small force of undisciplined Texans was confronted by a greatly superior force of Mexicans under Santa Anna. In this case the bridge over Vince's Bayou (an unfordable stream in rear of his position) was destroyed by his order, and his troops had absolutely no means of retreat. It thus became literally a case of "victory or death," as the Mexicans were not in the habit of giving quarter to Texans.

Requirements of a Good Position.—To be perfect, a defensive position should fulfill the following conditions:

- I. It should have a clear field of fire to the front and flanks.
- II. The ground in its front should be such as to impede the enemy without affording him shelter from fire.
- III. There should be no points in its front which could be advantageously occupied by the enemy. Should such points exist, they should either be held as advanced posts or destroyed.
- IV. It should be suitable in extent to the size of the force which occupies it.
- V. Its flanks should rest securely upon defensible objects.
- VI. It should have good lateral communications; such that the different parts of the front may be able to assist each other.
- VII. It should furnish good cover for the troops.
- VIII. It should be such as to admit of the concealment of the strength and composition of the force occupying it.
- IX. It should cover the line of retreat squarely.
- X. The terrain should be adapted to the action of that arm in which the defender is proportionately strongest or superior to the enemy; and it should be such as to facilitate the assumption of the offensive at an opportune moment.

No position can be expected to fulfill all these conditions, but a good position will fulfill many or most of them.

ORDERS OF BATTLE.

In regard to this subject there are some considerations relative to the defensive which have not been discussed in the foregoing pages. On the defensive, as on the offensive, the order of battle may be either straight, concave, or convex; and the defender may also assume the crotchet formation for the purpose of protecting one of his flanks. Whether the straight order on the part of the defender will be the same as the parallel order will depend, of course, upon the dispositions of the assailant. Provided that the defender can hold each part of his line strongly, that his flanks rest securely, and the reserves can be so held as to admit of the ready reinforcement of all parts of the line where the enemy can make his heaviest attacks, the straight order is usually the best that the defender can adopt.

Harbor { The Concave Order.—When the flanks rest so securely as to forbid attacks upon them, the concave order is, undoubtedly, the best for the defense. This was strikingly exemplified by Lee's position at Cold Harbor. The attacking force, in this battle, consisted of the corps of Hancock on the left, Wright in the center, and W. F. Smith on the right. "The enemy's general line," says General McMahon, "although refused at certain points and with salients elsewhere, because of the character of the country, was that of an arc of a circle, the concave side towards us, overlapping on both flanks the three corps intending to attack. The line of advance of Wright's command holding the center was therefore perpendicular to that of the enemy. Hancock's line, connecting with Wright's left, extended obliquely to the left and rear. A movement upon his part to the front must necessarily take him off obliquely from the line of advance of the center. The same was true of Smith's command upon the right. . . . The general attack was fixed for the afternoon of the 2d, and all preparations had been made, when the order was countermanded and the attack postponed until half-past four the

following morning. Promptly at the hour named, on the 3d of June, the men moved from the slight cover of the rifle-pits, thrown up during the night, with steady, determined advance, and there rang out suddenly on the summer air such a crash of artillery and musketry as is seldom heard in war. No great portion of the advance could be seen from any particular point, but those of the three corps that passed through the clearings were feeling the fire terribly. Not much return was made at first from our infantry, although the fire of our batteries was incessant. The time of actual advance was not over eight minutes.★

In that little period more men fell bleeding as they advanced than in any other like period of time throughout the war. A strange and terrible feature of this battle was that as the three gallant corps moved on, each was enfiladed while receiving the full force of the enemy's direct fire in front. The enemy's shell and shot were plunging through Hancock's battalions from his right. From the left a similarly destructive fire was poured in upon Smith, and from both flanks on the Sixth Corps in the center. . . . No troops could stand against such a fire, and the order to lie down was given all along the line. At points where no shelter was afforded, the men were withdrawn to such cover as could be found, and the battle of Cold Harbor, as to its result at least, was over. Each corps commander reported and complained to General Meade that the other corps commanders, right and left, as the case might be, failed to protect him from enfilading fire by silencing batteries in their respective fronts; Smith, that he could go no farther until Wright advanced upon his left; Hancock, that it was useless for him to attempt a further advance until Wright advanced upon his right; Wright, that it was impossible for him to move until Smith and Hancock advanced to his support on the right and left to shield him from the enemy's enfilade. These dispatches necessarily caused mystification at headquarters; so much so that copies of Hancock's and

Smith's dispatches were sent to Wright and copies of his to each of the others. The explanation was simple enough, although it was not known until reconnaissance had been made. The three corps had moved upon diverging lines, each directly facing the enemy in its immediate front, and the farther each had advanced the more its flank had become exposed."*

In order that the concave order of battle may be advantageous to the defense, it is an indispensable condition that the flanks should rest securely. Otherwise it would afford the enemy an opportunity to turn both flanks by a movement directly forward.

The Convex Order.—For the defender, as well as the assailant, the convex order is generally assumed from necessity rather than choice. To cover the embarkation of an army, or its retreat across a river, this order of battle is a necessity; and it is manifest that no other order would answer the purpose. When Schofield, retiring before the superior numbers of Hood, was endeavoring to effect a junction with Thomas, he found it necessary to check the closely pressed pursuit, at Franklin, in order to effect the passage of the Harpeth River. He accordingly adopted a convex order of battle, with both flanks resting on the river, and the reserve in rear of the center, whence it could readily support the center or either flank, according to the direction of the Confederate attack. In this connection, the remarks of General Ruger in his official report of the battle are peculiarly interesting, as showing some of the defects of a convex order of battle, and the manner in which they may be remedied: "Owing to the relation of the line to that which would be occupied by the enemy in case of an attack on us, being that of an inner arc of a circle, the enemy's being the outer arc, and affording, particularly to my left, positions for artillery which could enfilade and fire in reverse on the right portion of the line, I caused the line of breastworks

*"Battles and Leaders of the Civil War," Vol. IV., p. 215.

to be made in the form of a broken line, thus obviating that difficulty, and also giving a cross fire on portions of the ground in front, particularly the slight elevation before spoken of, as being about 150 yards in front of the center of the line of the division." That the convex order of battle, notwithstanding its defects, can be advantageously used on the defensive is abundantly proved by this battle, in which Hood was so heavily repulsed that Schofield was able to cross the river and effect his junction with Thomas, without further molestation.

The convex order of battle may often be advantageously employed by a rear guard in covering the retreat of an army across a river or through a defile.*

The Crotchet Order.—When a general finds it necessary to refuse one wing of his army to protect it against a flank attack by the enemy, the order of battle thus produced is known as the crotchet or rectangular order. A striking illustration of the defects of this formation is furnished by the battle of Prague (1757), where the Austrian army practically occupied two sides of a square. Frederick, throwing his weight upon the enemy's right wing, crushed it, cut off a portion of the Austrian army, and drove the rest in wild confusion into Prague. The objections to this order of battle are summed up by Hamley as follows:

1. "The whole force of the assailant may be brought to bear on one face of the angle.
2. "The advance of either face causes a gap at the angle.
3. "The face assailed will then be liable to be turned on both flanks.
4. "The fire of the assailant's artillery enfilades one or both faces.
5. "The defeat of the assailed wing compromises the retreat of the other, supposing the original front of the army to have covered its proper rear.

*See "The Service of Security and Information," p. 191.

6. "The troops at the angle, exposed to a cross fire, must crowd on each other in falling back, and so create a weak point in that decisive part of the line."

Nevertheless, under certain circumstances, the crotchet order may be adopted with advantage. It certainly has in its favor the fact that the reserve can be so posted as to reinforce readily any part of the line, and the nature of the ground may be such as to obviate the fourth objection stated above. At Gettysburg, Meade's order of battle was a salient one, and a close approximation to the crotchet order. Yet Culp's Hill and Cemetery Ridge served as huge traverses to protect each wing from a reverse or enfilade fire from the portion of the enemy fronting the other. The terrain offered similar advantages to the Austrians at Königgrätz. In both cases, however, the salient order was assumed as a matter of necessity.

THE THREE ARMS IN DEFENSE.

As in the offensive, the information in regard to the movements and probable intentions of the enemy is gained by reconnoissance, and, in the case of a large force, also by engagements of advance guards or outposts, which the enemy endeavors to drive in, either as a preliminary part of the attack or for the purpose of discovering the position by a reconnoissance in force. A shrewd commander can often divine the intentions of his adversary from his tentative attacks, discriminating between those which are apparently feints and those which seem to be indicative of serious designs. In case of doubt, it is a good rule for the commander on the defensive to take it for granted that the assailant is going to do just what he would himself do if the situation were reversed. As soon as practicable, the commander issues his orders, which are formulated in the same manner as in the case of a force acting on the offensive, substituting for the second, third, and fourth clauses as set forth on p. 402, the following :

- II. The plan of defense determined upon, and the part to be taken therein by each portion of the force, the strength and composition of which, with the names of the commanders, should be set forth in detail in the margin of the order.
- III. The positions to be occupied by each part of the force.
- IV. The time when these positions are to be occupied.

The defense consists of the *preparatory stage*, the *defense proper*, and the *counter-attack* or the *withdrawal from the position*.

As soon as the heads of the enemy's columns come within range, the batteries designated for that purpose* open fire upon them; but the guns in the main line are not brought up before the assailant's artillery takes up its reconnoitering position. Even then, as it is desirable to avoid betraying the nature and extent of the position, only as many guns are moved into place as may be necessary to protect the advanced posts, and compel the enemy's infantry to deploy before it crosses the first zone. As a rule, the artillery does not occupy the position in force until the general features of the attack are developed.† The corps artillery (especially the horse batteries) is at first held in reserve, ready to be moved rapidly into position as the enemy's attack develops. In the preparatory stage of the action, part of the infantry is deployed as skirmishers in front of the batteries or on their flanks; but the main body of this arm is held well in hand, sheltered and concealed as much as possible by the features of the terrain until the time comes for its effective employment. When the front of the infantry is covered with skirmishers, they should be on the line where the real defense is to be made, the troops who are to constitute the real firing line being in readiness to move up to reinforce them. To use them in advance of the real firing line might cause a repetition of the error at Abu Klea (January 17, 1885), where the skirmishers in front of

*See p. 354 *ante*. †*Ibid*.

a British square masked its fire, and the enemy, driving them in, was enabled to come within 200 yards of the square before the latter could open fire. Generally a few scouts are all that are necessary in front of the real firing line.

Cavalry and horse artillery are held near the flanks to guard against flank attacks, and to be in readiness to make attacks upon the flanks of the enemy. During the preparatory stage, bodies of cavalry are used incessantly in scouting, and in driving back reconnoitering parties of the enemy.

The main cavalry force, with a proper proportion of horse batteries, is held near the third line, ready to coöperate with it, at a proper moment, in a counter-attack.

In preparation for the main attack, the enemy will generally assail the advanced posts. If these have been occupied merely as posts of observation, or for the purpose of temporarily checking the enemy, the troops employed in them are now withdrawn under cover of the fire of the main line. If, however, the posts constitute salients of the main position, troops must be sent in to reinforce them in time to meet the enemy's attack.

The Defense Proper.—As we have already seen, the artillery performs the principal part in the early stages of the action;* but the termination of the artillery duel finds the infantry approaching the third zone, or within it, and the real attack now begins. The infantry may employ long-range fire while the assailants are within the second zone; but it must, at any rate, be in position when the enemy reaches the third zone. The dispositions for the real attack have now been completed, and the defender endeavors to make his final tactical arrangements accordingly. The infantry is reinforced at the decisive points, and the artillery, now ignoring the assailant's guns, turns its attention upon his infantry, which it endeavors to crush with shrapnel. The cavalry seeks every opportunity to

*See p. 356 *ante*.

strike the flanks of the hostile infantry when the attention of the enemy is chained to the troops in front, or when shattering losses, or an exhaustion of ammunition, deprive his infantry in a great measure of its power of resistance.

As the enemy approaches for the final charge, the entire first line of the defender's infantry is generally merged into the firing line, which opens a rapid fire, while the second line is held in readiness to charge to meet the enemy at the moment of collision. The cavalry and horse artillery assist the third line in a counter-attack, either just before or just after the enemy reaches the position.* The counter-attack is made in accordance with the principles of attack already considered. The extent to which it is carried will depend upon the degree of the enemy's repulse, the number of intact troops he still holds in hand, or the policy of the commander of the defensive force in regard to assuming a vigorous offensive, as Wellington did at Waterloo, or of inviting another attack, as he did at Busaco.

In case of defeat, the withdrawal of the defenders from the position is similar to the withdrawal of a defeated attacking force.

NIGHT ATTACKS.

The first essential for the effectiveness of the defender's fire being a clear view of the assailants, the attempt has often been made by the latter to take advantage of the cover of darkness to get within close proximity of the enemy without suffering loss. When a night attack can be successfully made, its results are generally very great, as its success naturally implies the surprise of the defender; but the operation is attended with so many difficulties that the history of night attacks presents many more instances of failure than of success.

The advantages of a night attack are: 1. The fire of the enemy is encountered only at short ranges, and the dispositions ordinarily necessary for an attack may accordingly be greatly simplified. Thus, the attack may

*See p. 151 *ante*.

be made in close order, with only a few skirmishers in advance; or, at least, the firing line may be more dense than it otherwise would be, the distances between the several echelons may be greatly reduced, and small columns may be retained to the last moment. 2. The enemy is taken by surprise, and his confusion and alarm are heightened by the darkness. The disadvantages are: 1. The attacking columns are liable to lose their way in the dark. 2. The different columns of the assailant are in danger of mistaking each other for hostile bodies, and thus not only incurring losses at their own hands, but giving warning to the enemy, and preventing the surprise on which the success of the attack depends. 3. The concentration of the troops in the dark is difficult and likely to lead to great confusion. 4. The ground cannot be so well known to the assailant as to the defender, who, if not surprised, can act intelligently in the dark in his own position, while the assailant is groping in an unknown locality.

An accurate knowledge of the terrain over which the movement is to be made being essential to the success of a night attack, the ground should, if practicable, be first reconnoitered by the officers designated to command the assaulting columns; if this be impracticable, guides should be selected who have frequently traversed it at night.

The leaders of the different larger tactical units should be carefully instructed beforehand as to the part they are to perform; a portion of the field should be assigned to each column, and there should be a watchword to enable the different columns to identify each other on meeting. It is also advisable, when practicable, to adopt a distinctive badge (such, for instance, as a band of white cloth around the left arm) by which the attacking troops may be recognized in close conflict. The commanding general should assure himself that the leaders of the different columns understand their orders perfectly, and that each has been furnished with the watchword. In the attack made by General Butler's command, on the Confederate position at Big Bethel

(June 10, 1861), the attacking force consisted of two columns, which moved at midnight, one from Camp Hamilton and the other from Newport News. General Butler had given the watchword "Boston" to be shouted if unrecognized troops were encountered; but Colonel Bendix, who commanded one of the columns, was not instructed on this point, and on meeting the other column at dawn, he mistook it for the enemy, and opened fire. The watchword was shouted, but was not understood, and the firing continued. Much confusion was caused before the error was discovered; the troops were demoralized by the unfortunate rencontre; the march was delayed; the hostile position was not reached until long after daylight; and the whole movement terminated in a miserable fiasco.

From the time the forward movement is begun, lateral communication should be kept up between the attacking columns. No talking nor smoking should be allowed, no loading should be permitted without orders, the utmost silence should be preserved, and if the enemy open fire, no persons should be allowed to halt to help the wounded, but all men not disabled should press steadily on. Each column should be preceded by pioneers, and on encountering obstacles, the infantry should lie down while the obstructions are removed. The column should approach as closely as possible to the enemy without firing, and should then charge with the bayonet, rushing forward rapidly and with a shout.

From the very nature of things, night attacks are better adapted to small forces than to large ones; for the visibility of the assailants and the noise of marching increase rapidly with the size of the attacking column. The size of the force attacked is also an important consideration; for a small force can be quickly swept away or captured by a surprise at night, while a strong body will generally be able to maintain the fight until help arrives. Night attacks are generally made by small bodies; often

upon the enemy's outposts by patrols, for the purpose of harassing them or capturing pickets.*

In the case of large forces, a dark night is not favorable for an assault, as the chances of confusion and the resulting miscarriage of the attack are too great. A moonlight night is much better; for there will then be enough light to enable the attacking columns to find their way, while their movements will not be visible at any considerable distance. The capture of Kars by the Russians, in 1877, furnishes one of the best instances of a night attack recorded in military annals. The strength of the Turkish position, the almost total absence of sheltering features of ground for the attacking infantry, and the lack of favorable positions for field artillery, absolutely precluded an assault by daylight. On the other hand, it was feared that an attack in the dark might miscarry and cause a disaster. It was accordingly decided to postpone the attack until a moonlight night would enable the columns to find their way without difficulty, and, at the same time, conceal the movement until the attacking troops arrived near the position. The night of November 15th was accordingly fixed upon; but a snowstorm and cloudy weather necessitated a further postponement of the attack to the night of the 17th. All the arrangements were made with the utmost secrecy, and the Turks had no suspicion of the impending assault. Five separate columns of assault were formed, and two columns of demonstration; about 5,000 men being held in reserve. The artillery was not to follow the troops, but was to remain, ready for action, near the reserves, until daylight or the receipt of further orders. The cavalry was to be stationed at important points on the roads by which the Turks might retreat.†

*See "The Service of Security and Information," Chapter IV.

†The strength of the attacking columns was as follows:—

First column, six battalions and sixteen guns;

Second column, three battalions;

Third and fourth columns (under one command), ten battalions and sixteen guns;

On the appointed evening the troops for the assault assembled at the designated places of rendezvous, and at 8:30 P. M. the columns moved forward. A full moon was shining, and the night was clear and cold, the temperature being below the freezing point. Not the least noise, save the tread of the infantry, broke the silence of the night as the dimly outlined skirmishers moved stealthily forward, followed by the columns of assault, which, as they approached the position, deployed into a line of company columns. About 9 o'clock some shots were heard at the Turkish outposts, but, as the Russians did not reply, the firing ceased. Some of the Russian batteries now opened a cannonade to attract the attention of the enemy to another part of the field. Before 9:30 a musketry fire from the defenders burst forth along the whole line of attack, and almost immediately the Turkish works blazed with a heavy fire of infantry and artillery. All the columns approached close to the enemy's position before they were discovered; the second column capturing the Turkish pickets and rushing into one of the forts almost before the defenders knew it was approaching. The assault was followed by desperate fighting, and it was not until shortly after dawn that the entire works were in the possession of the Russians. "It was," says Greene, "a good night's work—a fortified place of the first order captured in open assault, with 17,000 prisoners, 303 guns of various calibers, 25,000 or more small arms, and an immense quantity of provisions and material of all kinds." There was practically no artillery preparation for the assault, which was decided by a hand-to-hand fight in which the bayonet was freely used.*

Fifth column, five battalions and eight guns;

Sixth column (engaged in demonstration), five battalions and twenty-four guns;

Seventh column (engaged in demonstration), six battalions and twenty-four guns.

*The above description of the capture of Kars is based upon the full and excellent account in Greene's "Russian Campaigns in Turkey" (p. 404 *et seq.*), a perusal of which is recommended to the student.

Though night attacks are open to many objections, and their success is problematical at best, night marches can often be made by which a force may be put in position to attack at early dawn. In this manner, Daun surprised Frederick the Great in the early morning at Hochkirch (October 14, 1758); and other striking instances of this method of attack are not lacking. At Petersburg (June 17, 1864), a similar attack, at early dawn, upon the redans and lines on the ridge near the Shand house, was made with complete success. General Griffin, who commanded the two brigades engaged in the assault, describes it as follows: "I spent the entire night moving my troops through the felled timber, getting them in proper position, and preparing for the attack. I placed my brigade on the left of the Second Corps in a ravine immediately in front of the Shand house, which the enemy held, and within one hundred yards of their lines, with Curtin on my left and a little further to the rear on account of the conformation of the ground. We were so near the enemy that all our movements had to be made with the utmost care and caution; canteens were placed in knapsacks to prevent rattling, and all commands were given in whispers. I formed my brigade in two lines. . . . Colonel Curtin formed his in the same way. . . . My orders were not to fire a shot, but to depend wholly on the bayonet in carrying the lines. Just as the dawn began to light up the east, I gave the command, 'Forward.' It was passed along the line in whispers, the men sprang to their feet, and both brigades moved forward at once in well-formed lines, sweeping directly over the enemy's works, taking them completely by surprise, and carrying all before us. One gunner saw us approaching and fired his piece. This was all we heard from them, and almost the only shot fired on either side. The rebels were asleep with their arms in their hands, and many of them sprang up and ran away as we came over. Others surrendered without resistance. We swept their line for a

mile from where my right rested, gathering in prisoners and abandoned arms and equipments all the way. Four pieces of artillery, with caissons and horses, a stand of colors, 600 prisoners, 1,500 stand of arms, and some ammunition fell into our hands."*

In Egypt, in 1882, Lord Wolseley broke camp at Kassassin, made a night march of about twelve miles, with a force of 14,000 men, and halted within 1,000 yards of the Egyptian position at Tel-el-Kebir, without having encountered a single sentinel or patrol. The dispositions for attack were completed without being perceived by the enemy, and in the gray of morning the assault was made. The attacking troops were within 800 yards of the works before the defenders gave the least sign of life, and a rapid and vigorous assault was crowned with the most complete success.

From the nature of night attacks, it is evident that the forces actually employed therein should generally consist exclusively of infantry; but artillery should be held in readiness to push forward to assist the assaulting columns as soon as the attack is developed and there is no longer any occasion for secrecy. Artillery may also be used in making a feint, and attracting the attention of the enemy to a false point by its cannonading. Cavalry cannot well move with the silence required by night attacks; as the noise made by the horses is largely beyond the control of the men. Moreover, a mounted column is more liable than infantry to be impeded by unfavorable terrain. Still, when the ground is perfectly known, a night attack by cavalry may be advisable, as the enemy will be unable to make such full use of his rifle-fire in the dark as he would by daylight, and the prospect of surprise will be heightened by the obscurity of night. At Laon, Blücher's famous night attack on Marmont is said to have been decided by the Prussian cavalry.

*General Griffin, in a paper contributed to the Massachusetts Historical Society, quoted by General Humphreys in "The Virginia Campaign of 1864-65," p. 217.

Night attacks will probably be as rare in the future as they have been in the past; but it is not unlikely that night movements for the purpose of placing troops in a position from which they can attack in the early morning will be very frequently employed. Actual attacks at night by large forces will still be advisable only under the following conditions:

- I. When the attacking army is in such high spirits, and rendered so audacious by previous success, that it is in a condition to undertake anything.
- II. When the enemy is known to be demoralized, short of ammunition, or grossly careless in the performance of his outpost duties.
- III. When reinforcements are expected by the enemy, and the capture of the position is dependent upon prompt action, while an assault does not seem to be practicable by daylight.
- IV. For the purpose of cutting through a superior force of the enemy, in which case a surprise is necessary, and may be best effected under cover of the darkness.

CHAPTER XI.

CONVOYS.

"Lines of convoys are the muscles of the military body, which would become paralytic if they were sundered."—*Von Bülow*.

The two streams of transport in rear of the army, the one going to, the other returning from it; the one supplying energy by means of recruits, equipments, munitions, and provisions, the other draining off the incumbrances in

the shape of sick and wounded, prisoners, and trophies; are of an importance inferior only to that of the fighting efficiency of the troops itself. Indeed, it is upon the efficiency of the transport service that the maintenance of the fighting power of the army depends.

The regularity of the transport service must, therefore, be insured as much as possible; and this regularity depends upon good organization, efficient administration, and freedom from hostile interference. In one's own country, interference on the part of the enemy is limited to his regular forces; in the enemy's country, more particularly in insurgent districts, assaults from partisans and armed inhabitants are also to be apprehended. Hence the transport should at no time be without adequate armed protection.

The transport supplying an army is divided into the trains which accompany it and are under its immediate protection, and the means of transport which operate in its rear and require a special escort. The latter are termed *convoys*; and are broadly classed as *convoys by land* and *convoys by water*. In the former, the term *convoy* includes both the train and its escort. In *convoys by sea*, the term is sometimes restricted to the naval force guarding the transports.

CONVOYS BY LAND.

On land, transportation is effected by means of railroads, wagon-trains, pack-trains, or carriers. The last may be left out of consideration, as we shall probably never have occasion to employ them; nor need pack-trains be here considered, as they follow the troops to which they are attached, so closely as to be practically under their constant and immediate protection. The only means of land transport that require consideration in discussing convoys are, therefore, wagon-trains and railroads.

Wagon-trains.—Where the exigencies of the service do not demand great mobility, such as is required of the trans-

port accompanying independent cavalry or raiding columns, wheeled transport is to be preferred, as an animal can pull from six to eight times the weight it can carry on its back. In our service we have two kinds of wagons, a heavy and a light one; the former known as the "army wagon," the latter as the "escort wagon"; both of which have stood the test of rough usage under all kinds and conditions of service. The six-mule army wagon may be considered as our habitual means of transportation. The escort wagon, being of lighter construction, is inferior in carrying capacity, but will be found of great service where celerity of movement is required, as, with its light load, it has the mobility of cavalry, so long as it follows the road. The mule has been found preferable to the horse in our service as a draught animal, and will doubtless be used for this purpose in the future as it has been in the past.

Organization.—Wagon-trains should be under the immediate charge of officers of the Quartermaster's Department, or other staff departments, depending on the cargo, assisted by such other officers as may be available; and the *personnel* of the train should consist of men regularly enlisted in a quartermaster's corps. These men, being accustomed to military discipline, will be more efficient than hired civilians, and can be better depended upon in moments of danger. It will, however, frequently be found necessary to impress animals, wagons, and drivers, in which case increased watchfulness, discretion, and determination will be called for on the part of the commander.

The senior line officer of the convoy should command both the train and the escort, leaving the immediate charge of the latter to the second in rank. The commander should be able to speak the language of the inhabitants, and should be provided with detailed maps, and furnished with all obtainable information of the enemy and the country. He should know the exact strength, physically and morally, of his escort, in order that he may take no unjustifiable risks.

He should also know in what direction to retire, if compelled by the enemy to do so.

The train should be primarily divided into as many divisions as there are officers available to command. It should also be divided into convenient sections (generally from 20 to 30 wagons each) and half-sections, all commanded by wagonmasters, who should be non-commissioned officers of the quartermaster's corps. The wagons should be arranged from front to rear, according to their contents, as follows: 1. Ammunition; 2. Money; 3. Rations; 4. Quartermaster's stores; 5. Officers' baggage; 6. Sutlers' wagons and any private conveyances that may be permitted to accompany the convoy. All officers and non-commissioned officers belonging to the train should be mounted (on mules if necessary), and the drivers should be armed with pistol and carbine. Each section should have four extra teamsters, and also a ready-harnessed team, marching in rear of its last wagon, to assist in dragging broken-down vehicles off the road, and starting stalled teams. Each section should also have detailed to it a police guard of about one squad under a non-commissioned officer, when the strength of the escort permits. This guard assists in every way to keep the train moving, besides serving purposes of defense. It is especially desirable with large trains, but it will not always be possible to spare these details from the escort. When the train is an impressed one, quartermaster's men are usually not available; and a strong police guard detailed from the escort (one man to every two wagons) is then indispensable, to prevent irregularities on the part of hostile or unwilling drivers, and to expedite the march.

March of the Convoy.—If special rules and precautions are necessary for the safety and uniformity of movement of troops on the march, they are no less so for the long, unwieldy wagon columns of which the convoy is composed. Trains

move with an average speed of two miles per hour, depending on the condition of the roads and draught animals, and the load of the wagons. When the road is wide enough, or the ground otherwise permits, the wagons should move two or more abreast, thus shortening the column, accelerating the march, and greatly lessening the duties of the escort; but on the ordinary roads in the United States this formation is rarely practicable, as it would block the road to the transport coming from the opposite direction.

The train should be supplied with spare wagons, and every wagon should carry spare parts. Before starting, teams and wagons should be inspected by officers, defects remedied, and any unauthorized private articles found in the wagons should be thrown away. Care should be taken not to overload the train when it can be avoided, as such a measure would impair mobility, exhaust the animals, and render the wagons unnecessarily liable to stalling and breaking down. When a wagon breaks down, it must be dragged off the road at once, to keep the way open for the rest of the train. Its contents are then loaded on the spare wagons when they come up. If the broken wagon cannot be dragged off the road, or if there be no reserve vehicles, the load should be distributed among the nearest wagons. If this be impossible without overloading, the contents of the disabled vehicle must be destroyed and thrown aside. When practicable, the damaged wagon is patched up on the spot with spare parts and follows at the rear of the column.

The sections march with distances of twenty-five yards, and the wagons two yards, to avoid checks, more especially in going up and down hill.

As to halts, the same rules obtain as with marching troops; excepting that in the ascent of long slopes the teams must be given more frequent breathing spells. Long halts should be avoided as much as possible. When the halt is for any length of time, the train should be parked

for security, and sentinels should be posted at a distance from the train rarely less than 300 yards. The hour of starting depends upon circumstances. It is desirable to start early enough to insure the termination of the day's march before dark; but a start before daylight should be avoided, as it interferes with the needed rest of the men, and still more with that of the animals. When the convoy is closely following a large body of troops, the time of starting is regulated by the march of the column, which should gain two miles from the camp before the train starts. This is, however, a regulation more applicable to the trains with the army than to a regular convoy.

Camps.—Camping places should be selected with reference to wood and water, grass for the animals, space for parking the train, and considerations of safety. The vicinity of towns and villages in a hostile country is not ordinarily desirable; but, on account of the facilities they offer for making repairs to iron, wood, and leather work, it may often be advantageous to camp near them. To increase the chances of escape from the enemy, the camp should, if possible, be so selected that there will be more than one road leading from it in the direction of its proper line of retreat.

Upon going into camp, the animals should, if practicable, be turned out to herd under guard. In the absence of forage, it may be necessary to keep them on herd during the night. A guard is always placed over the park of wagons and the camp, and at night it is increased to insure safety from surprise.

There are various methods of parking trains, their employment depending upon the available space and the proximity and nature of the enemy. The most important formations, and the ones in which every train should be drilled, are, for ordinary camping purposes, the park in column of subdivisions, and, for purposes of defense, the park in two lines facing each other, and the corral, which may be in the form of a square, oval, or circle. With the

convoy subdivided and commanded as above indicated, a little improvised drill will enable these formations to be readily taken up.

The park in column of subdivisions is the habitual camping formation when no hostilities are to be apprehended. Column of sections or half-sections may be used, according to the space available, the distance between the sections from rear wheel to pole being twenty yards. If possible, an interval of six or eight yards should separate the wagons to admit of the animals being tied to them for feeding and for rest over night, as habitually practiced in our service. When the space does not admit of such a wide front, the wagons may be placed axle to axle, and the animals tied to a picket-rope in front of the wagons; this will reduce the size of the park considerably, and thus lighten the guard duty. The distances and intervals may be altered to suit the various conditions in which the convoy may be placed.

The park in two lines is essentially a defensive formation. The wagons are placed axle to axle, the "leaders" of the opposite teams facing each other at a distance of a few feet. This formation can be quickly assumed on the march, and it affords some protection from a dash of cavalry, as only the animals at the ends of the double column are directly exposed to damage, and the wagons cannot be speedily carried off.

The corral may be resorted to on the march when the enemy is threatening, or in camp as protection against attacks of regular or irregular troops, or insurgent inhabitants. The wagons are placed axle to axle, pole pointing inward; the animals being kept inside. If square, the corral is rounded off by placing one wagon obliquely at each corner. One or more places of egress should be left, which are closed at night, or in case of attack, by placing a wagon across each from the inner side.

The Escort.—The size and composition of the escort depend on various factors. When the train is large and

valuable, a strong escort will be necessary; when the convoy is marching in the vicinity of the enemy, or through an insurgent country, more troops will be required than when at a distance from large hostile forces or in a friendly region; in open country, cavalry will be more in demand; while in a close country, where cavalry cannot be well employed, and the trains are in danger of ambushade, the proportion of infantry must be increased. For the escort of convoys Napoleon generally allowed two infantry soldiers for every wagon, one mounted soldier for every eight wagons, and one gun for every 120 wagons; but when the train is small, the fighting power represented by the escort must not fall below a certain minimum, and the proportion above given is then disregarded. In general, 250 infantry and twenty-five cavalry may be assumed as the smallest allowable escort for a train of fifty or sixty wagons.*

The great length and unwieldiness of a wagon-train make apparent at once the difficulty of guarding it at all points. If the escort were divided up along the entire length of the convoy, it would nowhere be strong enough to oppose an effectual resistance to a dash of the enemy. If, on the contrary, it were held in one compact body, part of the train might be captured or destroyed before the troops could come into action. It is, therefore, plain that a division of the escort is imperative.

A wagon-train is most sensitive to a check at its head. If checked there, the whole column is brought to a halt, and any excitement, caused by the appearance of the enemy, or any unusual occurrence, is apt to throw it into confusion, unless the discipline be excellent and the police guard be efficient. If a check arise at any other point of the column, only the wagons in rear of such point are affected. The flanks are the parts most vulnerable to attack.

The tactics employed by the enemy in attempting the capture or destruction of a convoy would therefore proba-

*Furse's "Military Transport," page 264.

bly be to make a feint upon its head, so as to bring the whole to a halt; and, then, taking advantage of the ensuing confusion, to make his principal attack in flank or rear.

To meet this tactics, it is necessary to discover the enemy while yet distant, and, if possible, to hold and beat him there. This will enable the commander either to turn the train off into some other road, and slip by without direct molestation by the enemy, or to make such timely preparation for defense as the situation may warrant. Reconnaissance is, therefore, necessary; and the thorough performance of this duty is the first requirement for safety. For this reason, cavalry in sufficient force is indispensable as a component part of the escort. The latter is divided into: 1. The advanced cavalry; 2. The advance guard; 3. The main body; 4. The rear guard.

The Advanced Cavalry.—In open country this body, possessing superior mobility and power of reconnaissance, marches about five miles ahead of the train. It sends small patrols several miles to its front and flanks, and scouts the country thoroughly. Any information gained is at once sent to the commander of the advance guard.

On coming to a bridge, the commander of the advanced cavalry examines it carefully, sends word of its existence and condition to the rear, leaves a guard to hold it until relieved by the advance guard, and pushes on with the remainder of his men. In the absence of such precautions on the part of the advanced cavalry and the advance guard, a few concealed riflemen might kill the teams of a wagon on the bridge, thus blocking it and checking the whole train. A defile should be approached with the usual precautions;* after a careful examination of the flanks, the cavalry should pass through rapidly, leaving a guard on the near side. Having gained the farther side, the cavalry should carefully search the vicinity, and send out patrols to front and flanks.

*See "The Service of Security and Information," p. 112.

On the arrival of the advance guard, the cavalry moves forward.

When the enemy is encountered, word is sent to the rear at once. Should the hostile force consist of a small mounted party, the advanced cavalry should disperse it. If the enemy be so strong that this cannot be done, the advanced cavalry should not commit itself to an engagement in which it might be worsted and driven back in confusion, but should take up a position of defense or observation, and make every endeavor to gain exact knowledge of the composition, strength, and location of the hostile forces; remembering that the advanced cavalry is primarily charged with the duty of information and only indirectly with that of security.

In close country, the cavalry should march nearer the advance guard, to avoid being cut off and destroyed. When the country is rough and not readily accessible to cavalry, a patrol on the main road (and on parallel roads, if there be any reasonably near) is sufficient, the remainder of the cavalry being employed elsewhere. In this case the reconnoitering on the flanks as well as in the immediate vicinity of the road is done by the infantry of the advance guard, which should gain neighboring heights affording a good view. In a terrain which is much cut up the search of the ground near the road must be most thorough. Progress is naturally slow under these circumstances, but any delay caused by the precautions taken is fully repaid by the safe passage of the convoy.

The Advance Guard.—The advance guard, in strength varying from one-sixth to one-fourth of the escort, marches about a mile in front of the convoy, and should have some cavalry for messenger and scouting service. Its duties are to search more thoroughly the immediate vicinity of the road, to serve as a support to the advance cavalry, and to engage the enemy promptly. Its formation is that usual for an advance guard.* It should be accompanied by a

*See "The Service of Security and Information," Chap. II.

working party and tool-wagon to repair the road, bridges, etc., in order that the march of the train may not be delayed. The reserve of the advance guard, and the entire body (so far as may be compatible with its general duties), should be held well in hand, to enable it to offer a firm front to the enemy from the start, taking the offensive whenever practicable, but not engaging in pursuit.

At bridges and defiles the advance guard leaves guards, which resume their march when the detachment of infantry heading the train arrives. Unnecessary detachments should, however, be avoided, as it is difficult, if not impossible, for detached infantrymen to rejoin the advance guard until the latter comes to a halt. The leaving of many detachments would, therefore, necessitate the halting of the advance guard or a dangerous diminution of its strength.

It is important that the advance guard be not driven in on the train, as at least part of the convoy would thus be jeopardized. The advance guard commander should, therefore, constantly observe the ground, and, as he advances, he should note positions into which to throw his men if suddenly attacked in force. If attacked, he should, at all hazards, hold the enemy in check until the commander of the convoy has had time to complete his preparations for action, when the advance guard will either be reinforced or ordered to fall back upon the main body.

The Main Body.—The main body of the escort is charged with the duty of fighting the enemy at his principal point of attack. Its greatest strength should accordingly be in a compact body about the middle of the train. It must, however, detach a number of small bodies of infantry; a platoon marching at the immediate head, another at the immediate rear of the train, and patrols and flank guards being sent out to scour the country for half a mile on either side of the road and offer the first resistance when the enemy is encountered. The commander of the escort

marches with the main body, which, after furnishing all detachments, should still be equal to at least one-third of the whole escort. The main body should be held as a central reserve from which to succor any part of the column. When the train is not over a mile in length, the reserve can bring its fire to bear on either end of the column without change of position, if the terrain be open; or, in any case, it can advance readily to the assistance of the front or rear. When the column is longer, the reserve should still be able to give timely support, if the reconnaissance duty be conscientiously performed and the patrols and flank guards offer a stout resistance. In case, however, the train is of very great length, a division of the main body may become imperative. The details of the arrangements would vary according to circumstances; but care should always be taken to have as few subdivisions as possible, and to march them near the middle of the division of the train to which they are assigned.

The Rear Guard.—This body marches a short distance in rear of the wagon column, keeping a sharp lookout, and being at all times ready to fight. Its strength should be about one-sixth of the escort, and it should have the usual rear-guard formation.* In addition to its other duties, it assists wagons that have fallen to the rear, and aids in transferring the loads of broken-down vehicles to reserve wagons.

Defense of the Convoy.—When the duty of reconnaissance is efficiently performed, a surprise of the convoy is impossible, and the enemy, unless he be superior in force, should be engaged and held where first encountered. If the enemy be repulsed, pursuit, if made at all, should be conducted by only a small detachment, to make sure of the retreat of the hostile force. If the attack be made by irregular troops or armed inhabitants, their repulse should be as severe and bloody as possible, in order to teach them

*See "The Service of Security and Information," Chaps. II. and VI.

a wholesome respect for the convoy escorts. In an insurgent district, this is of especial importance, if the lines of communication are to be kept open. The passage of a defile, when the enemy is in the vicinity, is always a dangerous operation, for the train is compelled to pass in single file, and, owing to the confined space, the reinforcement of the different parts is always difficult and often impossible. It is inexcusable to enter a defile without having made the most careful reconnaissance. The advance guard, as soon as it passes through, takes up a defensive position far enough beyond the exit from the defile to permit the convoy to be parked or form corral upon emerging; and the convoy then passes through as quickly as possible. If necessary to halt at the entrance of the defile, the first half of the convoy may be parked, and the second half will then probably come up in time to pass through without halting. On emerging, the second half may then be parked, and the first half passes through and takes its place at the head of the column; the second half then follows. While the parts of the convoy are thus parked, the horses rest, and may be fed and watered. The main body either pushes through the defile quickly to reinforce the advance guard, or remains to cover the passage at the entrance, according to circumstances.

The discovery of the enemy at one point should be the signal for increased alertness at all parts of the escort. Neighboring detachments should assist one another, but otherwise no one should move without orders. When the enemy is not in force, he should be disposed of without requiring the wagons to be halted or parked. When the enemy is reported in strength, it is advisable to form corral at once, as this operation requires some time. If the enemy be in position at the entrance of a defile, he probably means to attempt the capture of the whole train by cutting in on one or both flanks, or by making a strong attack on the rear and driving the wagons in on the head of

the column which has been stopped in front, thus crowding everything into a confused mass. As soon as the enemy's intentions are evident, the main body of the escort should defeat the main attack, the advance guard taking energetic steps to clear the defile so as to allow the train to resume its march. When the main attack is made on one flank, and is discovered in time, the main body may take up a position on that flank, and hold the enemy at bay while the train marches off. The same means may be adopted when the attack comes from both flanks; in that case the greater part of the main body should endeavor to defeat the enemy quickly on the nearest flank, and then hasten to the assistance of the smaller part, which, in the meantime, has engaged him on the other flank.

Should the enemy bar the road in front in force, and render it necessary for the train to retire, the utmost care should be exercised to prevent wagons from being upset while turning round. One such mishap at a narrow place might cause the loss of the portion of the train between the obstruction and the enemy. When the enemy follows in pursuit, defiles should be obstructed, for which purpose, (in the absence of other means) some wagons may be upset in narrow places.

When the strength of the enemy makes it necessary to form corral, the main body should at once send out skirmishers to contest the ground with the enemy and gain the time required for corraling. In the meantime, the commander should make an inspection of the ground, select a favorable defensive position at some distance from the park, and occupy it with the remainder of his troops, behind which the advanced bodies, if driven in, can rally and form a reserve. When time permits, the position should be intrenched, in order to make an attack as costly to the enemy as possible. If the enemy be repulsed, no pursuit should be made except as already indicated. If, in forming corral, the different detachments keep their relative positions, the

corral, when completed, will be surrounded by a ring of small detachments, which should all remain at their posts, unless otherwise ordered. When the assailant confines himself to one feint and one main attack, the commander of the convoy may gradually withdraw the troops from those parts which are not threatened, in order to crush the enemy at the decisive point.

If the enemy should carry the first position taken up by the troops of the main body, the men in the fighting line should fall back under cover of the fire of the reserve to a second line, or, if there be no such second line, to the wagon park. The enemy will then have to make another costly attack, which, unless he be in greatly superior numbers, he will be reluctant to do, if he has been roughly handled in his first attempt. When the cargo of the convoy consists of ammunition, the wagons should be parked close together, and the escort formed at some distance to avoid drawing the fire upon the train. When the enemy is in such strength as to render the defeat of the escort certain, an attempt should be made to secure the escape of at least a portion of the train. In the famous capture of the Prussian convoy of 3,000 wagons under Colonel Mosel, by the Austrians, in June, 1758—an event which compelled Frederick to raise the siege of Olmütz, and exercised a great influence on the campaign—the commander of the escort succeeded in saving 250 wagons, thirty-seven of which were loaded with money.*

THE ATTACK OF CONVOYS.

The principles of attack on a convoy have already been considered incidentally in the discussion of the defense. To summarize them briefly, they consist in bringing the convoy to a halt, throwing it into confusion, and making the principal attack from an unexpected quarter. Surprise

*For an interesting description of the conduct and capture of this convoy, see Carlyle's "History of Frederick the Great" (Harper's edition), Vol. V., p. 241.

and celerity being the main features of the attack, cavalry is especially suitable for this purpose.

From the very nature of things, the attack of a convoy is much easier than its defense. The assailant can exercise to the fullest extent the power of the initiative, and select a favorable time and point of attack; while the commander of the escort, unable to cover every point, and in doubt as to the objective of the attack, may be deceived by a feint, and oppose an insignificant force to the real assault. Were convoys operating in the immediate vicinity of the hostile army, their defense would be well-nigh impossible, except by using an army as an escort.* But the front of the army generally interposes between the convoys and the main forces of the enemy, and, as a result, only guerrillas and hostile raiding parties are usually encountered. When the front of an army is on the prolongation of the line of communication with its base—when, in other words, it is connected with its base by a flank—convoy duty is extremely hazardous, and a strong escort and a vigilant and resolute commander are requisite for the safety of the train.

CONVOYS OF PRISONERS.

When large bodies of prisoners are conducted by foot marches, the usual strength of the escort is one infantry soldier to every ten prisoners; cavalry being added to the escort, if practicable, in the proportion of one trooper to every ten infantrymen. The commander of the escort should be able to speak the language of the prisoners; if unable to do so, he should be provided with an interpreter. The prisoners should be organized into bodies of suitable

*In his retreat through Bohemia, after raising the siege of Olmütz, Frederick was compelled to employ half of his army to escort a convoy of 4,000 wagons. In 1846, General Taylor, who was on the Rio Grande, finding the country in his rear so infested with Mexican guerrillas, and so threatened with the regular forces of the enemy, as to make it impassable for wagon-trains, left the 7th U. S. Infantry intrenched at Fort Brown, and with the rest of his command marched back to his base at Point Isabel, twenty-five miles distant, from which place his entire force acted as an escort to the wagon trains, fighting two battles before they reached Fort Brown.

size, preferably in their own companies, under their own non-commissioned officers. The commissioned officers should march in a separate body at the head or rear of the column; and, on giving their parole that they will not attempt to escape, they should be allowed to retain their swords. The parole should be written out and signed in the language of the prisoners. All considerations of chivalry and sympathy for brave men in misfortune demand that the prisoners should be treated with kindness; but they must, nevertheless, be given to understand that any attempt to escape, or to offer violence in any way to their guard, will be repressed with prompt and severe measures. In the enemy's country, communication of any kind between the prisoners and the inhabitants must be prevented. When halting for rest, or when the convoy is menaced by the enemy, the prisoners must be closed up in a compact body. At night they should be placed in inclosures or large buildings, if such be available, as they are thus more easily guarded; but it must not be forgotten that vigilant eyes constitute a better guard than any walls, and the prisoners in the buildings must be carefully watched.

CONVOYS BY RAILROAD.

The safety of transports by rail is primarily insured by guarding the tracks, which duty falls to the troops detailed for service on the lines of communication. The usual method is to post guards at points where the railroad can be easily and effectually destroyed (tunnels, bridges, etc.), and to patrol constantly between them. Where this is impossible or insufficient, the train to be convoyed should be preceded by a pioneer train, for the purpose of discovering places where concealed preparations for wrecking the train have been made, such as removing spikes, sawing through the timbers of trestles or bridges, etc. The locomotive of the pioneer train should have some empty platform cars in its front, to receive the shock of any concealed

torpedoes that may be encountered, and some coaches behind for a working party and a portion of the escort. The working party should be provided with the usual tools of a "wrecking train," and should carry a supply of rails, fish-plates, etc., to use in repairs. The platform car just in front of the locomotive may be fortified with shields of boiler iron or sand-bags, and occupied by detachments of sharpshooters; or it may be practicable to mount a field-piece on it, and thus scatter small parties of guerrillas by firing a few shells. Field-pieces were used on platform cars by the French at Paris and Metz, and also by the British at Alexandria and Suakim.

The train to be guarded follows at a distance varying from half a mile to two miles in rear, with the remainder of the escort placed in or on the cars at the head and rear of the train. A telegraph operator with apparatus for cutting in on the telegraph line should be on the train, in order that assistance in the form of reinforcements or wrecking-trains may be summoned if necessary.

In case the enemy has destroyed or obstructed the track, and is in position, the train should steam back some distance to allow the escort to disembark without molestation. If the track be undisturbed and the enemy be without artillery, nothing more is to be feared than direct musketry fire on the train as it passes, which can be returned by the men in and upon the cars. In such a case it is not probable that much harm will be done; though, in view of the great power of the modern infantry rifle, a fatal injury to the locomotive is not impossible.

When it is not practicable to have the convoy preceded by a pioneer train, it may be at least possible to use a single locomotive as a kind of advance guard to the train proper. An officer should accompany it, and a system of signals by means of the locomotive whistle should also be devised. When such signals cannot be conveniently or safely used, a signal detachment with flags should ride on the tender.

In railroad riots a pioneer train should be used in front of the train proper, sharpshooters being placed on the platform car nearest the engine. The train proper should also have a platform car immediately in front of the locomotive, which should also be occupied by sharpshooters, to pick off any rioters engaged in misplacing switches, removing rails or doing other malicious mischief after the passage of the pioneer train. When there is a sufficient number of parallel tracks, the train conveyed should be flanked on each side by a train carrying troops. Where these precautions are not practicable, guards should at least be placed on the tender of the locomotive, and on the top of the cars, while the main force should be held in readiness to disembark instantly.

CONVOYS BY WATER.

On the sea, convoy duty is, of course, performed by the navy. Transport on navigable streams is primarily secured by the field forces holding the region through which the stream flows; but convoy duty may, and often will, fall to the gunboats of the navy, as it generally did in the War of Secession. When the duty devolves on troops, especially on rivers and canals in dangerous districts, and more particularly when the banks are wooded, when the river passes through defiles, or the country offers good concealment, the escort itself, on board a vessel, immediately precedes the transport, and is provided with means for making a quick landing. The safest way, however, in a hostile country, is to have the escort march on both sides of the stream, reconnoitering the vicinity, and scouring the woods along the banks. This will necessarily make progress slow, but it may be necessary in order to avoid such a predicament as that in which Porter's gunboats found themselves, near Vicksburg, in 1863. These boats had proceeded up Deer Creek, which was very difficult of navigation, and but for the opportune arrival of General Sherman with

some infantry, they would probably have fallen into the hands of the enemy, who was obstructing the stream in front and in rear of the boats, and whose riflemen were lining the banks, and picking off every man who showed himself on deck.*

A novel, but effective, use of cavalry in escorting convoys by water is said to have been made on the Mississippi in the War of Secession. The banks of this river afforded excellent concealment for small bodies of guerrillas, who fired into the boats, causing infinite annoyance, and, in the aggregate, a great loss of life. Owing to the dispersion and concealment of these riflemen, it was difficult to reach them with artillery projectiles, and by the time infantry could land, the partisans were generally beyond the reach of harm. Some of the boats were accordingly fitted up with stalls for horses, and supplied with small detachments of cavalry. When fired upon, the boats immediately drew up to the shore, the gangway was dropped, the cavalry rushed ashore, and charging upon the guerrillas, pursued and dispersed them. This mode of action was so effective that the annoying bands of partisans were soon broken up.

*Sherman's "Memoirs," Vol. I., p. 335.

APPENDIX I.

THE TRANSPORTATION OF AN ARMY CORPS.

The corps transportation in detail is as follows:

Each battalion, 1 wagon.

Each regiment, 3 battalion wagons (as above), 1 headquarters wagon, 1 medical wagon, and 2 small-arm ammunition wagons. Total, 5 six-mule and 2 four-mule wagons.

Each brigade, 15 six-mule and 6 four-mule regimental wagons (as above), and 2 headquarters wagons. Total, 17 six-mule and four-mule wagons.

Each division, 51 six-mule and 18 four-mule brigade wagons (as above), 3 headquarters wagons, 10 six-mule wagons (hospital corps), 2 two-horse wagons (medicine), 50 ambulances (two-horse), and 2 water-carts (one-horse). Total, 64 six-mule, 18 four-mule, 52 two-horse, and 2 one-horse wagons.

Army corps, 192 six-mule, 54 four-mule, 156 two-horse, and 6 one-horse division wagons (as above), 6 headquarters wagons, 7 wagons of the hospital reserve (5 six-mule, 1 two-horse, and 1 one-horse), 53 six-mule and 5 four-mule wagons of the engineer train, 5 two-horse and 4 four-horse wagons of the signal train, and 6 six-mule and 1 four-mule wagons belonging to the regiment of cavalry. [The organization of the cavalry regiments at present provides for 1 wagon to each troop. This is mainly in view of frontier service. In operations in a more thickly settled region, it is believed that 2 wagons to a squadron would be sufficient. Even these might better be replaced with pack-mules. The four-mule wagon is an ammunition wagon.] Total, 262 six-mule, 60 four-mule, 4 four-horse, 162 two-horse, and 7 one-horse wagons, besides the ammunition, forage, and provision columns.

The ammunition column consists of 46 caissons, containing artillery ammunition; 70 six-mule wagons, carrying small-arm ammunition; a battery-wagon and forge; 3 spare gun-carriages with limbers, and 2 escort wagons.

Five days' forage for the cavalry, artillery, horse depot, and staff horses requires for its transportation 125 six-mule wagons.

For every 25 wagons there are 1 wagon-master, 1 assistant wagon-master, and 4 extra teamsters.

Five days' rations are required for 43,191 men, and the transportation for the same will be 344 six-mule wagons.

It will be observed that the above represents the minimum rather than the maximum allowance of transportation. The allowance of only 1 wagon to a battalion implies a reduction of impedimenta to the barest requirements.

APPENDIX II.

SPACE AND TIME REQUIRED IN FORMATIONS AND MARCHES.*

The following estimates of the front and depth of the various organizations of the several arms are not in all cases exact, but are generally close approximations, expressed in convenient figures. It should be noted that intervals, distances, etc., are stated in yards instead of paces.†

FRONT OF INFANTRY.

The front of the individual soldier is assumed to be twenty-eight inches (including the interval between files).

The Company.	$\begin{array}{r} 48 \text{ files @ } 28 \text{ in.} \dots\dots\dots = 1344 \text{ in.} \\ \text{Right and left guides (less 6 in.)} = \underline{50 \text{ in.}} \\ \hline 1394 \text{ in.} = 39 \text{ yds.} \end{array}$
The Battalion.	$\begin{array}{r} 39 \text{ yds.} \times 4 \dots\dots\dots = 156 \text{ yds.} \\ 2\frac{1}{2} \text{ yds. [interval]} \times 3 = \underline{7\frac{1}{2} \text{ yds.}} \\ \hline 163\frac{1}{2} \text{ yds., or (approximately)} \\ 165 \text{ yds., or } 41\frac{1}{2} \text{ yds.} \times \text{No. of companies} = 2\frac{1}{2} \text{ yds.} \end{array}$

In line of companies in column of fours = front in line—34 yards = 130 yards.

In column of files = 3 yards. May be reduced to 22 inches.

*The tables in this Appendix are mostly compiled from sheets prepared by Captain W. A. Shunk, 8th Cavalry, formerly assistant instructor in Military Art at the U. S. Infantry and Cavalry School, who has kindly authorized their use in this work.

†By *front* is meant the space in width occupied by a command, either in line or in column; by *interval*, an open space between elements of the same line by *depth*, the space from head to rear of any formation, including the leading and rear elements; by *distance*, an open space in the direction of depth.

In column of twos=4 yards. May be reduced to 50 inches.
 In column of fours=5 yards. May be reduced to 3 yards.
 In line of platoon columns=front in line—20 yards=145 yards.
 Same, closed intervals=100 yards.
 In close column=front of company.

The Regiment.	{	$163\frac{1}{2} \text{ yards} \times 3 = 490\frac{1}{2} \text{ yards.}$ $20 \text{ yards} \times 2 = 40 \text{ yards.}$ <hr style="width: 100px; margin-left: 0;"/> $530\frac{1}{2} \text{ yards.}$
In line of masses....	{	$39 \text{ yards} \times 3 = 117 \text{ yards.}$ $20 \text{ yards} \times 2 = 40 \text{ yards.}$ <hr style="width: 100px; margin-left: 0;"/> 157 yards.
In line of platoon columns..	{	$143\frac{1}{2} \times 3 = 430\frac{1}{2}$ $40 \times 2 = 80$ <hr style="width: 100px; margin-left: 0;"/> $510\frac{1}{2}$

Roughly estimating the front of the individual soldier and interval at 2 feet, the front of a force of infantry in line in double rank measures a number of feet equal to the number of men.

DEPTH OF INFANTRY.

The depth of an infantry soldier is assumed to be 12 inches.
 The depth of infantry is then as follows:
 In line=12 in. (captain)+60 in.+12 in. (front rank)+16 in.+12 in. (rear rank)+60 in.+12 in. (file-closers)=5 yards.
 In column of fours=frontage in line+18 in.; practically equal to frontage in line.
 In column at wheeling distance=front in line minus the front of the rear subdivision plus its depth.
 In close column=7 times the number of companies minus 2 yards.
 In line of platoon columns=24 yards.
 In line of masses (regiment), same as close column (battalion).
 In column of masses (regiment)=3 times depth of battalion in close column+twice company front=69 yards+78 yards=147 yards.

FRONT OF CAVALRY.

Individual horse=1 yard.
 Troop in line (96 files)=96 yards.
 Squadron in line=(96×4)+(3×8)=408 yards.
 Regiment in line=(408×3)+(2×16)=1256 yards.
 Column of files=3 yards. May be reduced to 1 yard.
 Column of twos=4 yards. May be reduced to 2 yards.
 Column of fours=6 yards. May be reduced to 4 yards.
 Column of platoons= $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$ the front of a troop in line.

Squadron in line of platoon columns. $\left\{ \begin{array}{l} 2 \text{ platoons per troop} = (48 \times 4) + (12 \times 3) = 228 \text{ yds.} \\ 3 \text{ platoons per troop} = (32 \times 4) + (12 \times 3) = 164 \text{ yds.} \\ 4 \text{ platoons per troop} = (24 \times 4) + (12 \times 3) = 132 \text{ yds.} \end{array} \right.$

Same at full intervals = front in line minus front of rear platoon of left troop.

Squadrons in line of troops in column of fours = $(4 \times 4) + (95 + 4)3 + 2 = 318$ yards.

Same with closed intervals = $(4 \times 4) + (11 \times 3) + 2 = 51$ yards.

Squadron in double column = 18 yards.

DEPTH OF CAVALRY.

Individual horse, 3 yards.

Formation in line = $3 + 6 + 3 + 2 + 3 = 17$ yards.

Column of fours = front in line minus 1 yard.

Column of twos = twice front in line minus 1 yard.

Column of files = four times front in line minus 1 yard.

Column of platoons = front in line minus front of rear platoon plus its depth.

Squadron in close column = 15 times the number of troops minus 7 yards.

In line of platoon columns = depth of one of the troops in column of platoons.

Squadron in double column = $(95 \times 2) + 9 = 199$ yards.

FRONT AND DEPTH OF ARTILLERY.

Intervals.

Between batteries in line, 30 yards; horse batteries, 38 yards.

Between sections in line at full intervals, 15 yards; horse battery, 19 yards.

Same at closed intervals, 5 yards.

In action the interval between guns should not exceed 40 yards, nor be less than 10 yards. If the former interval be exceeded, the captain cannot exercise efficient superintendence of the battery. If intervals of less than 10 yards be taken, too good a target is afforded to the hostile batteries.

Distances.

Between rear of one carriage and heads of horses of next carriage 2 yards. May be increased to 4 yards.

Between gun and gun detachment (horse artillery), 2 yards.

Between ranks of gun detachment (horse artillery), 1 yard.

Between two batteries in column of route, 17 yards.

Between a battery and troops of other arms, 25 yards.

	Front (Yards).	Depth (Yards).
Piece in battery with handspike	2	5
Piece or caisson drawn by six horses	2	15
Limber drawn by six horses	2	12
Field battery in column of sections*	2	$(12 \times 15) + (11 \times 2) = 202$
Field battery in column of platoons†	$15 + 2 + 2 = 19$	$(6 \times 15) + (5 \times 2) = 100$
Field battery in line (full intervals)	$(5 \times 15) + (6 \times 2) = 87$	$(2 \times 15) + 2 = 32$
Same (closed intervals)	$(5 \times 5) + (6 \times 2) = 37$	32
Same in battery (full intervals)	$(5 \times 15) + (6 \times 2) = 87$	$5 + 9 + 12 + 12 + 15 = 53$
Same in battery (closed intervals)	$(5 \times 10) + (6 \times 2) = 62$	53
Mounted detachment (horse battery)	4	7
In horse artillery, one section	2	$15 + 2 + 7 + 2 + 15 = 41$
Horse battery in column of sections	2	$(6 \times 41) + (5 \times 2) = 256$
Horse battery in column of platoons	23	$(3 \times 41) + (2 \times 2) = 127$
Horse battery in line (full intervals)	$(5 \times 19) + (6 \times 2) = 107$	41
Horse battery in line (closed intervals)	$(5 \times 5) + (6 \times 2) = 37$	41
Horse battery in battery (full intervals)	$(5 \times 19) + (6 \times 2) = 107$	53
Horse battery in battery (closed intervals)	62	53

The following should be especially noted :

The front of a company in line is (approximately) 40 yards.

The front of a battalion in line is (approximately) 165 yards.

The front of a regiment in line is (approximately) 530 yards.

The front of a brigade in line is (approximately) 1670 yards.

The front of a troop in line is (approximately) 100 yards.

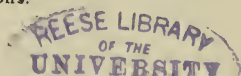
The front of a squadron in line is (approximately) 400 yards.

The front of a field battery, in line (full interval) or in battery, is (approximately) 90 yards.

The front of a horse battery, in line (full interval) or in battery, is (approximately) 110 yards.

*One gun with its caisson constitutes a section.

†The platoon consists of two guns with their caissons.



The front of a battery in line or in battery may vary from 62 to 125 yards; and the front of a brigade of four batteries, from 300 to 600 yards.

RATE OF MARCHING.

In a mixed force the pace is always that of the infantry; *i. e.*, 88 yards a minute.

In marching, the depth of a column is always greater than in the corresponding formations at drill. The amount of elongation or "tailing out" of a column depends upon the state of the weather and roads, and upon the discipline, *morale*, and national characteristics of the troops. It often varies from one-fourth to one-half the total length of the column. As a general rule of approximate accuracy, the allowance for elongation is 10 per cent. for a battalion; 15 per cent. for a division, and 20 per cent. for an army corps.

A rough rule for estimating the depth of a column, is to allow one yard for every two infantry soldiers, one yard for every trooper, and twenty yards for each gun or caisson.

In questions of space and time required for formations, marches, etc., the simple formula $t = \frac{s}{r}$ will be found convenient; t representing time; s , space passed over; and r , the rate of march. The same formula gives $s = t \times r$, and $r = \frac{s}{t}$.

EXAMPLES.

I. A brigade at A is to be reinforced by a battalion of infantry from B, a field battery from C, and a troop of cavalry from D. The reinforcements are all to arrive promptly at A at 11 o'clock A. M. At what hour must each start?

The distances measured on the map are as follows:

From B to A = 9 miles, 264 yards.

From C to A = 12 miles, 1270 yards.

From D to A = 7 miles, 690 yards.

The roads are excellent and the troops in good condition.

We have then, in the first case, $t = \frac{3}{8}$ hours + $\frac{264}{88}$ minutes = 3 hours 3 minutes.

In the second case, $t = \frac{1}{4}$ hours + $\frac{1270}{88}$ minutes = 3 hours 11 minutes.

In the third case (reducing to yards), $t = \frac{13010}{88} = 149$ minutes = 1 hour 51 minutes.

Hence the battalion must start at 7:57 A. M.; the battery, at 7:49 A. M.; and the troop, at 9:09 A. M. In this case, the distances being short, no allowance is made for halts.

II. A scout observes at a distance a body of cavalry, presumably hostile from their location and the direction of their march. He is

unable to ascertain their formation, but, being familiar with the lane on which they are marching, he knows that they cannot easily move thereon in column of fours, though the trail is wide enough for a column of twos. He sees the head of the column approach a small clump of trees, notes the time when it reaches it, and observes that the column, marching at a walk, is three minutes in passing the trees. In this case $s = 3 \times 117 = 351$; hence the column is 351 yards in length. A deduction of 35 yards is made for tailing out, which reduces the length of the column to 316 yards. This indicates that the number of troopers is $3\frac{1}{2}^a = 158$. The scout accordingly reports that he has seen a force of 150 hostile cavalry, probably consisting of two troops of seventy-five men each.

III. In a division constituting the main body of a column, the first brigade, having had the advance the day before, is ordered to march at the rear of the main body. The division is to move at 5 A. M. At what time must the brigade mentioned march out? The division consists of three brigades of infantry and four batteries of artillery. The head of the column must, therefore, have proceeded a distance equal to the length of the column minus the designated brigade before the latter marches off.

The depth of two brigades, including the distance between them, $= 3340 + 60 = 3400$ yards. The depth of four batteries in column of sections $= (202 \times 4) + (17 \times 3) = 859$ yards. To this must be added the distances between the artillery and the infantry in its front and rear (25×2) yards, which gives 909 yards. Hence, $s = 3400 + 909 + 60 = 4369$ yards; and $t = 4\frac{3}{8}^a = 50$ minutes, very nearly.

The designated brigade should, therefore, be in readiness to march at 5:50 A. M., and it would be merely subjecting it to useless fatigue to have it ready at the time specified for the march of the division. In this example no allowance is made for tailing out, as the march begins in the morning when the troops are fresh.

In a similar manner may be ascertained the length of time during which a rear guard must hold the enemy in check to cover the passage of the main body across a bridge or through a defile; and also the length of time required for the deployment of a given force. When the force deploys to one side only of the road on which it is marching, an approximate rule is, that the time required for the deployment equals the time required for the rear man to pass over a distance equal to the length of the column. When the force can deploy to both sides, the time is one-half that required when the deployment is to one side only.

The rate of march is generally uniform under the same conditions of roads and weather; and in a forced march an increase in

the number of marching hours instead of an acceleration of the pace is made. The use of the formula $r = \frac{s}{t}$ is therefore not frequent; though in exceptional cases it may be of use to compute the rate of march necessary in order to reach a given point at a designated time.

APPENDIX III.

RECENT CHANGES IN EUROPEAN INFANTRY TACTICS.

The best European tactical authorities are of the opinion that, owing to the introduction of smokeless powder and the far-reaching rifle of the present day, material changes in the attack formation of infantry have become imperative. The effect of the fire of the new rifle is such that a strong firing line is deemed necessary from the beginning, in order to gain that superiority of fire on which success depends; and the object of keeping the men well in hand and under good fire discipline, so that they can deliver an effective fire from the moment of their first employment, is deemed of more importance than the greater security from loss afforded by a thinner line—even if such greater security were not a matter of dispute rather than an acknowledged fact. The advocates of the new formation claim that, owing to the long range and flat trajectory of the rifle now in use, the supports merely act as butts to stop the bullets which either miss or penetrate the firing line, and that they represent “a tactical capital which bears no interest,” being close enough to suffer heavy losses, and, at the same time, contributing nothing to the fire effect.

In the French autumn maneuvers of 1892 the recent changes were foreshadowed by an attack formation which was conducted as follows: “The deployment being completed, generally outside the extreme range of the enemy’s artillery, the several lines moved forward together, the first line gradually breaking up into smaller and smaller fractions: these fractions gradually extend, and the firing line gradually thickens, until at about 1200 yards from the position, the whole front is covered by a screen of men in single rank, each squad of twelve or fifteen rifles separated by an interval from those right and left, and the men moving with plenty of elbow-room Behind came the supports, generally in single rank, then the bat-

talion reserves, and in rear again the second and third lines, and in some instances a fourth line, or general reserve. Firing, when on the offensive, began, as a rule, between 1200 and 800 yards, without much delay in the advance until the decisive range—within 500 yards—was reached. By the time the firing line had reached this distance, the supports and reserves had closed up, the second line was near at hand, and the advance was continued by rushes of 60 or 70 yards. Supports and reserves were brought up, and magazine fire commenced. The second line now come forward, and after a very rapid fire, and with drums beating, and the men shouting '*À la baïonnette*,' the whole line charged the position."*

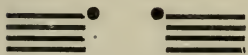
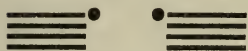
Similarly, in the German maneuvers in Alsace, in 1893, the infantry did not deploy as skirmishers, but formed single rank, and advanced in platoons in line, under command of lieutenants. At no time were the men on the firing line seen more than two feet apart, and they were generally touching. The vacant spaces on the firing line were not between men, but between sections, or generally platoons.

The new system, as finally adopted by the French, and published to their army in the drill regulations of 1894, may be best illustrated by a brief outline of the conduct of an attack by a French regiment.

On open and unsheltered ground, the major habitually forms his battalion in "open double column," with distances and intervals varying according to the extent of front assigned to the battalion.† As soon as the order is given to form for attack, the major commanding the battalion in the first line assembles his captains, the officer detailed to command the scouts, and such other officers of the battalion as it may be practicable to summon, and gives them his instructions. He designates the companies for the fighting line, and specifies the number of scouts to be sent out. The fighting line consists of one or more companies (generally two companies), the remaining companies of the battalion constituting the reserve.

*Major G. F. R. Henderson.

†The double column is formed of two columns separated by an interval of twenty-four paces, each column being composed of two companies each



in column of sections, the distance between the companies being equal to the front of a section plus six paces. In each column the guide is on the flank nearest the center of the battalion. The interval may be reduced to six paces. In open double column the interval is variable, according to circumstances, but is always more than twenty-four paces. In the accompanying figure, the position of the major is indicated by a cross, and that of each captain by a circle.

Each captain of the fighting line then sends out scouts (generally two men from each squad who have been specially trained for this duty), who precede the fighting line at a distance depending upon the terrain, but never less than 500 meters on open ground. The scouts advance either singly or in small groups, covering the entire front of the battalion, and halt about 900 meters from the hostile position, a few of them being sent farther on to reconnoiter the enemy. They then await the arrival of the firing line, their rôle as scouts ceasing when it comes up.

In moving forward to the line of scouts, the company is disposed in sections, or preferably platoons, marching "by the flank"—a formation practically the same as a line of sections or platoons in columns of fours—with intervals sufficient to enable it to occupy the front assigned to it when brought into line. Whatever the formation may be, it must be such as to insure enough men being placed promptly in the firing line to obtain a superiority of fire. When the company begins to feel the enemy's fire (say at 1,300 meters from the hostile position), it is brought into line in single rank, or in double rank with an interval of one pace between files, an interval of a few paces being left in either case between the sections to facilitate the marching and firing. In this formation it reaches the line of scouts, when it immediately forms in single rank, if not already in that formation. In the meantime the companies of the reserve are following at a distance of 400 to 500 meters in such formation as will best enable them to obtain concealment and shelter.

The leading companies preserve an interval of about thirty meters, and when it becomes necessary to open fire, they do so with vigor, preferably by volleys. Each of the leading companies advances, as a rule, in one body, guide center. The advance from point to point alternates with fire action, and is carried out by order of the major, either by the whole line, or by echelon of companies—generally the latter. The reserve companies, without awaiting orders, gradually draw near, and unless they can better utilize cover elsewhere, they place themselves about 300 meters in rear of the wings, or opposite the interval in the fighting line, and keep this distance until ordered to reinforce the latter.

When it becomes necessary to support the fighting line, the major reinforces it with a portion of a company (generally a platoon or even with an entire company; being careful to avoid making the line two or more deep before the time arrives for the decisive effort, unless cover exists. As the fighting line is increased by reinforcements, its captains divide the command along the line and preserve

a distinct separation, so as to be able to advance by echelon without confusion.

At about 400 meters from the enemy, bayonets are fixed, and rapid fire is opened by the whole fighting line. The major now brings up all available fractions of the reserve, and places them in rear of the points where reinforcement seems to be most necessary. The battalion of the second line approaches gradually, and its commander watches carefully the phases of the fight in his front. The advance of the fighting line continues by rushes, each rush being followed by rapid fire of short duration. The fighting line, reinforced from the reserve, and, if necessary, from the second line, advances to 200 or 150 meters of the enemy, when magazine fire is opened, and the portion of the reserve still available, and, if necessary, the second line, in part or entire, as circumstances may demand, joins the fighting line, and, at a signal from the colonel, the assault is made. The battalion in the third line, if there be one, is used in the manner already described. (See p. 128.)

During the attack, the major communicates with his captains by means of orderlies. He supervises the movement to the extent of regulating the direction and securing the necessary cohesion of the command, but he leaves to each captain all the initiative necessary for the proper handling of his own company.

The German drill regulations prescribe that the reserve in open terrain may be more than 200 meters in rear of the firing line, and that this distance must not be decreased until the approach of the decisive moment of assault. In close country the distance may be reduced. Especially when a small force is employed, it may be necessary to insert a small support between the firing line and the reserve, when circumstances require a close backing up of the former; and it may also be necessary to hold separate detachments in rear of the flanks for their protection; but it is expressly stated that such subdivisions are an evil which must be restricted to exceptional cases.

The gist of these changes is found in the substitution for the skirmish line of a line in single rank with intervals between the sections; in the diminished depth of the entire formation, the fighting line consisting of a single line instead of skirmishers and supports, and being in fact the same as the firing line. The new formation has not yet had the test of use in war, and it is probable that the practical lessons of the battle-field will necessitate further modifications which theory has not yet foreseen. The new firing line will certainly offer to the enemy a better target than the old one, but it will also develop a greater amount of fire—and better controlled fire—than the old “dispersed” line, in which fire discipline was so hard to maintain. ★

APPENDIX IV.

QUESTIONS.

The following questions have been prepared with a view to their use in a general review of the book. The number in parentheses indicates the page on which the answer to the question is to be found.

CHAPTER I.

INTRODUCTION.

1. State the two great divisions of the art of war and define each. (1.)
2. Give other divisions and define them. (1.)
3. How are strategy and tactics connected? (1-2.)
4. Give the several heads under which tactics may be discussed. (2.)
5. Why should organization and tactics be considered together? (2.)

CHAPTER II.

ORGANIZATION AND DISCIPLINE.

6. Define tactical organization. (3.)

THE LINE.

7. Upon what unit should the organization of an army be based? (4.)
8. What is the real tactical unit in the German army? (4.)
9. What are the advantages of the battalion as a tactical unit in our service? (4.)
10. Give the subdivisions of the battalion down to and including the squad. (5-6.)
11. What organization is the administrative unit, and why is it so regarded? (6.)
12. What is the necessity for grouping the battalions into regiments? (6.)
13. What is the composition of the brigade? (7.)
14. What is the tactical unit of artillery, and how many guns does this unit contain? (7.)

15. How is artillery united into larger organizations? (8.)
16. What is the use of the regiment in artillery organization? (8.)
17. Give the tactical unit of cavalry in our own and in other armies. (8.)
18. In cavalry what is the use of the regimental organization, and of what does it consist? (8.)
19. What is the organization of foreign cavalry regiments? (8.)
20. What is the largest independent cavalry organization in our service? (9.)
21. How are cavalry brigades, divisions, and corps constituted? (9.)
22. Give the composition of an infantry division. (9-10.)
23. What kind of unit is an army corps, and what will govern its composition? (11.)
24. In the United States, who grants authority for the organization of corps, and how are they numbered? (11.)
25. Give the composition of an army corps. (11.)
26. How is the command of the artillery exercised? (11.)
27. What is the ordinary size of an army corps in round numbers? (12.)
28. What considerations govern the size of an army corps? (12.)
29. What considerations govern in the grouping of army corps into armies? (13.)
30. What is the rule as to an artillery reserve in our own and foreign services? (13.)
31. What are the advantages of the foreign system? (14.)
32. Upon what does the question of the proportion of the three arms depend? (14.)
33. State the rule for the proportion of artillery in general and under unfavorable conditions. (14-15)
34. How and why does the proportion of guns to infantry vary during the campaign? (15.)
35. What consideration fixes the number of guns with an army? (16.)
36. How does the proportion of cavalry vary, and what should be the rule with us? (16.)

SPECIAL TROOPS.

37. What are the special troops of our own and other services? (17.)
38. What are the duties of engineer troops in the United States army? (17.)
39. What is the capacity of the bridge train of a German army corps? (18.)
40. How should the bridge trains of our army be organized and handled? (19-20.)

41. State the strength, duties, and equipment of the signal troops with an army corps. (20.)
42. Give the medical force attached to a regiment of infantry, squadron of cavalry, and battery of artillery. (20.)
43. Give the medical staff of a brigade and of a division. (20.)
44. Give the sanitary organizations of a division and their duties. (20.)
45. Give the medical staff of a corps and its field hospital equipment. (21.)
46. Give the medical force attached to a regiment of corps cavalry and to special troops. (21.)
47. State the purpose and position of general hospitals, and the supervision of them by the army commander. (21.)
48. State the method pursued in the United States in providing for the military police of the army. (21.)

THE TRAIN.

49. What is the amount of small-arm ammunition with which the infantry should be promptly supplied, and how is it carried? (22.)
50. What is the amount of artillery ammunition carried for field batteries? (22.)
51. What is the amount of ammunition carried for horse batteries? (22.)
52. How is the ammunition column commanded and organized, and to what is it attached? (22.)
53. The *personnel* of the ammunition column is composed of what? (22.)
54. What is the organization of the corps train, and what does it carry? (23.)
55. What does the baggage train carry, and how is it distributed? (23.)
56. Of what does the horse depot consist? (23.)
57. What is the load for an army wagon? weight of artillery ammunition? weight of 1000 rounds of rifle cartridges, new model? weight of soldiers' ration? weight of forage ration? (23.)
58. Give the total transportation of an army corps at full strength. (23.)
59. Give an approximate estimate of the train of a German army corps. (24.)
60. Discuss the means of securing a good train service. (24-25.)

THE STAFF.

61. What are some of the duties of a commanding general, and how is he relieved from a portion of them? (25-26.)

62. What is the German system of promoting efficiency in the staff. (26.)
63. Give the duties and responsibilities of a chief of staff. (27.)
64. What officers should be under the command of the chief of staff, and what officers constitute the military staff? (27.)
65. Give the duties of the provost-marshal general. (27-28.)
66. Give the duties of the chief signal officer. (28.)
67. Give the duties of the chief of artillery. (28.)
68. Give the duties of the chief of cavalry. (28-29.)
69. Give the duties of the chief engineer. (29.)
70. State what officers compose the administrative staff, and give the duties of each. (29.)
71. Through what channel is the correspondence of the staff departments conducted? (30.)
72. Describe the responsibilities of officers of supply departments in the French army since reorganization. (31.)
73. What is the rule as to the number of persons on a staff? (31.)
74. Give the staff of an army corps. (32.)
75. Give the staff of a division. (33.)
76. Give the staff of a brigade. (33.)
77. How are clerks and messengers obtained for the several headquarters? (33.)
78. Give the composition of the division (its different units), and its aggregate strength. (34.)
79. Give the composition of an army corps (its different units), and its aggregate strength. (35.)
80. How is a detached division reinforced? (35.)
81. What is the difference between the "fighting strength" and the "ration strength" of an army corps? (35.)

RANK AND COMMAND.

82. Give the proper rank of the commanders of the different organizations. (35.)
83. What has been the practice in the United States army, and what are the objections to such a system? (36.)

RECRUITMENT.

84. What is the necessity for recruiting? (36.)
85. Give the two general methods of recruiting an army, and discuss each. (37.)

DISCIPLINE.

86. Discuss discipline in a general way, giving the best means of promoting and maintaining it. (38 to 45.)

CHAPTER III.

CHARACTERISTICS OF THE THREE ARMS.

INFANTRY.

87. Give the powers and limitations of infantry. (46.)
88. Discuss the arms and the action of infantry. (46.)
89. Discuss the intrenching tool. (47-48.)
90. Discuss the pace of infantry. (48.)
91. State the essential qualities of infantry. (49.)

CAVALRY.

92. Of what does the action of cavalry consist? (49.)
93. Discuss the shock action of cavalry. (49.)
94. Discuss the dismounted fire action of cavalry. (50.)
95. Discuss the mounted fire action of cavalry with the carbine. (50.)
96. Discuss the detached action of cavalry. (51.)
97. How is cavalry divided and classified? (51.)
98. Describe heavy and light cavalry and their uses. (51.)
99. Describe medium cavalry. (52.)
100. Describe the equipment of the various classes of cavalry. (52.)
101. How is all cavalry armed and trained? (52.)
102. To what type are cavalymen approaching? (52.)
103. Give the present requirements of cavalry. (52-53.)
104. What are the arms of the trooper in the United States and Europe? (53.)
105. Discuss the pace of cavalry. (55.)
106. Discuss the powers and limitations of cavalry. (55.)
107. Discuss the subject of mounted infantry. (56.)

ARTILLERY.

108. How is artillery primarily divided? (57.)
109. What does heavy artillery embrace? (57.)
110. What does light artillery comprise? (57.)
111. Describe horse artillery. (57.)
112. Describe the several divisions of field artillery. (58.)
113. Describe mountain batteries. (58.)
114. Discuss the arms of artillery. (58.)
115. Discuss the pace of artillery. (59.)
116. Discuss the powers and limitations of artillery. (59.)
117. Discuss the range of artillery and the division of the range into zones of fire. (60.)
118. Give the kinds of artillery fire, and describe each. (60-61.)
119. Give the classification of shell, and describe each. (61.)
120. Describe shrapnel. (61.)
121. Describe canister. (62.)

122. Give the use and classification of fuses, and describe each. (62.)
123. Discuss the use of common shell. (62.)
124. Discuss the use of torpedo or mine shells. (63.)
125. Discuss the use of shrapnel. (63-64.)
126. Discuss the subject of field mortars. (65-66.)
127. Define rapid-firing guns, and discuss their use as field artillery. (66.)
128. Define machine guns, and discuss their use on the field of battle. (66-67.)
129. Discuss the subject of cover for guns. (67-68.)

CHAPTER V.

INFANTRY IN ATTACK AND DEFENSE.

130. Discuss the general theory of the infantry attack. (104-109.)
131. How have the functions of the skirmishers changed, what difficulty has accordingly arisen, and what measures are taken for obviating this difficulty? (109-110.)
132. What should each man be instructed to do when separated from his squad, and how should new squads be formed? (110.)
133. State what is meant by "fire discipline," and give the five rules required by it. (110-111.)
134. Why is the observance of the simple rules which regulate fire discipline a matter of great difficulty in battle? (111.)
135. Upon what will the time of beginning the firing depend, and why is long-range firing generally to be deprecated? (112.)
136. How may long-range fire be forced upon the assailant, and what should he then do? (113.)
137. When long-range fire is used by the assailant, it will generally be by what troops, and how? (113.)
138. If possible, the attacking infantry should advance how close to the enemy before opening fire, and how close can it usually advance? (114.)
139. How must the attacking infantry obtain protection at the longer ranges. (114)
140. State why volley firing is desirable, the objections to it, when it is possible, and what should be done when the men are becoming disconcerted. (114-115.)
141. Discuss individual fire. (115-116)

142. How is protection from the enemy's fire sought at the shorter ranges, and what conditions must the cover fulfill? (116.)
143. In regard to cover, what two things should the men be taught? (116.)
144. Why are rushes necessary, what regulates their distance, and how are they made? (117-118.)
145. Why should the fractions of the line alternately rushing be large? (119.)
146. Discuss the composition of the firing line. (120)
147. Why should great care be taken to give the proper direction to the firing line when it first moves to the attack? (120.)
148. The firing line is essentially what? (120.)
149. How and why are scouts used in an infantry attack? (121.)
150. What is the two-fold object of the support? (121.)
151. State the considerations which affect the strength of the support. (122.)
152. Discuss the distance of the support from the firing line. (122.)
153. Discuss the formation of the support. (123.)
154. Discuss the reinforcement of the firing line from the support. (124.)
155. State the general objects of the reserve. (125.)
156. Discuss the formation of the reserve. (125-126.)
157. Discuss the distance of the reserve from the bodies in front. (126.)
158. How and when are reinforcements sent forward from the reserve? (126-127.)
159. What should be the strength of the reserve? (127.)
160. What are the objects of the second line? (127-128.)
161. What should be the strength of the second line, its distance from the first line, and who should command it? (128.)
162. What are the duties of the third line, and by what other line are these duties sometimes performed? (128-129)
163. Who commands the third line, what is its distance from the second line, and what is its strength? (130.)
164. Discuss the method of attack by a regiment of infantry. (130 to 138)
165. Discuss the method of attack by a brigade of infantry. (138-139.)
166. Give the general rules to be observed in conducting an infantry attack. (140)
167. Define the three distinct phases of the infantry attack. (140-141.)
168. What is requisite for the success of a front attack, and what advantages are gained by a flank attack? (141.)

169. Why is a combination of front and flank attacks necessary, and why does this combination promise success? (141-142.)
170. In what two ways may a flank attack be made? (142.)
171. Define a turning movement, and state what is necessary in order that it may be successful. (142.)
172. State when the troops for the flank attack are generally concentrated before the flank which is to be attacked, and discuss the conduct of a flank attack. (142-143.)
173. What is the object of the force on the defensive, what are the essential conditions to a good defense, and how are these conditions best fulfilled? (144.)
174. Describe the general characteristics of the defense. (145.)
175. Discuss the preliminary dispositions of the firing line on the defensive. (145-146.)
176. Why can long-range fire generally be more effectively used by the defenders than by the assailants? (146-147.)
177. What should be the objective of the fire of the firing line on the defensive? (147 to 149.)
178. Discuss the subject of the support in defense. (149-150.)
179. Discuss the subject of the reserve in defense. (150.)
180. Discuss the subject of the second line in defense. (150.)
181. Discuss the subject of the third line in defense. (151-152.)
182. Discuss the strength of the three lines. (153.)
183. Give the first and most important requisite of an infantry position; the next in importance; an especially desirable position, and state why a position on a steep hillside is not desirable. (154-155.)
184. How should a position on a hill be occupied? (155.)
185. To what should the position be suited in its extent, and what may be constructed in front of it? (155-156.)
186. When the enemy is encountered, and, in the course of reinforcing the advance guard, the defensive is assumed either by choice or from necessity, state what is done. (156.)
187. Discuss the subject of hasty intrenchments for infantry—how they should be traced; how they may be concealed; when and how they should be constructed; how they may be used on the offensive; and their effect on the *morale* of the men if they be invariably relied upon. (156 to 160.)
188. Discuss the relative advantages of the offensive and defensive. (160-161.)
189. Discuss the subject of withdrawal from action. (161 to 163.)
190. Discuss the supply of infantry ammunition on the field. (164.)
191. Discuss the action of infantry against cavalry. (165-166.)

192. What are the first duties of an infantry commander opposed to cavalry? (168.)
 193. Discuss the effect of smokeless powder on infantry tactics (168 to 170.)
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CHAPTER VII.

CAVALRY IN ATTACK AND DEFENSE.

194. Discuss the formation of cavalry for the charge in line—how the charge is made, and on what its effect depends; the necessity for and position of the support; same of the reserve; when these bodies may be combined; the three parts of which an attacking force of cavalry generally consists, and the relative strength of these parts; the distances between these parts; the proper formation for maneuvering cavalry, and when deployment should be effected. (216 to 219.)
195. Draw a diagram representing the normal attack formation of a brigade of cavalry. (219.)
196. Discuss the advantages and disadvantages of charging in single rank and in double rank. (220.)
197. Discuss the pace and conduct of the attack. (220 to 223.)
198. Discuss the influence of the terrain on a cavalry charge. (223.)
199. Discuss the use of ground scouts and combat patrols. (224–225.)
200. Discuss the subject of flank attacks in cavalry charges. (225–226.)
201. What is the first consideration in a cavalry attack, and why is this the case? (226.)
202. What are the necessary qualifications for a good cavalry leader? (226.)
203. In the charge in column, what should be the distance between the subdivisions; their formation; what does the charge in column of subdivisions produce; and when is it preferable to a charge in line? (227.)
204. How should the charge in column of fours be made? (228–229.)
205. Discuss the charge as foragers. (229.)
206. Why will the number of cavalry battles probably be greater in the future than it has been in the past? (229–230.)
207. What circumstances may justify the charge of a small force of cavalry upon a large one? (231.)
208. When are the best opportunities offered for an attack upon the enemy's cavalry? (231.)

209. By what bodies will the combats of cavalry with cavalry generally be fought? (232.)
210. State the different circumstances (eleven) under which cavalry may be used with effect in charging infantry. (232 to 240.)
211. What may be produced by a threatened cavalry attack? (240.)
212. Discuss the conduct of a cavalry charge on infantry. (241-242.)
213. Why is the use of cavalry against infantry not a thing of the past? (242-243.)
214. State the three cases in which artillery may be attacked by cavalry. (243 to 246.)
215. Discuss the method of attack by cavalry upon artillery, and the measures to be taken on capturing a battery. (246-247.)
216. Discuss the defensive use of shock action by cavalry. (247.)
217. State the purposes (ten) for which dismounted action of cavalry may be usefully employed. (247 to 251.)
218. To what is the increased value of dismounted action solely due? (251.)
219. Discuss the manner of conducting dismounted action by cavalry. (252 to 254.)
220. Discuss mounted fire action with the carbine. (255.)
221. Discuss the effect of smokeless powder on cavalry tactics. (255-256.)
222. State the objects (eight) for which cavalry raids may be undertaken. (256 to 260.)
223. When are raids practicable, and why should they not be undertaken without an important object? (260 to 262.)
224. Describe the composition and preparation of a raiding force. (263 to 265.)
225. Discuss the conduct of a raid. (265-266.)
226. Against what will the principal destructive efforts of a raiding force be directed, and how should the destruction be effected in each case? (266-267.)
227. What does the tactics of cavalry embrace? (267-268.)

CHAPTER IX.

ARTILLERY IN ATTACK AND DEFENSE.

228. Discuss the general theory of the employment of artillery in attack. (305 to 308.)
229. How does the tactics of artillery compare with that of the other arms; what should be the intervals between guns in action; and what may be said in regard to the alignment of the battery? (308.)

230. State the requirements of a good position for artillery. (308-
to 312.)
231. What are the only indispensable conditions to be sought in
choosing an artillery position? (312.)
232. What should be the position of the artillery on the march, and
why? (313.)
233. How soon must the artillery be in action, and what will be the
proportion of artillery to infantry in the early part of the
action, as compared with the later stages? (313.)
234. What are the three principal positions occupied by the artillery
in the attack, what are its functions in each position, and
what is generally the distance of each position from the
enemy? (313 to 316.)
235. Who indicates the general position for the artillery, and who
then selects the place for it and gives orders accordingly?
(316)
236. Describe the manner in which artillery is prepared for action,
and the relative positions of the different parts in action.
(316-317.)
237. Describe the manner of occupying the artillery position.
(317-318.)
238. Why are lateral changes made by artillery; why should unnec-
essary movements be avoided; and why are changes in the
position of artillery less frequent now than they were for-
merly? (320.)
239. Describe the manner of moving forward to the duel and sup-
porting positions. (321-322.)
240. When the advance guard encounters such resistance as to
render it necessary to deploy for action, how is the artillery
generally brought into action, and how is the artillery of
the main body brought forward and placed in position?
(322-323.)
241. When the division is operating alone, what is the best place
for the artillery (relative to the infantry), and why? (323.)
242. In the case of an army corps, state the position of the artillery
on the march, when the corps is marching by a single road;
when marching by two roads; and when marching by three.
(323-324.)
243. In the case of an army corps, how is the artillery brought into
action when the corps is advancing by a single road; when
advancing by two roads; and when advancing by three?
(324.)

244. What are the objections to uniting all the artillery of the corps in one continuous battery? (325.)
245. Although the concentration of the entire artillery of an army corps into one continuous battery is not often either desirable or practicable, how should the separate groups be situated? (325.)
246. When several battalions of artillery are united in action, what intervals should be left, and why? (325-326.)
247. What is meant by massing guns? (326.)
248. To what arms are the most favorable positions given up in the different zones? (326.)
249. When should artillery fire over its own infantry; and why is such action ever necessary? (326-327.)
250. To what dangers is infantry subjected when fired over by its own artillery? (327.)
251. What may be regarded in practice as the minimum distance of the infantry from the guns, in order that it may be safely fired over? (328.)
252. What may be regarded as the minimum distance from the battery to its objective, in order that the infantry may be safely fired over? (328.)
253. In all cases of artillery firing over its own infantry, what arrangements should be made, and what fuses should be employed? (328-329.)
254. Fire tactics, as applied to artillery, may be how defined? (329.)
255. Discuss the functions of the chief of artillery of a corps, the senior artillery officer of a division, the commander of an artillery battalion, and a battery commander in action. (329 to 331.)
256. As a general rule, against what is the fire of artillery directed; and as a result, what is generally the objective of the artillery fire in the different zones? (331-332.)
257. When the line of hostile guns is continuous, how should it be divided as a target? (332.)
258. What should be the target of a battery when opposed to infantry in extended order; and what when preparing for assault? (332.)
259. When may it be advisable to open or continue artillery fire, even though it be evident that the material effects will be insignificant? (333.)
260. How is artillery fire classed, according to the rate of fire? Describe each kind of fire. (334-335.)

261. What is the usual order of firing; when may a fire by platoon be used; when may salvoes be employed; and when may a fire at will become necessary? (335-336.)
262. Discuss the subject of ranging when the target is stationary. (336-337.)
263. Discuss the subject of ranging when the target is a movable one. (337-338.)
264. By whom is the observation of the fire of a battery made; by what is it affected; and how are the consequent difficulties overcome? (339 to 342.)
265. What is the great object of the artillery of both the assailant and the defender? (343.)
266. Why is the artillery duel necessary, where does it begin, and where is it usually concluded? (343-344.)
267. In the artillery duel, should the artillery direct its efforts against the *personnel* or the *matériel* of its opponent, and why? (345.)
268. In what way may the cessation of fire on the part of the defender's batteries be a mere ruse? (345)
269. In the artillery duel, what is emphatically the target of our own guns, but what exception may be made? (346.)
270. Why has the artillery preparation of the infantry attack become of greater importance than it was formerly? (346-347.)
271. As soon as the enemy's guns have been silenced in the duel or our own have at least gained a marked superiority over those of the enemy, what should be done? (348.)
272. In the engagement of so large a force as an army corps, when is the preparation of the infantry attack usually completed; and when, with a small force? (348.)
273. When circumstances demand that the attack should be of the nature of a surprise, what may be done in regard to the artillery preparation? (348.)
274. Describe the manner of supporting the infantry attack by artillery. (348 to 350)
275. In supporting the infantry attack, what will be the result if the artillery fire be suspended too soon, what if it be continued too long, and what is the best rule to follow? (350.)
276. What should be done by the artillery when the hostile position is carried? (351.)
277. How does the artillery give solidity to the attack formation? (351.)
278. Discuss the use of artillery in a flank attack. (352.)

279. Give the general theory of the employment of artillery in defense. (352-353.)
280. Discuss the subject of the artillery position in defense. (353-354.)
281. Discuss the subject of cover for artillery. (354-355.)
282. How is the position of the defender occupied at first, and how are small bodies of infantry and cavalry used? (356.)
283. How are infantry skirmishers used in connection with artillery, and why? (356.)
284. When a division alone is engaged, how are the batteries posted in relation to the infantry? (357.)
285. In the case of an army corps, how are the batteries posted in relation to the infantry? (357.)
286. Discuss the occupation of the position by the artillery of the defense. (357-358.)
287. What advantage has the artillery of the defender over that of the assailant, but why is mobility on the part of the former nevertheless necessary? (358-359.)
288. The artillery should never withdraw from action, without what? (359.)
289. When may it be expedient for the artillery of the defense to decline the artillery duel? (360-361.)
290. When the assailant's infantry becomes actively engaged in the assault, what is done by the defender's artillery? (361.)
291. How should the artillery endeavor to withdraw from action? (361-362.)
292. That the artillery may withdraw in good order, when must the dispositions for withdrawal be made? (362.)
293. What alone should be considered in regard to the loss of guns? (363.)
294. Retreating artillery once withdrawn from its position has what to fear most? (365.)
295. What may be said in regard to the capacity of artillery to defend its own front from attacks by infantry or cavalry? (366.)
296. What is the opinion of Von Dresky in regard to driving good infantry out of position with artillery fire alone; and how may this, perhaps, be changed, owing to improved guns? (367.)
297. What may be said of the danger to artillery from skirmishers in future? (367-368.)
298. When engaged in a fight with infantry, what should artillery endeavor to do? (368.)

299. On what should artillery, as a rule, rely for its protection? (368.)
300. When may a special escort be necessary for artillery, and what are the two great objects of such escort? (368-369.)
301. When the artillery is in position, where is the escort? (369.)
302. Why should not a permanent escort be assigned to a force of artillery? (370.)
303. State the functions of the escort commander, and his relations to the commander of the artillery. (369-370.)
304. When a force of artillery is in position and doing effective work, but is exposed without an adequate escort, how may it sometimes be practicable to support it? (370.)
305. Upon what does the battery depend for its ammunition? (371.)
306. State the position of the limbers and caissons in action? (371.)
307. State the position of the ammunition column on the march and in action. (371 to 373.)
308. What are the two methods of supplying ammunition in action, which is the better, and why? (373.)
309. Describe the method of supplying ammunition from the caissons. (374.)
310. When a battery on the line of battle finds its ammunition exhausted and no immediate supply available, what should be done? (375.)
311. How are men and horses supplied to the batteries in action? (376.)

HORSE ARTILLERY.

312. In what way is horse artillery especially valuable as a part of the corps artillery? (377.)
313. What are the functions of horse artillery with a cavalry division? (378.)
314. What is the position of the horse artillery with a cavalry division on the march? (378-379.)
315. How may horse artillery be used in reconnaissance? (379-380.)
316. Why is horse artillery especially useful in the preliminary phases of a battle; what are its functions in an engagement of cavalry; and what may be said of its efficiency and tactics? (380.)
317. Discuss the position of the horse artillery in a cavalry battle. (380-381.)
318. Discuss the objective of the fire of horse artillery in a cavalry battle; state what should be done when the charge is successful; when the charge is unsuccessful; and when the defeated cavalry is driven straight back upon the guns. (381 to 383.)

319. Discuss the position and duties of horse artillery in a general engagement. (383-384.)
 320. Why should horse artillery always have an escort detailed for its protection? (384-385.)
 321. In moving into position, how may a battery of horse artillery be given the appearance of cavalry? (385.)
 322. Discuss the effect of smokeless powder on artillery tactics. (385 to 387.)
 323. Give the general principles governing the employment of artillery in battle. (387-388.)
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CHAPTER X.

THE THREE ARMS COMBINED.

THE OFFENSIVE.

324. What decisions and arrangements constitute the plan of battle? (389.)
325. Discuss the relative advantages of the offensive and defensive. (389 to 391.)
326. State the objections to a frontal attack; when such attacks may be expedient; and what a frontal attack requires, in order that it may be successful. (391-392.)
327. Why are flank attacks necessary; with what are they usually combined; and what has led naturally to this form of combined attack? (393.)
328. While acting aggressively against the enemy with the reinforced part of the line, why and how must the other part be protected? (393-394.)
329. What may generally be said about an attempt to attack simultaneously both flanks of an equal force? (394.)
330. What is the effect of piercing the enemy's front; and why is this plan very difficult under modern conditions? (394-395.)
331. What is meant by the term "order of battle"? (395.)
332. What are the three orders of battle; and how is each brought about? (396.)
333. State the advantages and disadvantages of the concave order of battle. (396.)
334. When is the convex order of battle necessary on the offensive; and what are its disadvantages? (397.)
335. Whatever the order of battle may be, what must the army be prepared to do? (397.)

336. The determination of the point on which the main attack is to fall rests on what considerations, and when should each be given the greater weight? (397.)
337. State the influence of strategical considerations in determining the point of attack in the following cases: When the hostile army is connected with its base by one flank; when the hostile army is connected by a flank with another army, a fortress, or any important strategic point; when the line of retreat lies obliquely in rear of one wing. (398.)
338. When the attacking army is connected by a flank with an allied army, with its base, with a fortress, or any important strategic point, with what part of its front should it make the attack? (399.)
339. Among the tactical considerations influencing the selection of the point of attack, discuss the following: The enemy's advanced posts; a strongly fortified post in the line of battle; when the fortified post or some natural feature in the enemy's line secures his line of retreat, or commands the other parts of the field; when one of the enemy's flanks rests on an impassable obstacle; any commanding ground which will afford a view of the enemy's dispositions in the preliminary stage of an action. (399 to 402.)
340. How is the information gained on which a general bases his plan of battle? (402)
341. What should the general order set forth clearly? (403.)
342. What should be the nature of the special order sent to each subordinate commander. (403)
343. Discuss the position and functions of the commander in battle; state what precautions should be taken in regard to his successor; and state how reliable aids may be utilized to represent the commanding officer, what information and discretionary power may be given to them, and how they should exercise the authority thus delegated. (404 to 407.)
344. Discuss the reserve—its object, its size, the local reserves, the general reserve, the time of employing the reserve. (407-408.)
345. State the only fundamental rule that can be established for the employment of the three arms combined; state briefly the functions of each arm when used in combination with the others; and state the three parts into which the attack may be divided. (409.)
346. Discuss the preparation for the attack. (410.)
347. Discuss the attack by the three arms combined. (411-412.)

348. State the special points to be considered in preparing and carrying out an attack by a force consisting of all three arms. (412.)
349. Discuss the occupation of the hostile position after a successful assault. (412 to 414.)
350. Discuss the withdrawal after repulse. (414.)

THE THREE ARMS IN DEFENSE.

351. When a commander assumes the offensive, either from choice or through necessity, he should endeavor to occupy a position that will afford what three advantages? (414.)
352. What circumstances may render a purely defensive action sufficient? (414-415.)
353. Discuss the features and conditions of the ground in front of a defensive position. (415 to 418.)
354. What is one of the very first requisites of a defensive position, and how many men may be allowed to each yard of front? (418-419.)
355. What (approximately) is the front of an army corps on the offensive, and what on the defensive? (419.)
356. What cover may generally be found in a defensive position, and what must be provided? (420.)
357. What advantage do intrenchments give to a commander; into into what two zones may the field be divided for defensive purposes, and how should the intrenchments be constructed on each? (420.)
358. In constructing intrenchments, what precaution should be taken with a view to a counter-stroke? (420.)
359. When, and by whom, should the intrenchments be constructed? (420-421.)
360. What conditions are necessary, in order that strong points may be advantageously held in the line itself? (421.)
361. How should the flanks be supported, and why is it not desirable to rest them upon impassable obstacles? (422.)
362. Why does an impassable obstacle intersecting the position constitute a serious defect in it? (423.)
363. What should be offered by the ground in rear of a position? (424.)
364. Why is a position with a river at its back generally a bad one, and when may such a position be an admissible one? (424.)
365. State the requirements of a perfect defensive position. (425.)
366. What orders of battle may be adopted on the defensive, and which is generally the best? (426.)

367. When is the concave order of battle peculiarly suited to the defensive, and what is the indispensable condition in this case? (426 to 428.)
 368. When may the convex order of battle be advantageously used on the defensive? (428-429.)
 369. How is the crotchet order of battle produced, and what are the objections to it? (429.)
 370. Notwithstanding its disadvantages, when may the crotchet order of battle be adopted with advantage? (430.)
 371. State how the commander on the defensive gains the information on which to base his plans, and when and how he formulates his orders? (430.)
 372. Of what three stages does the defense consist? Discuss each. (431 to 433.)
 373. What are the advantages and disadvantages of a night attack? (433-434.)
 374. What knowledge is necessary to the success of a night attack; what precautions should be taken in preparing for the attack, and how should the attack be conducted? (434-435.)
 375. To what forces are night attacks best adapted, by what are they generally made, and what kind of night is best suited for such operations? (435-436.)
 376. Though night attacks are open to many objections, and their success is problematical at best, how may the darkness of night be utilized in military operations? (438.)
 377. Discuss the use of the different arms in night attacks. (439.)
 378. Under what conditions will actual attacks at night, by large forces, be advisable? (440.)
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CHAPTER XI.

CONVOYS.

379. How is the transport supplying an army primarily divided? (441.)
380. How are the convoys broadly classed? (441.)
381. How is transportation on land effected, and what are the two chief methods? (441.)
382. What kind of animals and wagons are employed in the wagon-trains in the U. S. service? (442.)
383. Discuss the organization of a wagon-train. (442-443.)

384. Discuss the march of the convoy, when the transport is by wagon. (443 to 445.)
385. Discuss the selection and occupation of camps for convoys, and describe the several methods of parking the wagon-train. (445-446.)
386. On what do the size and composition of the escort of a wagon convoy depend, what proportion should the number of men bear to the number of wagons, what may be regarded as the smallest allowable escort for a train of fifty or sixty wagons, and into what parts is the convoy usually divided? (446 to 448.)
387. Discuss the action of the advanced cavalry of a convoy. (448-449.)
388. Discuss the conduct of the advance guard of a convoy. (449-450.)
389. State the composition, distribution, and general functions of the main body of the escort of a wagon convoy. (450-451.)
390. State the strength and duties of the rear guard of a wagon convoy. (451.)
391. Discuss the defense of the convoy. (451 to 454.)
392. Discuss the attack of convoys. (454-455.)
393. Discuss the subject of convoys of prisoners. (455-456.)
394. Discuss the subject of convoys by railroad. (456-457.)
395. How should railroad trains be convoyed in railroad riots? (458.)
396. Discuss the subject of convoys by water. (458.)

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