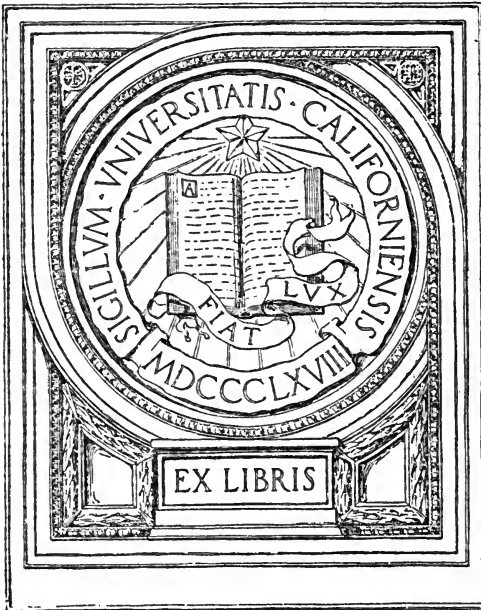
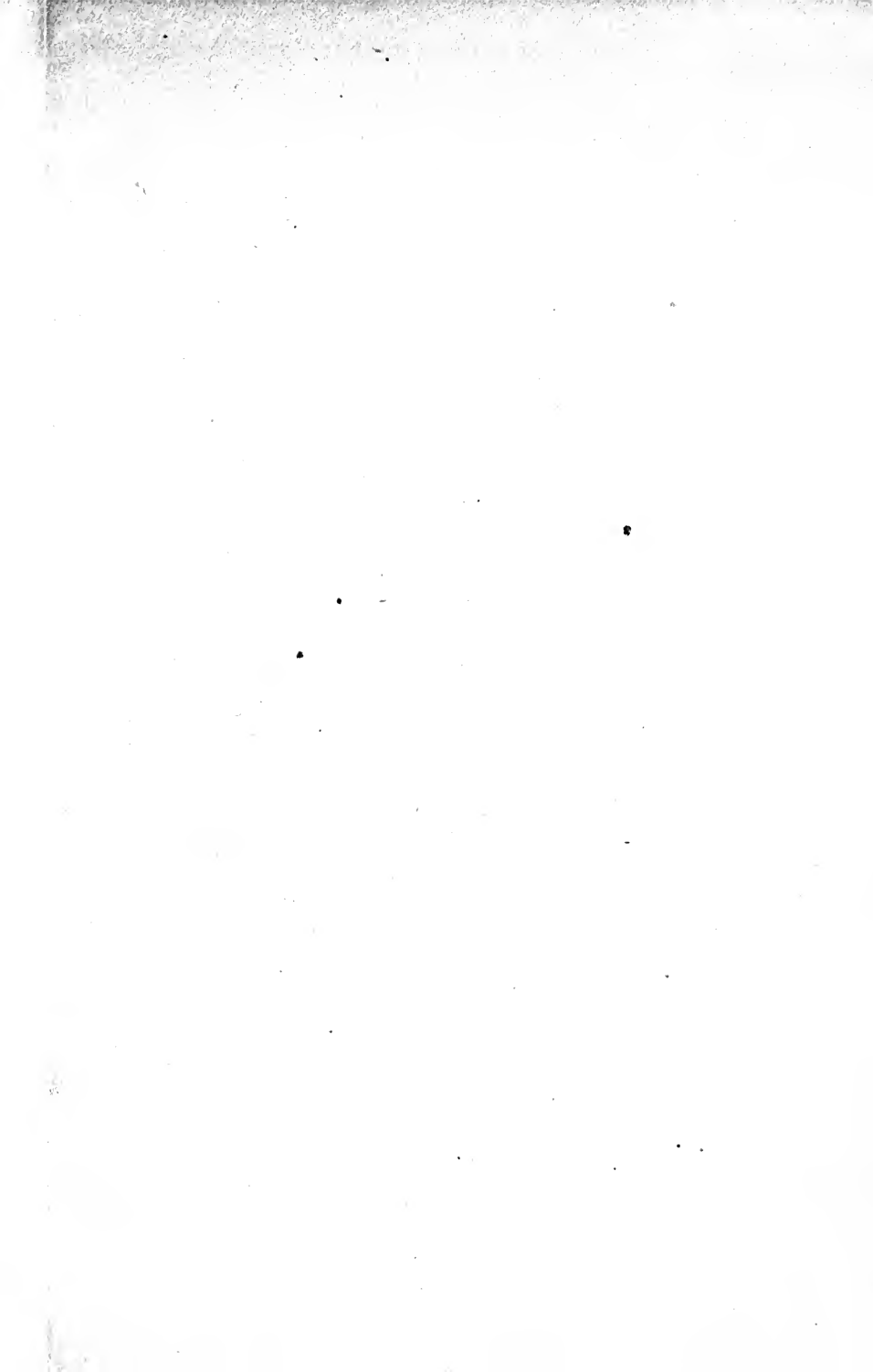




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(7th Edition, 1906.)

DEPARTMENT OF
CALIFORNIA

Organization and Tactics

BY

ARTHUR L. WAGNER,

LATE COLONEL, MILITARY SECRETARY'S DEPARTMENT, GENERAL STAFF, U. S. ARMY; INSTRUCTOR IN THE ART OF WAR AT U. S. INFANTRY AND CAVALRY SCHOOL; GOLD MEDALIST OF THE MILITARY SERVICE INSTITUTION OF THE UNITED STATES; AUTHOR OF "THE SERVICE OF SECURITY AND INFORMATION," "THE CAMPAIGN OF KONIGGRATZ," ETC.

REVISED BY

CAPT. MALIN CRAIG, 1st Cav., CAPT. HERBERT J. BREES,
1st Cav., and FIRST LIEUT. LESLIE A. I.
CHAPMAN, 1st Cav.

Officially recommended from the Headquarters of the Army
to Officers subject to examination for promotion.

FRANKLIN HUDSON PUBLISHING CO.,
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PREFACE TO THE SECOND EDITION.

The cordial reception accorded to the first edition of "Organization and Tactics" encourages the author to offer a new edition with the hope that it may continue to receive the favor of military students.

Profiting by an experience of two years in using the work as a text-book at the U. S. Infantry and Cavalry School, and by the kind suggestions of American and English critics, the author has made a few changes in the text, but they are not sufficient to effect any material change from the first edition.

The author desires here to express his obligations to First Lieutenant J. T. Dickman, 3d Cavalry, and First Lieutenant A. L. Mills, 1st Cavalry, assistant instructors in Art of War at the U. S. Infantry and Cavalry School, for valued assistance in preparing the new edition of this work for the press.

U. S. Infantry and Cavalry School,
Fort Leavenworth, Kansas,
February 5, 1897.

PREFACE TO THE FIRST EDITION.

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 conduct 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.

He is also indebted to Captain Eben Swift, 5th Cavalry, and Lieutenant Carl Reichmann, 9th Infantry, assistant instructors in Military Art at the U. S. Infantry and Cavalry School (in which the advanced sheets of most of the chapters have been used in the course of instruction), for a number of valuable suggestions, which he has adopted.

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

EXPLANATORY NOTE.

United States Infantry and Cavalry School and Staff College,
Fort Leavenworth, Kansas, March 1, 1906.

The author of this book, the late Colonel A. L. Wagner, General Staff, U. S. Army, while on duty as assistant commandant at this School, collected data and solicited the assistance of the College in a proposed revision thereof. He was soon ordered to Washington and assigned to duty with the Army War College. Here he found himself so completely occupied that he could devote no attention to anything else.

His untimely death occurred shortly afterwards, and his publisher then visited me for the purpose of asking advice and assistance in securing the revision Colonel Wagner had contemplated.

A number of officers, considered well qualified to undertake the work, were mentioned to the publisher, and, at his request, I wrote to the widow of Colonel Wagner to ascertain her wishes in the premises. The names of the officers whom I had mentioned to the publisher, among them several each from the Infantry and Cavalry branches of the Service, were submitted to Mrs. Wagner's choice. She expressed a preference that the work should be undertaken by the three officers whose names appear on the title-page, because they were honor and distinguished graduates of the Infantry and Cavalry School and graduates of the Staff College, and also because they were stationed at the same post, where they could collaborate with each other.

It was further agreed that the work of these three officers should be submitted to the assistant commandant, Major Eben Swift, 12th Cavalry, and to those instructors of the Department of Military Art who had been engaged in teaching the subject of Organization and Tactics. The proof-sheets as corrected by the revisers were submitted to those officers, and they went over the revisions carefully prior to publication.

J. F. BELL,
Brigadier-General, U. S. Army,
Commandant.

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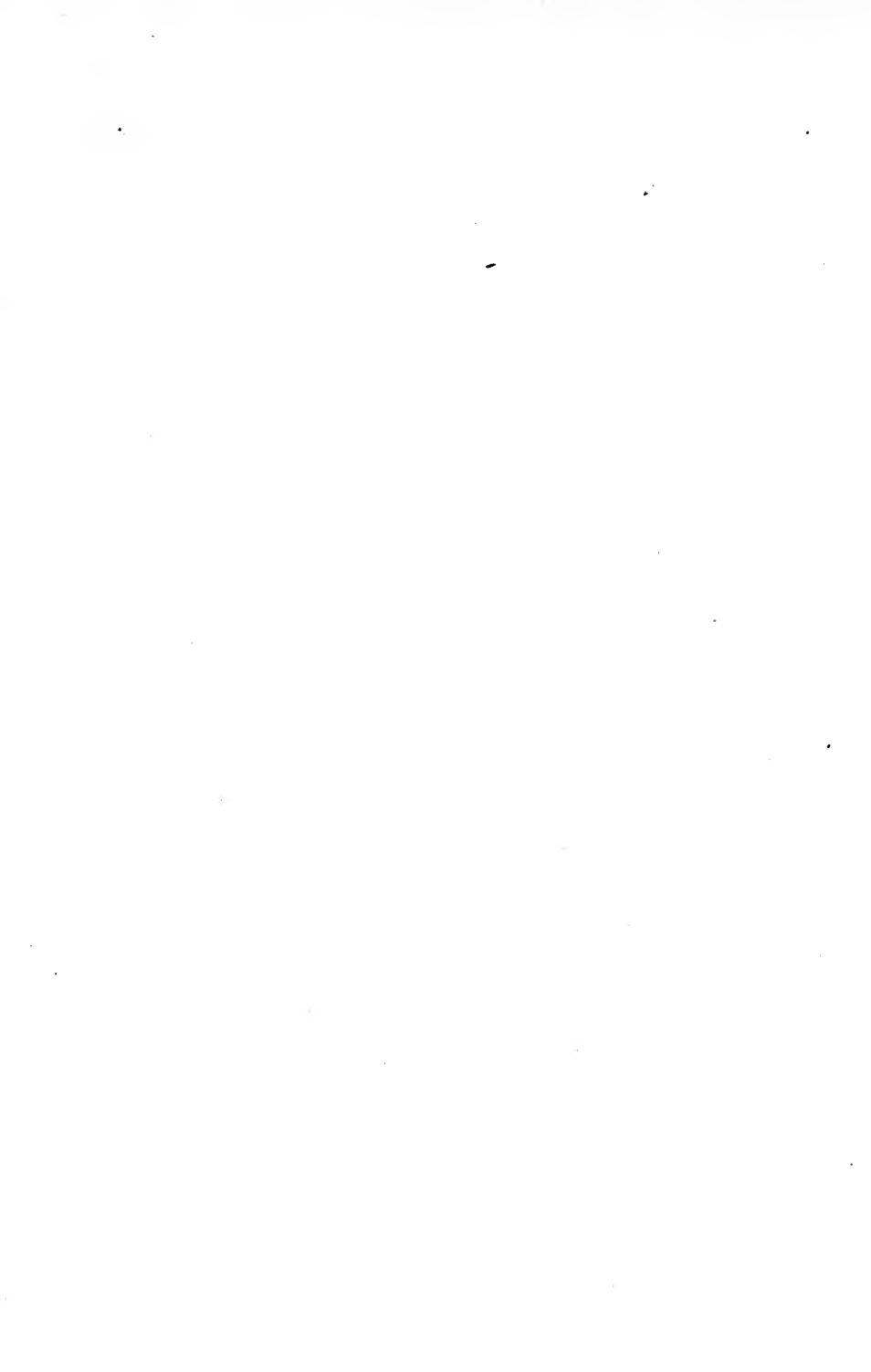


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CHAPTER I.

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

*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.

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.

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 entire theory of organization rests upon the principle of individual responsibility and subordination, so that, no matter how small or how great the number of individuals gathered together, some *one* is responsible, to whom the others must be subordinate. This responsibility and subordination are the great factors in the control of the army.

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. It is the basis of organization for the tactical handling of troops in the field. Used in this connection, it appears to be the smallest body of infantry capable of carrying out a definite object in the attack through its several phases.

The battalion was formerly regarded as the tactical unit; but in most of the European armies and the Army of Japan its place in this respect has been taken by the company of 150 to 250 men. In the Napoleonic wars the French battalion of about 500 men seems to have been a very satisfactory unit.* With the murderous fire and extended order of the present day, a smaller unit is necessary than in the early part of the last century, and the large company of the continental armies is undoubtedly better than their battalion as a tactical unit. The British Company of 3 officers and 113 men is regarded as too small as a tactical unit, while their battalion of eight companies would appear to be unwieldy, but their half-battalion or wing corresponds very closely with the battalion in the United States Army.

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 constantly maintained. On our greatest battle-fields the best work was done by these small regiments, which were, in fact, excellent tactical units.

*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.

It may, then, be safely assumed that the best organization for our infantry requires companies of about 125 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 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 8 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 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

*In the United States Army the infantry company, at full war strength, consists of 1 captain, 1 first lieutenant, 1 second lieutenant, 1 first sergeant, 1 quartermaster sergeant, 6 sergeants, 10 corporals, 2 cooks, 2 musicians, 1 artificer, 105 privates; total, 3 officers and 128 enlisted.

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.**

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 4,700 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 modern tendency seems to be toward the four-gun battery, although Great Britain and Germany still retain the six-gun organization and the Russians adhere to their eight-gun battery. France has adopted the four-gun battery for a portion of her artillery, retaining six for the other bat-

*Von der Goltz.

**The war organization of an infantry battalion in the United States Army consists of 1 major, 1 adjutant (first lieutenant), 1 quartermaster and commissary (second lieutenant), 1 sergeant major and 4 companies; total, 15 officers and 513 enlisted.

The regiment consists of 1 colonel, 1 lieutenant-colonel, 1 adjutant (captain), 1 quartermaster (captain), 1 commissary (captain), 1 sergeant-major, 1 quartermaster sergeant, 1 commissary sergeant, 2 color sergeants, 20 mounted orderlies, a band (consisting of 1 chief musician, 1 principal musician, 1 drum major, 4 sergeants, 8 corporals, 1 cook, and 12 privates), and 3 battalions; total, 50 commissioned and 1,592 enlisted.

Each regiment of the volunteer Army shall have 1 surgeon; 2 assistant surgeons, and 1 chaplain. (G. O. 38, A. G. O., 1898.)

teries. The United States has definitely adopted the battery of four guns.*

Batteries rarely work alone, but are united in battalions of two or three. Our battalion of three field batteries corresponds to the German and British "brigade division." The tendency in the United States is to restore the regimental organization for the field artillery, although at present the battalion is the administrative unit for the field artillery and the artillery district for the coast artillery.

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 96 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 organization of a field battery in the United States Army in time of war is as follows: 1 captain, 2 first lieutenants, 1 second lieutenant, 1 first sergeant, 1 quartermaster sergeant, 1 stable sergeant, 6 sergeants, 12 corporals, 2 cooks, 4 artificers, 2 musicians, 131 privates; total, 4 officers and 160 enlisted men. The battery contains 4 guns, 12 caissons, 2 battery wagons, 1 forge wagon, and 1 store wagon. The artillery battalion consists of 1 major, 1 adjutant (first lieutenant), 1 quartermaster and commissary (second lieutenant), 1 veterinarian, 1 sergeant-major, and 3 batteries. *Under the law, all batteries of field artillery, including siege and mountain batteries, have the same organization.*

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 British regiment is organized in three, or in some cases four, service squadrons, and a reserve squadron made up of the band, machine gun detachment, employed men, recruits, and young horses. The field strength of the British regiment of cavalry is 536, all ranks.

In the United States Army the regiment is the largest cavalry organization entirely independent of the other arms. The cavalry brigade, consisting of two or three regiments (three being the normal formation) has two batteries of horse artillery attached when acting independently. Our cavalry brigade has practically the same strength as the German, Austrian or French cavalry division, to which at least one battery of horse artillery is always attached.

The cavalry division in the United States Army consists of 3 cavalry brigades, 6 batteries of horse artillery, 1 company of engineers (mounted), 1 company of signal corps (mounted), 1 ammunition column, 1 supply column, and 2 field hospitals (with light transportation).

Apparently, it is not contemplated by the present Field Service Regulations that cavalry corps will ever be organized. The cavalry division has a strength in round numbers of 10,000 sabers in addition to the artillery and special

*The troop, at war strength, consists of 1 captain, 1 first lieutenant, 1 second lieutenant, 1 first sergeant, 1 quartermaster sergeant, 6 sergeants, 8 corporals, 2 cooks, 2 farriers and blacksmiths, 1 saddler, 1 wagoner, 2 trumpeters, and 76 privates; total, 3 officers and 100 enlisted. The squadron consists of 1 major, 1 adjutant (first lieutenant), 1 quartermaster and commissary (second lieutenant), 1 squadron sergeant major, and 4 troops; total, 15 officers and 401 men. The regiment consists of 1 colonel, 1 lieutenant-colonel, 1 adjutant (captain), 1 quartermaster (captain), 1 commissary (captain), 2 veterinarians, 1 sergeant-major, 1 quartermaster sergeant, 1 commissary sergeant, 2 color sergeants, a band (consisting of 1 chief musician, 1 chief trumpeter, 1 principal musician, 1 drum-major, 4 sergeants, 8 corporals, 1 cook, and 11 privates), and 3 squadrons; total, 50 commissioned and 1,236 enlisted.

troops. This body of cavalry is practically as large as any which has ever been organized in the United States. The entire cavalry force under Sheridan in the Shenandoah Valley numbered less than 12,000 "present for duty," while Wilson's command in 1865 numbered about 13,000 sabers. These two were the largest bodies of cavalry under one command during the War of Secession. During the Napoleonic Wars large bodies of cavalry were frequently employed. In the invasion of Russia in 1812 Murat commanded a cavalry reserve composed of four corps and aggregating 40,000 men. This use of cavalry has now practically disappeared. In the Austro-Prussian War of 1866 the Prussian cavalry was assembled into two corps, aggregating 7,200 sabers; but the result did not encourage this organization, and four years later the German cavalry, operating in France, worked altogether by divisions. It is possible, however, that sometimes cavalry corps will be organized from two or more depleted divisions.

The Arms Combined.—The division is 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 is both a tactical and an administrative unit. It forms the basis of army organization and should be complete in all its parts and capable of acting independently at any time. When brigades are detached, they will be supplied with a due proportion of the auxiliary arms and services corresponding to their independent functions and the nature of the special service expected. The division consists of 3 brigades of infantry, 1 regiment of cavalry, 9 batteries of field artillery (which shall be organized as a provisional regiment of field artillery), 1 battalion of engineers, 1 company of signal corps, 4 field hospitals, 1 ammunition column (composed of 3 sections of 21 wagons each, for small-arms ammunition, and 2 sections of 21 wagons each, for artillery ammunition and stores), 1 supply column (composed of 3 wagon-trains of 27 wagons each), 1 pack-train.

The cavalry assigned to the division is known as the divisional cavalry. Additional artillery may be assigned to the division to the extent demanded by the nature of the operations in prospect. The divisional artillery is under the command of the general commanding the division, and passes from his control only under circumstances which will be considered later.

The Army Corps.—The army corps is a *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. It is formed by the combination of two or three divisions and the assignment of the necessary military and administrative staffs. Depending upon the nature of the operations, additional reserves of ammunition, stores, equipment, and food supplies may be formed and a balloon-train and horse depot attached to the corps. The horse batteries of the divisions may be combined into a separate command, and as corps artillery remain under the direct control of the corps commander.

Brigades in divisions and divisions in army corps receive numerical designations upon organization; for example, First Brigade Second Division; Third Division Fourth Army Corps. Army corps are organized only by special authority from the President, and are numbered in sequence of the date of their organization.

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 column 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

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

**With the present organization of the United States Army a division with all trains will occupy a road space of about eleven miles; an army corps, with all its auxiliary troops and trains, about thirty-five miles.

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.

The Army.—When the force operating in the theater is large, a final organization larger than a corps becomes necessary. When two or more army corps are united under the command of a single chief, they constitute an army. One or more cavalry divisions usually form a part of such an organization. In considering the proper strength of an army, the general consensus of opinion among military writers, supported by the practice of nations, is that a single army should not exceed 150,000 fighting men. Experience has demonstrated that very large armies have less cohesion and flexibility than smaller ones, and the rapidly increasing difficulties of command soon tax the ability of the average leader. Larger armies have been formed many times, but usually under force of circumstances and to meet exceptional conditions. Where the force put in the field exceeds this number, it is customary to divide it into two or more separate armies, and where these separate armies have the same objective, to combine their operations under a general-in-chief. This principle of the division of large combatant forces into several armies has been exemplified in all recent campaigns, was practiced by both the North and the South in the Rebellion, and by the Japanese in Manchuria. With the latter, each army was formed by the combination of several divisions, no corps having been organized.

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 about one-fifth and the artillery nearly one-fourth. In the French Army these proportions are approximately

the same. 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. In a comparison of many field armies of the past century, if the infantry be represented by unity, the cavalry has varied usually from one-fourth to one-tenth, the artillery from 2 to 5 guns to 1,000 infantry, and even these limits are often exceeded.

The proportion of artillery is generally from 3 to 4 guns for every 1,000 men of the other arms of the service;* but in a mountainous or heavily wooded country 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, although they had only 3 guns to 1,000 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 100 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."**

*The Chief of Staff of the United States Army, in his report for 1905, recommends that the proportion be 3 guns for every 1,000 infantry. The General Staff believes that 3½ would be nearer the proper proportion.

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

In Sherman's march to the sea, and in his subsequent campaign in the Carolinas, his artillery was reduced to 1 gun to every 1,000 men of the other arms. On the other hand, the Germans, in 1870, had nearly 4 guns to 1,000 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; 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 be safely 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 sub-

ject 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.**

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 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.

**In a letter to the author, General James H. Wilson, the distinguished cavalry commander, says: "I do not doubt that a properly organized army should have one-third cavalry, or that, all other things being equal, that army which has the largest proportion of cavalry will win in the next great war."

***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.

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 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 35 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 division should have a battalion of engineer troops and a bridge-train capable of spanning a stream 100 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 an army, as they are always useful, often indispensable, and in an emergency can serve as infantry. A portion of the engineers and bridge-train might be assigned to a brigade when detached, but such partition of the bridge-train should not be habitual. It may, then, be prescribed that the bridge-train of the division should, as a rule, be kept intact; that provision should be made for uniting the bridge-trains of the several divisions under the chief engineer of the corps 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 corps or army. Advance guard and reserve bridge-trains will be assigned to the engineer troops of divisions, army corps, and armies as occasion may require.

The engineer troops of a division will consist of one battalion of four companies—viz., three pioneer companies and one ponton company.*

*A pioneer company consists of 1 captain (mounted), 1 first lieutenant (mounted), 1 first lieutenant, 1 second lieutenant, 1 first sergeant, 1 quartermaster sergeant, 2 sergeants (mounted), 3 corporals (mounted), 1 cook (mounted), 9 privates first class (mounted), 9 privates second class (mounted), 10 sergeants, 15 corporals, 1 cook, 2 musicians, 55 privates first class, 55 privates second class; total, 4 officers and 164 enlisted.

The three pioneer companies will each have 4 pack-mules and 2 wagons for the purpose of carrying entrenching tools, explosives, etc. The organization of the ponton company will be the same as for pioneer companies, except that the mounted detachment consists of 2 sergeants and 3 corporals.

The battalion consists of 1 major, 1 adjutant (captain), 1 quartermaster and commissary, 1 sergeant-major, 1 quartermaster sergeant, 4 companies; total, 19 officers and 658 enlisted.

Signal Corps.—The signal corps is charged with the management of the field telegraph, the field telephones, wireless stations, military balloons, and the service of signaling generally. A company of signal troops is attached to each division and consists of 1 captain, 3 first lieutenants, 1 first sergeant, 1 quartermaster sergeant, 20 sergeants first class, 40 sergeants, 10 corporals, 74 privates, and 4 cooks. This organization is contemplated in the Field Service Regulations, United States Army, 1905, but no organization for the signal company has yet been provided for by law. A detachment of the company will have charge of visual signaling for the division with flag, torch-light, flash-light, rockets, and heliograph. Details will also be required to form a signal detachment at corps headquarters. The remainder of the company will have charge of the construction, repair, and operation of telegraph and telephone lines at the front and on the lines of communication connecting with civil lines.

Medical Department.—To each regiment of cavalry or infantry are assigned 3 medical officers, 3 non-commissioned officers, and 9 privates of the hospital corps; to each squadron of cavalry or battalion of infantry are assigned 1 medical officer, 1 non-commissioned officer, and 1 private; to a battery of field artillery, 1 medical officer, 1 non-commissioned officer, and 1 hospital corps private; to the engineer battalion, 2 officers, 2 non-commissioned officers, and 6 privates; to the signal company, 1 officer, 1 non-commissioned officer, and 1 private; at the headquarters of each brigade are attached 3 officers, 3 non-commissioned officers, and 6 privates.

There are assigned to the headquarters of the division 2 officers, 1 non-commissioned officer, and 6 privates. In addition, the medical organization of the division includes 4 field hospitals, each comprising 1 major, 2 captains, 4 lieutenants, 1 sergeant first class (senior sergeant), 1 sergeant (assistant to the quartermaster), 1 sergeant (wagonmaster), 1 private first class (blacksmith), 1 private first class (saddler), 3 privates first

class (orderlies), 1 hospital section, and 1 ambulance company section; total, 7 officers and 118 enlisted. The transportation of each field hospital consists of 10 ambulances, 8 escort wagons, and 4 pack-mules.

The duties of the bearers are to establish a dressing station as near to the firing line as the presence of cover will permit, and to carry or guide the wounded to it. Here the wounded receive such bandaging and attendance as is necessary before their removal to the field hospital, to which they are conveyed by the ambulance section. The field hospital is stationed about three miles in rear of the firing-line of each brigade. The capacity of each of these field hospitals is 108 beds, or, by the use of bed-sacks, 216.

The *service of the rear* eventually converts the field hospitals into stationary hospitals, releasing the *matériel* and *personnel*. It takes care of the sick and wounded and of their transfer to home stations.

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 gendarmery, 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 se-

*Napier.

verely 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 gendarmery.

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 Potomac, 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 gendarmery and a force of 250 infantry and 180 cavalry.

Mounted Couriers.—To avoid an undue tax upon the strength of the cavalry for courier duty, there are assigned to each regiment of infantry 20 mounted couriers, whose duties are limited to the transmission of orders and intelligence. They are required to be good riders on all kinds of ground, and to be thoroughly educated, both theoretically and practically, in the duties of scouts and couriers. Their special duties are to maintain the necessary communication in battle between different bodies of troops of the same or neighboring commands, to transmit orders over great distances, and to perform scouting and messenger duty on the march and with the advance posts, or in battle. Each courier carries a revolver, and should be provided with a map-case and field-glass. No provision has as yet been made in our army for the attachment of mounted couriers to brigade and division headquarters, which service has hitherto been rendered by the divisional cavalry, correspondingly decreasing its efficiency.

THE TRAIN.

Ammunition Supply.—Arrangements should be made for promptly supplying the infantry with at least 270 rounds of ammunition per man, and the artillery with 460 rounds per gun. The men carry on their persons 90 rounds of cartridges, the battalion ammunition wagons carry 60 additional rounds per man, and 120 rounds more

per man are carried in the ammunition column. With each field battery 354 rounds per gun are carried (36 in each limber, and 318 in each of the 12 caissons), the remaining 106 rounds per gun being with the ammunition column. The same number of rounds per gun is provided for the horse batteries, which when necessary in a cavalry action draw ammunition from the limbers, the ammunition so used being replaced as soon as practicable from the caissons. Cavalry divisions are provided with light ammunition columns carrying cartridges for the rifles and ammunition for the horse batteries. While engaged in reconnaissance, the number of ammunition wagons is regulated by the commanding officer. In many cases the ammunition for cavalry detachments is carried by pack-trains.

The ammunition column is attached to the division and is under the charge of an artillery officer. It is composed of three sections of 21 wagons each for small-arms ammunition, and two sections of 21 wagons each for artillery ammunition and stores. The sections for the artillery should have for their *personnel* trained artillerymen, this portion of the column forming a reserve of men and horses for the batteries.

Ammunition columns refill from ordnance trains, which load at principal depots on the lines of communication or at a railway terminus, and follow the army under orders from the commander-in-chief.

WAGON-TRAINS.

Baggage, tentage, at least two days' rations, and the extra ammunition of the troops are carried in wagons which are assigned to the units and remain in their charge. The standard wagon is the four-mule army wagon, usually known as the escort wagon. The load should not exceed 3,000 pounds on good roads; for average conditions, 2,500 pounds is considered a fair load. The normal allowance is as follows:

For the corps headquarters, 4 escort wagons; for each division, 3; for each brigade, 2; for the headquarters for each regiment, 2; for each battalion of infantry or artillery or squadron of cavalry, 1; for each company

of infantry, 1; for each troop of cavalry, 2; for each battery, 3. The allowance of all other mounted troops corresponds to that of cavalry; for all other foot troops to that of infantry.

Each company wagon carries two days' rations, and forage for the team. The additional wagon assigned to each troop of cavalry is loaded with forage. Allowing 850 pounds for tentage and 250 pounds for officers' baggage, and 350 pounds for cooking utensils in addition, the average weight of 2,500 pounds is reached.

This is known as the regimental train in contradistinction to the light train, which comprises the led horses, battalion ammunition wagons, and regimental ambulances. The ammunition wagons are distributed 1 to each battalion of infantry, and 2 to each regiment of cavalry.

The number of wagons with the troops may be increased in order to carry additional war *matériel* and supplies and to overcome special difficulties of climate or temperature, or to transport sick and wounded. More frequently, however, a reduction in the allowance will be rendered necessary by the lack of means of transportation, by the nature of the country or the condition of the roads. In active campaign, the tentage will usually be stored at the temporary base, and the allowance of wagons reduced to the barest necessities. The wagons thus released may be utilized to form additional trains in the supply column. The wagons remaining with the regiments will then be divided into two groups—those carrying rations exclusively and those carrying utensils and baggage. The various artillery carriages of field and siege batteries, as well as all ammunition wagons attached, are not counted as part of the regimental train. Conditions of service will frequently render necessary a departure from the standard of equipment, but this will be done only under authority of the Secretary of War.

Supply Columns.—In addition to the above, each division has a supply column, ordinarily divided into three sections of 27 wagons each.* Each of these sections

*A wagon-train is composed of 1 wagonmaster, 2 assistant wagonmasters, 1 farrier and blacksmith, 1 cook, 1 watchman, 28

carries one day's rations and forage for its division. These columns form a *rolling reserve* of three days' rations and forage. When it is necessary to make issues to the regimental trains, one section of each column, called a *supply section*, moves up to the troops at the end of the day's march; the other two sections, called the *reserve sections*, remain about a half-day's march in rear. When beef on the hoof accompanies an expedition, it may be attached to the supply column.

Reserve Supply Column.—When the distance from rail-way stations or magazines renders it desirable, additional supply columns carrying not less than three days' rations and forage will be organized. These supplies are under the control of the commander-in-chief and come into use especially at the time of concentration of troops for action. When the army is stationary, the supply columns transfer stores from the magazines to the troops.

Location of Trains on the March.—The light trains usually march with the battalions to which they pertain. When no conflict with the enemy is anticipated, the light trains of the battalions may be united with that of the regiment under charge of an officer, the whole marching in rear of the regiment. The wagons for regimental headquarters are attached to the regimental train. The wagons carrying the other headquarters baggage and supplies usually march at the head of the assembled regimental trains, but the means of transportation for a general officer and his staff may be ordered to march separately. The field telegraph, field post-office, and provost guard wagons accompany the headquarters transportation. On ordinary marches the regimental trains follow a mile or two in rear of the column if practicable, but at the end of the day's march, or in the evening, they will be brought up so that camp may be formed and supplies issued. The ammunition

teamsters, 112 draft-mules, 5 saddle-mules, 27 wagons; total, 34 *personnel*.

A pack-train is composed of 1 packmaster, 1 cargador, 1 farrier and blacksmith, 1 cook, 10 packers, 14 saddle-mules, 50 pack-mules, 1 bell-mare; total, 14 *personnel*.

wagons for cavalry march with the horse batteries. The ammunition column of the division follows in rear of the main body, being separated therefrom by the field hospitals and bridge-trains. The supply columns remain about a day's march in rear of the troops as long as local supplies are available to replenish the regimental train; otherwise they will march about a half-day's march in rear of the column.

Total Transportation of the Division.—The number of wagons accompanying an army is necessarily very great, as can be seen from the authorized transportation for a division, which comprises a total of 476 escort wagons and 51 ambulances, in addition to the *matériel* of the signal corps company and the advance guard and reserve bridge-trains.

The number of wagons accompanying a German army corps, as given by Bronsart von Schellendorf, is 775 two-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 does 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, 1,000 men on its rolls, and about 300 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 17 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

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

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 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.

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 in the Army and Field Service Regulations.

The most important member of the staff is, as the name implies, the chief of staff, who should enjoy the complete confidence of the commanding general and a considerable degree of independence in the performance of his ordinary duties. 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 stra-

*Wolseley.

tegral and tactical problems which continually confront him. He elaborates the arrangements for exploration and protection and for the marching, fighting, and camping or quartering of the troops, establishes the service of information concerning the theater of war and the enemy's forces, collects important material for the reports of operations and the subsequent history of the war, and exercises a general supervision over all records and returns and the supply of suitable maps. He should be informed at all times as to the state of supplies and the strength, armament, equipment, health, marching powers, and morale of the troops and be prepared to render a report thereon. He issues instructions to the provost-marshal-general and to the commander of the base and line of communications of the army,* draws up the orders for special reconnaissances, raids, and detached service, and administers through intelligence officers the intelligence service, which comprises within its functions the field post-office, the secret service, the subject of reconnaissance, and the collection, preparation, and distribution of military information, including maps and sketches. He performs such special functions as may be delegated to him by the commanding general. In these duties he is assisted by such officers of the general staff, military secretary's department, and

*For each territorial army or important expeditionary force about to take the field, a base will be selected and equipped and a service of a line of communications organized, both to be under the control of the commanding general of the field army or expedition except when otherwise ordered by the War Department.

An officer of appropriate rank will be designated to the immediate command of the base and line of communications and the necessary troops and *personnel* will be placed under his orders. He will be aided by a suitable staff and by such of the following subordinate chiefs as may be required:

- (a) A commander at the base;
- (b) A chief of transportation;
- (c) A chief of the railway service;
- (d) A chief of transport by water;
- (e) A chief commissary of base and line of communications;
- (f) A chief ordnance officer;
- (g) A chief paymaster;
- (h) A chief medical officer;
- (i) A chief of telegraph and telephone service;
- (k) A provost-marshal of base and line of communications

inspector-general's department as may be necessary. The duties of chiefs of staff of smaller commands than those of an army are similar to those just detailed.

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 military staff of the commanding general of an army will consist of the aides authorized by law (the personal staff), the chief of staff, officers of the general staff, the military secretary's and inspector-general's departments, the chiefs of artillery, cavalry, engineers, and signal corps, and a provost-marshal-general.

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 receives his orders through the chief of staff, makes such written reports as may be required, and is charged with the preservation of a proper police throughout the army and on the lines of communication, and with the protection of the inhabitants from pillage and violence. He keeps a list and description of all non-military persons and camp-followers and watches

*Schwartzenberg's chief of staff, Radetzky, was given the credit for planning the battle of Lelpsic, but afterwards the credit for Radetzky's own great victory at Novara was given to *his* chief of staff, Hess. Blücher 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.

their conduct; follows the column on the march and brings up stragglers, arrests skulkers and fugitives from the battle-field, and takes charge of all prisoners of war and deserters from the enemy. For these purposes, he exercises supervision over the provost guard and military police.

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.

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 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 of an army are in general as follows: he shall furnish all engineering information required by his commanding general; he may be called upon to assist in the selection of lines of attack or of positions for defense; he supervises the location and design of the more important field works and may be charged with their construction; he is in general charge of the engineering features of all siege operations, unless another officer is especially designated for that purpose; he is responsible for the construction and repair of the mil-

*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.

itary roads and bridges, and for the construction, repair, and operation of railroads in the theater of operations; he will execute the demolitions required by the general instructions or the specific orders of the commanding general; to him may be assigned the selection and preparation of the permanent camps and any other duties requiring knowledge of an engineering nature. To carry out his duties he should have a sufficient force of military assistants, ample funds in his charge, and authority to employ necessary civilian labor and assistance. The duties of the chief of engineers as regards the command of troops are analogous to those of the chief of artillery. The duties of engineer officers on the staffs of corps and division commanders are similar in all respects to those of the chief of engineers of an army, differing only in scope and degree.

The Administrative Staff.—The administrative staff will consist of superior officers of the quartermaster's, subsistence, pay, medical, ordnance, and judge-advocate-general's departments, with such subordinate officers as may be required. A mustering officer will be attached to the headquarters of each army or army corps, and to each division or separate brigade an assistant mustering officer.

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-general has charge of the hospital and 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-general.

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

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

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

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 de-

partment 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.”*

General Grant's staff, in the Virginia campaign, consisted of 1 chief of staff, 2 military secretaries, 7 aides-de-camp, 2 assistant adjutants-general, 1 inspector-general, 1 chief quartermaster, with 1 assistant quartermaster, 1 chief commissary of subsistence, with 1 assistant commissary of subsistence, 1 chief engineer, 1 provost-marshal-general, and 1 assistant provost-marshal-general. In rank, the staff consisted of 5 brigadier-generals, 1 colonel, 9 lieutenant-colonels, 4 captains, and 1 lieutenant; total, 20 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 consists of 1 chief of staff, colonel of the general staff corps; 2 assistants of the chief of staff, majors or captains; 1 adjutant-general, lieutenant-colonel; 1 chief of engineers, lieutenant-colonel; 1 inspector-general, lieutenant colonel: 1 chief quartermaster, lieutenant-colonel; 1 chief commissary, lieutenant-colonel; 1 judge-advocate, lieutenant-colonel; 1 chief surgeon, lieutenant-colonel; 1 chief signal officer, lieutenant-colonel; 1 chief ordnance officer, lieutenant-colonel; 1 assistant adjutant-general, captain; 3 aides, captains or lieutenants.

In addition to these, the following will generally be necessary in time of war: 1 chief of artillery, brigadier-general; 1 provost-marshal, field officer; 1 mustering officer, field officer.

An officer of the pay department may be designated as chief paymaster of an expeditionary corps; usually, however, the payment of troops will be arranged for from army headquarters.

The staff of a division consists of 1 chief of staff, lieutenant-colonel or major of the general staff corps; 1 adjutant-general, major; 1 engineer officer, major; 1 inspector-general, major; 1 chief quartermaster, major; 1 chief commissary, major; 1 chief surgeon, major; 1 chief ordnance officer, major; 1 chief signal officer, major; 3 aides, captains

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

or lieutenants; 1 provost-marshal, captain; 1 mustering officer, captain; 1 judge-advocate, major or captain.

The senior artillery officer of the division is *ex officio* chief of the artillery of the division.

The staff of a brigade consists of 1 adjutant-general, captain; 1 quartermaster, captain; 1 commissary, captain; 1 surgeon, major; 2 aides, lieutenants.

Staff officers will organize the clerical force and other *personnel* necessary for the administration of their services in the corps as well as in the division and brigade; deficiencies existing after assignment of the general service and civil service list and the non-commissioned staff will have to be supplied by details from the troops. 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.

The following table gives the strength and composition of a division of the United States Army at war strength, exclusive of the trains of the engineer and signal troops:

	Officers.	Medical Dept.		Enlisted Combatants.	Civilian Employees.	Wagons.	Ambulances.	Pack Mules.	Draft Mules.	Horses.
		Officers.	Enlisted.							
Division Headquarters.	16	2	7	.....	21	3	...	...	12	39
3 Brigades Infantry....	480	30	117	14,328	12	186	9	...	780	603
1 Regiment Cavalry....	50	3	12	1,236	...	31	1	...	128	1,388
9 Batteries Field Artillery.....	50	9	18	1,446	...	32	1	...	132	1,536
1 Battalion Engineers..	19	2	8	658	...	5	...	...	20	103
1 Company Signal Corps.	4	1	2	150	...	1	...	...	4	36
4 Field Hospitals.....	...	28	472	.....	...	32	40	16	288	104
Trains.....	...	...	...	.....	546	186	...	64	816	1
Totals.....	619	75	636	18,818	579	476	51	80	2,180	3,810

No positive data are 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

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.

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 to 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,*

*"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*.

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.

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. All together, 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 10 per cent, requi-

sition 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 cavalry 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 evolu-

tions 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 are not necessarily (though usually) 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 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 en-

*"L'Armée Américaine," p. 243.

counter 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 battle-field.

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.

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.

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 stomachs, 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. Unsuc-

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

**"Memoirs," Vol. II., p. 419.

cessful operations in other parts of the theater 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 superlatively brave one.

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 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 action, 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 has been comparatively rare, as the defenders have usually given way or the assailants retired before bayonets could be crossed; but the recent Russo-Japanese War has demonstrated repeatedly that stubborn infantry be-

hind field-works cannot be driven from their intrenched position without actual shock. The moral effect of a threatened collision is, however, decisive in many cases, 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 about 1,800 yards,* but it is only at 1,200 yards that the fire becomes really effective. At 600 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 often depends as much upon moral effect as upon actual shock. 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 bayo-

*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 intrenchments 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.*

net has been advocated by some military authorities, but, in view of its frequent use in actual combat as exemplified in the recent campaign in Manchuria, and 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 is unquestionably necessary. The men should be carefully trained in its use.

Intrenching Tool.—The intrenching tool now forms an indispensable part of the equipment of the infantry soldier, and for the first time is now supplied in the United States Army as part of the regular equipment.

Napoleon says that a soldier should never be separated from his musket, his cartridges, his knapsack, his rations for 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 an 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. The experiences of the two most recent wars have shown that all troops, from the most advanced skirmishers to the reserves, must intrench on the field to avoid ruinous losses from small-arms and artillery fire. The construction of hasty field intrench-

*"Maximes de Guerre."

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

ments is no less essential to the attacking force than to the defense.

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. 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, in tactical maneuvers, and in seeking and constructing cover; must be armed with a magazine rifle; must carry at least ninety rounds of cartridges on his person; must be equipped with a serviceable intrenching tool; and must be provided with a bayonet and trained in its use.

CAVALRY.

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

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 or rifle, 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 considered seriously, 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 charging, 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.

Independent 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 “independent action”; for on this action the safety of the army and the soundness of the plans of the commanding general mainly depend. Independent 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 independent action are elsewhere considered.*

Classes of Cavalry.—Cavalry is divided into heavy, medium, and light cavalry, and is also classified according to

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

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 independent 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, fourteen are heavy, fifty-three are medium, and twenty-six light.

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, a great portion of the cavalry in European armies is 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 and discard the revolver except for officers and non-commissioned officers. The use of the lance in the British cavalry is now limited to ceremonies, and the continental powers appear to be approaching rapidly the conclusion that the lance as a weapon has become obsolete. However, the lance still has its advocates, who 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.

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 *mellay* 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 *mellay*; 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.

So long as shock action constitutes one of the uses of cavalry on the battle-field the saber must be carried as a weapon by 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 6 miles an hour, or 176 yards a minute. Including rests, the average marching rate of cavalry is 5 miles an hour.

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 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,

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

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 cavalymen 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 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. 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 primarily divided into *siege*, *heavy field*, *light field*, *horse*, and *mountain batteries*.

Siege artillery embraces all the heavy guns which may be employed in siege operations. In all recent wars it has been the custom to use large naval guns or any other heavy ordnance which was available or could be procured from the home depots, in addition to the mobile siege batteries attached to the army in the field. The mobile siege batteries in the United States Army are equipped with a 4.7-inch gun, firing a 60-pound projectile, and a 6-inch siege howitzer, firing a 120-pound projectile.

Heavy field artillery includes all the heavy mobile batteries employed upon the battle-field. Prior to 1899 batteries of position were employed in defending important

points on the field of battle, or used in action in any manner where their destructive power could be independent of the quality of considerable mobility. Such batteries were generally composed of siege guns or other heavy ordnance which might be available. Foot batteries armed with heavy guns were added to the armies of several of the European powers. Experience in Manchuria shows the importance in battle of heavy guns. The same thing was forcibly demonstrated in South Africa, where one or two heavy Boer guns sometimes prevented the British field guns from accomplishing anything at all. This heavy artillery is capable of rapid movement only for short distances and short periods of time, but must be sufficiently mobile to be brought into action in time to be employed against the enemy's light artillery before the latter can approach within effective range. It is also of great value against hostile intrenchments which resist guns of lighter caliber. The 3.8-inch field gun, firing a 30-pound projectile, and the 4.7-inch field howitzer, firing a 60-pound projectile, have been adopted for use in the United States Army, and are intended for use under conditions where the lighter projectile of the ordinary field artillery would prove inadequate.

Light field artillery constitutes the bulk of an army's artillery in the field. In the United States service the caliber of this gun is 3 inches, firing a 15-pound projectile. The mobile artillery of an army should contain a certain number of howitzers for searching out trenches, protected positions, etc., against which their high-angle fire is more effective than the direct fire of guns. This class of artillery has the other advantage, that for the same weight of gun, carriage, and limber a projectile of double the weight of that of a rifle can be used. To this end, a 3.8-inch field howitzer, firing a 30-pound projectile, but giving the same weight behind the horses as the 3-inch gun, has been designed.

Horse artillery is especially designed for service with cavalry. Mobility is its essential characteristic. To this end, each cannoner is mounted upon horseback. In the United States service the horse batteries are, as a rule, equipped with the same gun as the light field artillery, but

as it was questioned as to whether a gun of such weight would be sufficiently mobile under all conditions, a lighter gun with 2.38-inch calibre and firing a 7.5-pound projectile has been designed by the Ordnance Department for issue to some of the horse batteries. This latter gun is considered the smallest caliber that can effectively employ shrapnel. Its lightness makes it a valuable part of the mobile artillery system.

Mountain artillery is in a class by itself. The gun and carriage are arranged for either wheel or pack transportation. The mountain batteries are intended for use in mountainous regions, or in sections where the roads are bad and the traction difficult. Formerly the majority of mountain guns in our Army were of 75 mm. caliber and of foreign manufacture, but it has now been practically decided to increase the caliber to 3 inches, thus permitting them to use the field artillery projectile, thereby decreasing the difficulties of manufacture and issue of ammunition. Previous difficulties in packing the ammunition for these guns, due to the different weights of projectiles and the special carriers that were required, have now been obviated by arranging the original shipping-boxes, in which the projectiles are packed at the place of manufacture, so that these boxes can be hung directly to the new form of pack-saddle. The utility and rate of fire is also to be improved materially by increasing the maximum elevation at which the gun can be fired to 45 degrees, and increasing the length of recoil of the gun on the carriage, thereby making the latter more stable, and enabling the adoption of improved sights, permitting the use of both direct and indirect fire.

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. 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 pro-

vide 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 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

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

**"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.

train; it is bulky and occupies great space on the march; it can be injured disastrously in *matériel* as well as in *personnel*; and its effective action is largely dependent on the state of the ground and weather.

Range.—Equipped as it is with telescopic sights, and having an unobstructed field of fire, modern field artillery can produce results at a range of more than four miles; but, owing to the obstructed view of most battle-fields, and the limits of human vision, the extreme range at which field guns would ordinarily be used may be taken at 6,000 yards. From this distance to the enemy's position the ranges may be classified as follows:

	Light Artillery.	Heavy Artillery.
Distant. . . .	Over 4,500 yards.	Over 6,000 yards.
Serious. . . .	4,500 to 3,500 yards.	6,000 to 5,000 yards.
Effective. . . .	3,500 to 2,000 yards.	4,000 to 2,500 yards.
Decisive. . . .	Under 2,000 yards.	Under 2,500 yards.

Kinds of Fire.—Artillery fire is classified as to its trajectory as *direct*, *indirect*, *curved*, and *high-angle* fire.

Direct fire is delivered at objects which can be seen from the gun in battery, laid at moderate angles of elevation.

Indirect fire is delivered over an intervening obstacle, the gun and object being mutually invisible, but both battery and target being visible from an observing station from which the fire is directed.

Curved fire is delivered at angles not exceeding 15 degrees, with guns with reduced charges, and with howitzers with service charges at long ranges, and with reduced charges at short ranges.

High-angle fire is the fire at angles exceeding 15 degrees, with howitzers with reduced charges and mortars with service charges.

The gun is designed especially for direct fire; the howitzer for curved fire; and the mortar for high angle fire; all may be used for indirect fire.

Artillery fire is classified as to its direction as *frontal*, *oblique*, *enfilade*, *reverse*, and *cross* fire.

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

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

Enfilade fire is from 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 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 is that 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 classified as *shell* and *shrapnel*. Canister, which was formerly used and consisted of a tin cylinder filled with bullets held in place by filling the interstices with sawdust, clay, or sand, is now obsolete. Its effect is now accomplished by the use of the ordinary shrapnel with its fuse cut at zero.

Shell.—The shell now used is a "hollow cast-iron or steel cylinder with an ogival head," filled with gun cotton or other high explosive. It may be characterized as a flying mine, the chief object of which is to destroy material objects at a distance.

Shrapnel.—Shrapnel consists of a strong cylindrical steel case, open at the forward end. In this are packed 300 steel-jacketed balls, and a point section, containing the time fuse, is screwed on. A central channel connects the fuse with the powder charge, which is in the base. The weight of the bullets is 53 per cent of the entire weight of the projectile. The new projectile has a base bursting charge, while the old one had a head charge which decreased the velocity of the bullets on burst while causing them to scatter more. The weakest cross-section is at the line of attachment of the point section. Hence, upon ex-

plosion of the charge, the head is blown off, the case usually remaining intact, thus acting like a short shot-gun, throwing the contents to the front with an added velocity.

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 in general use.

The fuse now issued is a great improvement over the old one, in that it is set for time, not by punching, but by turning a disk about an axis coinciding with that of the projectile. After an old fuse was once punched, it could not afterwards be used at a longer range, while the new one may be set and reset repeatedly. Thus, a battery may, if desired, go into action with its fuses set at zero, ready to use its maximum canister effect at a moment's notice; and still reset fuses as desired at any range.

Use of Different Projectiles.—Shell is used with the percussion fuse to destroy parapets, buildings, palisades, abatis, etc., or to set fire to houses and villages. With the time fuse, it is used against troops behind intrenchments by bursting the shells directly overhead.

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 all ranges. At a range of 6,500 yards each bullet has a resultant velocity of 950 foot seconds, or, roughly speaking, the same effect as a shot fired from the service revolver.

Shrapnel should be burst in the air with a time fuse. 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. It is becoming more and more prominent as the great artillery projectile, even having replaced the shell in ranging.

Field Mortars.—The use of the field mortar is still purely theoretical, and the organization of the mortar battery is as yet undecided. Such batteries would be largely batteries of position and their use confined to siege operations. If organized, they would be undoubtedly separate from other field batteries.

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 per minute to be fired. All modern field guns come under this classification. Among the best known and most efficient rapid-firing guns are the Hotchkiss, Driggs-Schroeder, Nordenfelt, Krupp, and Canet. The smaller calibers use shell only; the larger, both shell and shrapnel.

Machine Guns.—There are two general types of machine guns, of which the Gatling and Colt may be taken as representatives, they being the guns now in use in our service. In the Gatling gun a group of rifle barrels, from six to ten, is assembled about a central shaft, to which all are parallel. These are loaded and fired in continuous succession, or by volleys, by the action of suitable machinery at the breech, the power being applied by crank and gearing. Fixed ammunition is used, the empty cartridge shell being automatically ejected.

In the Colt gun there is only one barrel. By means of a small cylinder containing a piston and connected to the barrel by a vent, a portion of the powder gas is util-

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

ized to operate automatically the breech mechanism. Some guns of the single-barrel type are operated by recoil, and others by both gas pressure and recoil. Of the latter type, the Vickers-Maxim is a notable example. The single-barrel gun is rapidly superseding the older revolving type of machine gun. The rate of fire of the Gatling gun is 800 shots or more per minute; of the Colt, 480 rounds per minute.

Distinction should be made between the small gun using infantry ammunition and the so-called "machine gun of caliber" large enough to fire an explosive projectile. The British "pompom" is an example of the latter class.

Most European armies have separate machine gun companies of from six to eight guns, which are, as a rule, attached to regiments of infantry or to the cavalry divisions. They are not considered as a part of the field artillery. In the United States Army no system has been developed for the employment of machine guns. Experimentally, machine guns have been attached to some regiments of infantry at the rate of one gun to each battalion, the gun being operated by a detachment under command of an officer, and arranged for either pack or wheel transportation.

Machine guns should not be pitted against field artillery, which by superior range and weight of metal could annihilate them.

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 independent 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. 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 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.

The main objection 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. They would seldom be constructed except in the open or where no other possible cover would be available.

For the protection of the *personnel* of the guns against small-arms and shrapnel bullets, a steel shield .2 inches thick is provided with the modern field gun. This shield consists of three parts—apron, main and top shield, which fold together when the piece is limbered. Each shield is tested by firing against it with the service rifle at a range of 100 yards. On the defensive, artificial cover can easily be 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.

CHAPTER IV.

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 attack implies primarily an ability to reach the defender's 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 in many wars has shown that a line composed of skirmishers at considerable 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 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 approximate 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 begin, and must be quickly replaced; and as the line draws nearer to the enemy the number of rifles engaged 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. For some time after the introduction of smokeless powder, it afforded considerable protection to the support; for it is a well-known fact that soldiers in battle instinctively and invariably fire at those who are shooting at them. It followed, therefore, that only those bullets which passed 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—struck the men in the support. It was 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 experiences of the last two wars have demonstrated, however, that with the flat trajectory of modern rifles, troops in support will lose more heavily than those in the advanced lines if compact formations are employed, unless they are protected by accidents of the terrain and intrenched. The dispersed formation for the support must therefore be adopted. The distance of this supporting line from the one in advance is influenced by the nature of the terrain and of the enemy's rifle fire. If cover can be obtained, the supports should be as close as possible to the firing line. If the small-arm employed by the enemy has a high trajectory, the angle of fall of the bullet will be great, and the supporting line may approach comparatively close to the skirmishers; but, with the flat trajectory of most modern military rifles, the supports must be held further back, in order that they may not become butts, as it were, for the living targets in the advanced skirmish line.

As the assailants approach the hostile position, the supporting line draws more closely to the firing line, owing to its almost continuous advance, while the firing line halts and fires. This distance steadily decreases, the support being constantly pushed forward into the firing line until it is entirely 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 force 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 deploys on the same ground as the firing line, thus enabling it 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 600 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*.

It must not be understood by the term "firing line" that the most advanced line is the only one which actually delivers fire. On the contrary, although the front line will do most of the firing, others in rear will also bear their share of it. On ordinary terrain, lines in rear may from time to time be better placed to fire upon the enemy's position than those preceding them, and advantage should be taken of this. It will indeed be sometimes the case that several successive lines will be firing simultaneously when they can safely fire over the heads or past the flanks of preceding lines.

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 last few years. 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 dis-

cipline, and careful instruction in that branch of 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 care-

*Von der Goltz.

**Mayne.

fully 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."
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

*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.

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 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 Jay, 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. 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.

When used, it will generally be with counted cartridges. Thus if ammunition be plentiful, severe losses may be inflicted upon the enemy, especially 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.

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 attack-

*So dependent upon each other are the several arms that it is impossible to consider the tactics of one without reference to

ing infantry should advance to about 800 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 1,000 or 1,200 yards in the open 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.—This is generally limited to the *fire of position* in the attack. Selected bodies of troops in the supports and reserves fire over the heads of men in the firing line when the latter is on ground sufficiently lower than that occupied by the selected bodies to allow such fire to be used. The use of volley firing by the firing line in the attack until the shorter ranges shall have been reached is still advocated by some tacticians, on the grounds that the men are more easily kept in hand, the expenditure of ammunition 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 vol-

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*.

leys, 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 with counted cartridges, 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 whenever bodies of the enemy can be surprised in mass formation or otherwise taken at a disadvantage.

Individual Fire.—Individual fire is of three classes: *fire with counted cartridges*, *fire at will*, and *rapid 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, or will, if the number be not indicated, cease firing at once upon hearing the signal.

Fire with Counted Cartridges.—This is used principally in the attack from the time of opening fire until mid range* is reached. More than three counted cartridges are rarely used without intermission; this is to steady the men and prevent waste of ammunition.

Fire at Will.—Fire at will is employed in the attack from the beginning of mid range to the place selected for the delivering of the assault. Pauses in the fire are valuable, as they enable wild fire to be checked and tend to economize ammunition.

Rapid Fire.—This will, if possible, be postponed until the decisive moment of the action, just before the final assault. At this point the bayonet should be fixed, the rear sight laid down, the magazine used, and as intense a fire

*Infantry Drill Regulations, U. S. Army, 1904, classifies distances of from 300 to 600 yards as mid range.

as possible directed straight to the front. At this critical moment fire discipline will probably disappear, but officers and non-commissioned officers should make every effort to cause the men to lay down their sights and fire straight to the front, and prevent them from blazing away in the air.

Cover.—At all ranges, protection from the enemy's fire must be sought in the use of natural or artificial cover. In the attack of any position, it will be necessary for the firing line to intrench as it advances unless natural cover exists. These intrenchments will be utilized by succeeding lines, and if necessity demands, may be deepened by them. 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 a 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 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.—The advance should be continued without interruption, as 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 from 700 to 900 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. A zone will finally be reached which can only be crossed by a succession of short advances. The methods of the Japanese in the recent Manchurian campaign are worthy of note. In some instances their further advance was made by individual skirmishers rushing forward to cover, there intrenching.

if necessary, and opening fire. Here they remained until sufficiently reinforced to conduct another similar advance. In other instances the advance was conducted by an irregular line of squads or sections at considerable intervals, each group advancing in column of files to cover, where they would remain until sufficiently reinforced for a further advance. The former idea of regular advances or rushes by alternate sections of the firing line has to a great extent disappeared. 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. It seems certain that *whenever it is possible*, the rush should be supported by fire action.

Whenever rushing by alternate sections of the line is deemed advisable, the fractions of the line advancing 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. 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.

The advance by rapid rushes is not the only means of approaching the enemy's position, for in the late Anglo-Boer War and in the Russo-Japanese War the lines often advanced by creeping.

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; obliquing may be depended upon to gain slight distances to either flank; 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 300 yards. The movements of the line of scouts are regulated by the officers accompanying it, one officer for the scouts from each battalion. 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 900 or 1,000 yards of the hostile position.

The French regulations require their scouts to precede the firing line by about 500 yards.

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.

Some European armies have no supports, but use reserves only.

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 should be such that fire directed at the latter would not reach the former. One kind of German shrapnel has beaten ground 275 yards deep; diaphragm shrapnel has beaten ground 500 yards deep. 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 minimum 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 or skirmishers. The support is generally absorbed by the firing line by the time the latter is within decisive ranges. Before reaching this point it will be necessary for the support to deploy as skirmishers; but as a rule the reinforcement will be made by squads in extended order. 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 is 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 carried the great Russian battery at the Alma consisted of a mixture of troops

*"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*.

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 300 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 must seek cover.

THE RESERVE.

The Objects 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 well in hand 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 600 to 1,000 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 uninterrupted. 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 600 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 reinforce 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 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.

*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.

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

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' Confederate 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 po-

sition, 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, 1,000 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 the former case the distance between the first and second lines is about 600 yards; in the latter, the first and second lines are separated by about 600 yards, and the second and third lines by about 1,000 yards. The formation in three lines is the one adopted when a powerful attack is intended, and will accordingly be the one here considered. This is a favorite formation with the Germans and French, and is the one almost invariably used by the latter when the regiment is acting alone.

Just before entering the first zone of artillery fire, the regiment (being in route formation) is formed into column of battalions. 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 to form the firing line, and the first and fourth companies for the support and reserve respectively, names the officer to command the battalion scouts, and orders the formation for attack to be taken. The companies designated for the firing line each send forward a few scouts under a non-commissioned officer, who reports to the officer named by the battalion commander to direct the scouting. When

*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.

Fig. 1
 - Attack Formation of a Regiment of Infantry -
 Firing Line 1200 yards from Hostile Position.

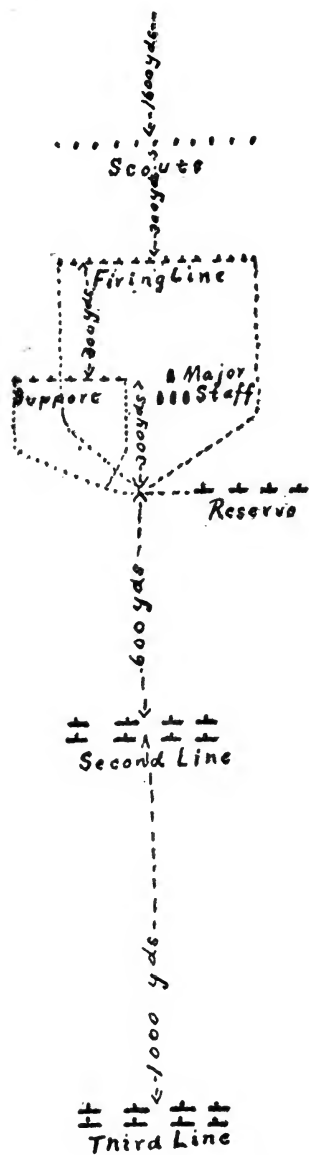


Fig. 2.
 - Attack Formation of a Regiment of Infantry -
 Firing Line about 1200 yards from Hostile Position.

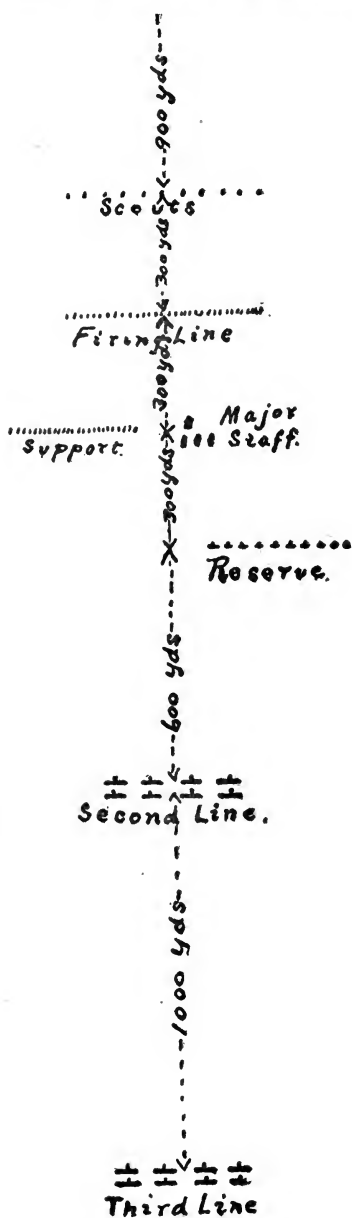


Fig. 3.

Attack Formation of a Regiment of Infantry—
 Firing Line about 900 yards from Hostile Position—

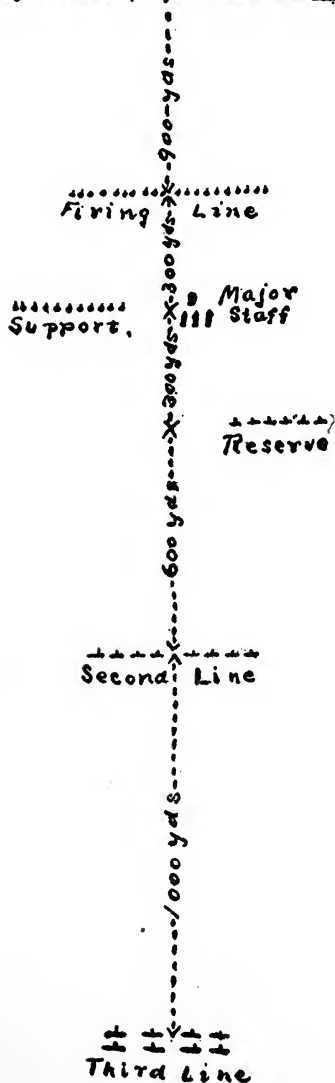


Fig. 4
 - Attack Formation of a Regiment of Infantry -
 - Firing Line about 200 yards from Hessian Position -

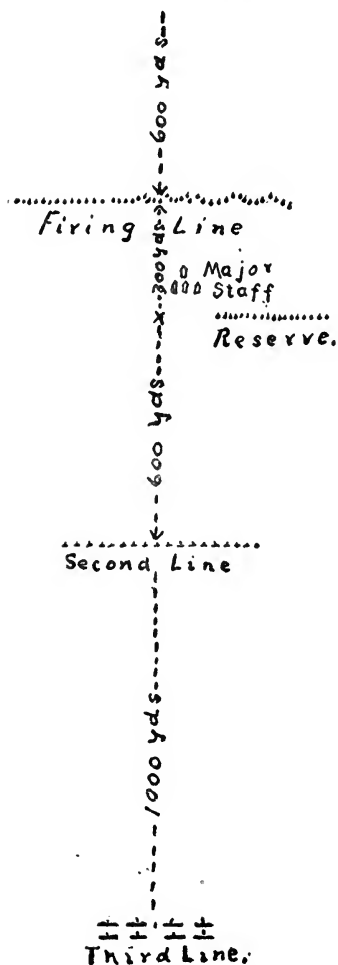
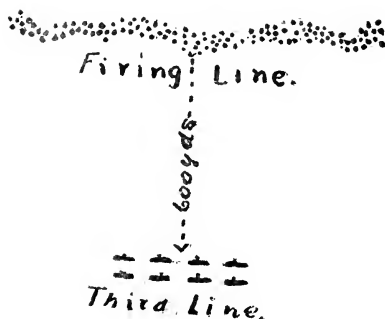


Fig. 6
Attack Formation of a Regiment of Infantry
The Charge



the line of scouts has advanced sufficiently, the two companies of the firing line deploy into line of squads, and follow the scouts at a distance of about 300 yards.

The further deployment of the firing line from a line of groups to skirmishers will probably be compelled by the enemy's fire at some point between 1,900 and 1,200 yards from the hostile position. The company in support follows the firing line when the latter has gained a distance of about 300 yards, and the reserve follows the support at the same distance. The support and reserve are so disposed as to protect the flanks of the firing line. Both the support and the reserve deploy on the same ground as the firing line. The second line in suitable formation follows the reserve of the first line at a distance of about 600 yards, and the third in similar formation follows the second line at a distance of about 1,000 yards. (See Fig. 1.)

At about 1,200 to 1,000 yards from the hostile position the firing line halts and opens fire on the enemy, firing by platoons or companies with counted cartridges. (See Fig. 2.) When the firing line has approached within about 900 yards of the enemy, the support deploys into

line of skirmishers. (See Fig. 3.) The scouts are usually absorbed by the firing line about this time. The firing line continues its advance, the skirmishers gradually closing in toward the center. The reserve deploys as skirmishers when about 1,200 yards from the hostile position. When about 600 yards from the enemy, the support is placed on a flank, or in an interval of the firing line. (See Fig. 4.) The reserve then follows as a support, and is placed in the line by deployed squads between 600 and 200 yards, or reinforces as a unit at about 200 yards, taking part in the rapid fire.

To advance by alternate portions of the line, the major designates the companies to move forward and those to open fire. Each captain gives the commands necessary for his own company to advance, halt, and open fire independently of the other companies. The advance by alternate portions of the line, once taken up, is continued until the major directs the company in rear to halt on the line with the leading companies.

When the first line is about 200 yards from the enemy's position, 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. As soon as the rapid fire has begun, the second line, which, upon arriving within 1,200 yards of the enemy's position, has deployed into line of skirmishers, fixes bayonets and moves forward at double time. At a signal from the colonel, given as the two lines unite (see Fig. 5), the trumpets sound the charge, and the men rush forward with a hurrah, upon the enemy's position. 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.

It must not be understood that the advance of the attacking infantry against the hostile position is made with the rapidity that might be presumed from reading the above description. On the other hand, the different phases of the attack may last hours or even days. The

firing line will make its advance as nearly continuous as the conditions will permit, but at every halt it will be necessary for some portions of the line to intrench and pour in a fire upon the enemy while some other portion of the line will advance by creeping, by rushes, or by individual skirmishers to a point further to the front, there to intrench and open fire while the rest of the line works forward to this position or to one still more advanced. At every stage of the action until the position is reached from which it is intended to make the final assault, some portion of the skirmish line should be advancing toward the enemy. This position reached, it will undoubtedly be necessary for the first line, now fully deployed and engaged in delivering its most telling fire to intrench unless adequate natural cover should exist. The advance of the second line will continue as rapidly as possible, but cannot be made continuous. The fire of the first line upon the enemy's trenches, however, will make the losses of the second line much less than those of the first line during its advance to this position. But the last rush of the second line to the point where it joins the first should be made with sufficient impetus to carry the latter forward to the enemy's position, in the final assault.

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 ren-

dering 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 600 yards. 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 life; 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, 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 compelled to assume 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.

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.

SUMMARY.

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 decisive action, 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.

It must be observed that there is no unanimity of opinion among the great military powers as to the details of infantry attack. The German and French formations have been developed from their experiences in the great Franco-German War of 1870 as modified by their observations since that date, and have not yet been put to the practical test to which the British ideas existing prior to 1899 were subjected. The English ideas are based largely on their experiences in the Boer War, when they were compelled to oppose a peculiar foe on an unusual terrain. The real value to be assigned to the experiences of this war is largely problematical.

The wonderful success of the Japanese methods of attack may to a considerable extent be due to the advantage possessed by them of being able to apply the lessons learned by them in the war against China on the same terrain where these experiences were gained.

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 it 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 Spichern.

The distance to be passed over by the turning force increases, of course, with the 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 means of the field telegraph or tele-

phone, or, if he be unprovided with field signal communications, 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 pre-arranged sound signal generally fail miserably.

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 in a good defense. These conditions are best fulfilled by utilizing natural, and constructing artificial, cover, and having a firing line of 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

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

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 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 attacks, 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 or 2,500 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 2,500 to 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 ascertained 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 sustained by 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 in 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; 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 concentrated 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 has rendered 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 intrenched and 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 1,200 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 600 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 should always be intrenched, and is usually located 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 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.

This line forms no exception to the general rule that troops in reserve should be intrenched.

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 assailant, 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 definitely checked.

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; 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.*

*Each of these features has been used to advantage in battle. At Fredericksburg, 2,500 men of McLaw's division were posted in

Reverse slopes in themselves constitute no protection from modern artillery fire. It may here be stated that, as a general rule, *all troops on the defensive must intrench, unless protected by adequate natural cover.* 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 particularly 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

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.

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

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.

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 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.

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

The colonel assures himself that each battalion and company is in the best possible position in regard to cover and effective fire.

THE USE OF HASTY INTRENCHMENTS BY INFANTRY.

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

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 intrenchments may thus prove a curse rather than a blessing. General 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

*"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 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

of a commander will largely consist 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 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 assail-

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.

ants 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.

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

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

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 defenders' 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.*

*Describing the unsuccessful assault of Davis' division against the Confederate position at Kenesaw Mountain, General Cox says:

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.

There is, as yet, no form of ammunition wagon or cart prescribed for the United States Army, other than the escort wagon.

The following general rules are recognized, as they are based upon the experience of armies in which much attention has been bestowed upon the subject.

An acting ordnance officer or reliable sergeant is in charge of the battalion ammunition wagons when they march in rear of the regiment. One wagon is attached to each battalion and accompanies it. The small-arms ammunition columns should always be pushed as far to the front as may be practicable without undue exposure. As soon as the battalion wagon has been emptied of its

"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.*

ammunition, it should be sent back to the 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.

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. Other troops 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 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.

There is, however, nothing radically new in the relations of cavalry and infantry, and it would be absurd 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.

CHAPTER V.

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 cavalryman, trusting to shock action on the battle-field, has played a conspicuous part in the history of war for many generations; his exploits have decided the issue of many a doubtful combat. On occasion he has exerted a supreme influence over the course of the action from its commencement to its close, but the era for operations of this kind has passed. Opportunities will often present themselves in engagements of the future for charges by mounted troops wielding the saber. The true rôle of the horseman of to-day is, however, very different from that of even a few years ago.

Although it is probable that the trooper will employ his firearms more frequently than either saber or lance, it must not be concluded that the use of these weapons has disappeared from the battle-field. Occasions for their employment will seldom arise in the course of future campaigns, but when they do occur, cavalry will have opportunities which could never be grasped by any other arm.

The difference between mounted infantry and cavalry proper does not arise from the fact that the *personnel* of the former is drawn from infantry regiments, but that it is able to fight only on foot. Mounted troops who for want of some suitable weapon are incapable of injuring their opponents unless they dismount, will frequently miss opportunities of performing very effective service. For campaigns between great modern armies, the trooper must be a genuine horseman who can wield his saber confidently from the saddle, but who is no less ready to use his car-

bine, dismounted, when circumstances do not admit of the former action.

The true function of the cavalryman of to-day lies in independent action. This does not by any means preclude the actual charge, but shock tactics must be the exception under conditions as they now exist, and are very unlikely to be employed on a scale of much importance in the future.

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 mellay 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 mellay. 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 con-

fusion 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 mellay, 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 to 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.

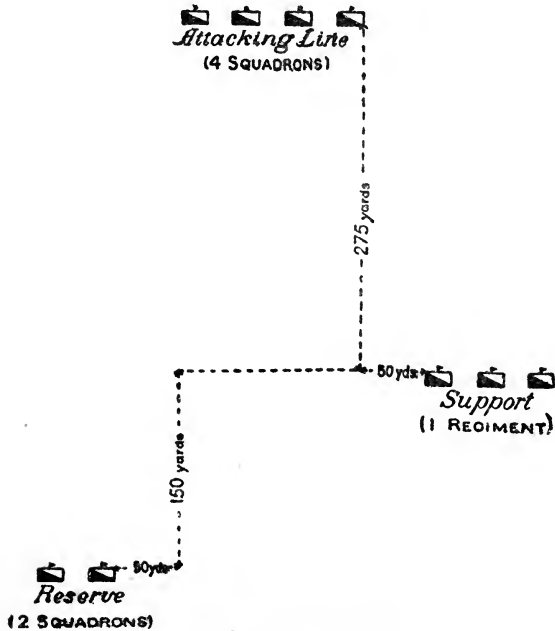
The distances between the lines, or echelons, vary with the size of the attacking force. In the case of a troop, the distance from the attacking line to the support is about 80 yards, and from the support to the reserve not more than 150 yards. In the case of a brigade or division, the former distance 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 50 to 75 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 6.)

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 the 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, 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

Figure 6. **NORMAL ATTACK FORMATION OF A BRIGADE OF CAVALRY.**



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 about 600 yards from the hostile position. The columns then deploy into line and take the gallop, gradually increasing in speed until within from 75 to 50 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 trumpets 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. 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 at-

tack 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 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. 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

*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 Chapter VI.

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 ground suitable for the charge exists 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 mellay 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. 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.

*German "Official Account."

To avoid such accidents, ground scouts should be sent 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 the United States it will 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 mellay 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 resolution 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 reformed, 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

*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.

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 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. 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 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.

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.*

*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.

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 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 divisional cavalry will habitually be used in conjunction with the other troops of the division, 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.

Cavalry may be used with effect against infantry under the following circumstances:

- I. When the infantry is broken by the fire of the opposing infantry or artillery.
- II. When the infantry is engaged with opposing infantry.
- III. 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.
- IV. To check an attack of the enemy's infantry and gain time for the arrival of reinforcements.

- V. When infantry is exhausted by a prolonged contest with infantry.
- VI. When infantry is disordered in retreat.
- VII. In covering a retreat.
- VIII. To cut through a surrounding force of hostile infantry.
- IX. When the infantry is demoralized, of poor quality, is out of ammunition, or can be taken by surprise.
- X. When the infantry is mounted.

Infantry is fitted neither by training nor armament for mounted combat, and is consequently at a great disadvantage until dismounted. The act of dismounting takes some seconds, and for a battalion or regiment to transform itself from a body of horsemen to a force on foot, with their horses held securely under cover in the rear, requires an appreciable space of time.

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.

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, witnessed 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, numerous cases 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.

Artillery should not ordinarily fear a front attack of cavalry. Nevertheless, opportunities will occur in battle in which artillery may be attacked by cavalry with every prospect of success.

- I. When in the course of the battle the artillery stands alone unsupported by other arms.

II. When the artillery can be surprised, especially while limbering up or in the act of unlimbering.

In this case 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 should be disabled,** and the horses and limbers carried off

*McClellan's "Campaigns of Stuart's Cavalry," p. 268.

**"To disable a field gun, open the breech-block and then break 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

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.

Divisional 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 divisional 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.

Cavalry in active operations has two well-defined rôles: that of detached or independent action and that in conjunction with other arms. In the performance of either of these duties, dismounted fire action plays an important part. In the United States service, the trooper is now armed with the same rifle as the infantryman, except that

shotgun 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.*

he is unprovided with a bayonet. Making the necessary deductions for horse-holders, a force of cavalry should be able to perform as efficient service with the rifle as infantry. Owing to his greater mobility, the trooper should be able to move quickly to any portion of the field and thus improve opportunities for firing upon the enemy, which the slower-moving foot soldier would be unable to grasp.

Thus dismounted fire action will be successfully employed by cavalry for the following purposes:

- I. To drive away or capture small bodies of infantry or partisan troops, who endeavor to check the progress of raiding or reconnoitering cavalry.
- II. To force a defile which blocks an advance, and thus avoid a delay; or, to seize and hold localities until the arrival of infantry.
- III. To reinforce infantry in emergencies.
- IV. To fill a gap in the line of battle.

Formerly the compact order in which infantry maneuvered facilitated control by commanders and rendered gaps in a line of battle rare; dispersion, however, is the order of fighting of the present day, and under such conditions involuntary breaches in the general front are liable to occur, and to fill these, mounted troops kept in reserve will prove most servicable.

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.

- V. In an inclosed, wooded, or broken country, where mounted action is impracticable.
- VI. In covering a retreat.
- VII. When exhausted or defeated cavalry is called upon to resist a charge of fresh cavalry.
- VIII. In conjunction with cavalry mounted.
- IX. In turning movements, when opportunities are presented for opening enflade fire on the enemy's lines.

There will be many occasions when the enemy is held in front by infantry, on which a force of cavalry on account of its mobility could make a rapid turning movement

and enfilade the enemy's line before he can make dispositions to meet it.

X. Whenever cavalry, through force of circumstances, is deprived of the power of using mounted action.

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 first 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 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 conjunc-

tion 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 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 add to its 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.

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.

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 may be 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

*See the subject "Mounted Fire Action," in Chapter III.

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.

The combined operations of Forrest and Van Dorn against Grant in Mississippi in December, 1862, 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.

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, destroyed 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."*

*"Campaigns of Stuart's Cavalry."

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, on the 27th of June, culminated in the defeat of the Federal right wing at Cold Harbor."**

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, had 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.

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.

*Official instructions of Lee to Stuart.

**"Campaigns of Stuart's Cavalry."

***See "The Civil War in America," by the Comte de Paris (American edition), Vol. II., page 83.

as their object will generally be the destruction of a bridge, viaduct, tunnel, or lock, and celerity will be of paramount 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 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.

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.

A review of the raids undertaken by the cavalry of both the opposing armies in the recent campaign in Manchuria shows that they were generally unsuccessful.

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 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 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

*Duke.

**Notably Von der Goltz and Hohenlohe.

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

*This raid severed Lee's communications with the South for six weeks, and would have compelled the evacuation of Richmond and Petersburg had the infantry done its share of the work properly. Grant's use of cavalry during this part of the year was defective. It should have been kept united, and used together; first against the railroads north, and second against those south of Richmond. As it was, Sheridan was baffled on his Trevilian raid, while Wilson, although entirely successful, was compelled to beat a hasty retreat. United they could have defeated any force the Confederates could have sent against them.

**Official Report, July 4, 1864.

misfortune to the Confederates; for it caused his absence from Lee's army on the first day of the battle of Gettysburg, 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, infantry should form no part of a raiding column. If a deficiency in cavalry render the employment of infantry necessary, the latter should be mounted. Artillery may often be used with great advantage on raids, but it should consist of mountain or horse batteries. While no fixed proportion can be prescribed for the number of guns to the total strength of the raiding column, it should be the least consistent with the objects of the expedition.

*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.

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 his 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 pertaining 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.

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,

*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."

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.

Bridges of the truss variety are most easily destroyed by attacking the lower chord of through bridges, and the upper chord of deck bridges.

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, removes 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 road-bed.*

SUMMARY.

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 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."

*For detailed instructions in regard to hasty demolitions, etc., see the "Manual of Military Field Engineering."—*Major William D. Beach, 10th Cavalry.*

CHAPTER VI.

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 5,000 to 3,000 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 ad-

vancing 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.

THE TACTICS OF FIELD ARTILLERY.*

There is sometimes an impression among officers who have not had occasion to consider the matter particularly, that artillery is a purely technical arm, and has little use for tactics in the broader sense. It seems at first sight that it has only to move forward in some sort of decent order—which is a matter merely of Drill Regulations—and then take up a suitable position and open fire—both of which duties require a knowledge more technical than tactical.

This impression has perhaps been strengthened by misinterpretation of two well-known quotations from Hohenlohe's "Letters on Artillery." The first is: "Judging from my own experiences in war—and you will own that in

*REVISERS' NOTE.—No attempt has been made to revise the chapter relating to Artillery in Attack and Defense at this time. It is believed that the principles enunciated by Colonel Wagner concerning the use of artillery are unchanged, and that they have been modified in their application alone. Up to the present, the Artillery Board of the United States Army has not reached final conclusions, regarding Drill Regulations, tactical or technical handling of the new field artillery. Data as to the use of artillery in the recent campaign in Manchuria are not yet complete. Under these circumstances, it has been thought best to substitute for the remainder of the chapter on "Artillery in Attack and Defense," a lecture prepared from all the data available at present, by Captain Oliver L. Spaulding, Jr., Artillery Corps, U. S. Army, under the title "The Tactics of Field Artillery," for use in the Infantry and Cavalry School and Staff College, as a substitute for the chapter on the same subject in "Organization and Tactics." It is intended to further revise this chapter whenever the War Department shall have issued something authoritative on the subject.

matters connected with artillery they are fairly numerous—the only movements which are of use in the field are, the advance in column or route, deployments, and the advance in line.” The second is: “The artillery must in the first place, *hit*; in the second place, *hit*; in the third place, *hit*.”

These two sentences, by themselves, would seem to support the idea in question; but of course they do not when taken with their context. True, the movements required of artillery on the battle-field are simple, and the guns are worse than useless if there be a lack of the technical knowledge necessary to establish them in position and range them properly; but tactical knowledge in the broader sense is required to control all these technical operations. Not only must all be skillfully combined to accomplish the required tactical purpose, but the manner of combination must be adapted to the corresponding operations of other troops; for artillery is an auxiliary arm, and its business is to assist and support its infantry.

Thus there arises a complete system of artillery tactics, consisting of the principles by which a commander should be guided in making these combinations of technical operations.

The guns themselves must be moved and fought, as Hohenlohe points out. This is the technical foundation, and this duty falls in the main upon the battery commanders. As we follow up the chain of command, to the chief of artillery and the commander-in-chief, the technical duties grow less and less, and the tactical duties greater and greater.

Naturally enough, such a tactical system is deeply affected by changes in technical methods, and these methods must always adapt themselves to the *matériel* with which they have to deal.

Now, artillery *matériel* has been greatly changed in the last few years, and the methods of handling it have changed with it. The question naturally arises, whether the whole system of artillery tactics has not thereby been overturned, necessitating the development of an entirely new one; and

many students of the subject are inclined to answer in the affirmative.

But this view seems a trifle one-sided. It takes account only of the changed tool, not of the unchanged purpose, which is to help the infantry to win battles.

The means by which artillery gives this help is always fire action. The methods of developing the fire are nowadays widely different from those of a few years ago, and its power is much increased; but the nature of the fire itself is the same. *Prima facie*, then, ought we not to expect to find the old system of tactics modified, rather than revolutionized?

A great deal of study is naturally being given the question now, when the re-armament with rapid-fire guns is approaching completion throughout the world; and, as usual, there are extremists on both sides—ultra-conservatives and ultra-radicals. But it is believed that in the final solution of the problem, the old broad principles will be found to remain, the details being modified to conform to the altered conditions. Study of the Japanese Regulations, under which such excellent work has been done in the late war, supports this belief.

Since artillery always fights in line, and at a halt, the choice of position becomes of paramount importance. The convenience with which indirect fire may now be employed makes it much easier to put up with a poor position than formerly, and renders it possible to use guns with some effect from almost anywhere within range of the target; but most of the old rules for choice of a position still hold good, and the best position will be the one which most nearly satisfies the requirements of those rules. The following are the principal things to be sought:

1. Good cover; a ridge, behind which guns may be placed out of sight, is usually sought; but trees, bushes, or high standing grain, completely concealing the battery, are also good.

2. Clear, open ground to the front and flanks, giving the greatest possible range and the broadest possible field of fire.

3. Good stations for the observation of fire.
4. Good aiming points, in case of indirect laying.
5. A front generally perpendicular to the line of fire.
6. Sufficient space to allow the deployment of all the batteries that it is desired to use.
7. Firm soil, to resist the wear and tear of the firing.
8. Easy access from the rear, convenience of moving to the front, and good lateral communication—all under cover.

The relative importance of these desiderata depends upon circumstances—upon the purpose in view, the nature and extent of the target, and the disposition of friendly troops.

The most careful reconnaissance possible should be made before deciding upon a position. Dismounted as well as mounted examination of the ground should be made; and observation from the direction of the enemy is very desirable.

Such reconnaissance is easily made in the case of deliberate occupation of a defensive position. But on the march the matter is not so simple, for such work takes time. If the advance guard meets with serious opposition, and it is necessary to bring up artillery to its assistance, the artillery commander will not be able to do very much before his guns are ready to come into action.

In order to facilitate this reconnaissance, as well as to assist in locating positions of the enemy, it is advisable to have an artillery officer, under the immediate orders of the artillery commander, march with the leading elements of the advance guard. His special duty is to look for places favorable to the action of artillery.

On reaching such a position, the officer halts and makes a careful study of the ground. He notes its advantages and disadvantages; estimates the number of batteries which could be used with convenience; notes desirable locations for observation stations; selects and determines distances to convenient aiming-points; locates any important features shown on the map; picks out the places where an enemy might probably appear; and, in fact, con-

ducts as complete a reconnaissance as time will permit at each position as he reaches it.

Several good men should accompany him, as scouts and orderlies; by means of these men, he keeps in communication with the artillery commander, sending back such memoranda as seem of especial importance.

Thus, when the batteries do have to come into action, the commander will find his reconnaissance well under way, and the officer, who will meet him upon the position, will be prepared to help him complete it in the shortest possible time.

If possible, positions should be occupied unseen by the enemy. Battles nowadays are likely to last several days, and take on something of the character of siege operations; so that positions may often be occupied under cover of darkness. The guns may then remain silent and concealed until the time comes for their use, when they may enjoy the advantage of acting by surprise.

Changes of position are undesirable; the guns are useless and vulnerable while in motion, and time is lost in ranging at each new position. Hence changes should not be made when it can be avoided; as will be seen later, however, some few changes during the course of the action will ordinarily be necessary.

The fire of all the guns is under the general supervision of the artillery commander; but the methods of carrying out his orders are left to the subordinate commanders. Fire should not be opened without his order; and no subordinate should fire upon a target other than that designated by him, unless in an emergency, or at some critical moment; in such case the subordinate should at once report his action to his immediate superior.

As to the objective of the fire, the rule of our old Drill Regulations holds good: "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 which the artillery is supporting."

In treating tactical subjects, it is customary to con-

sider offensive and defensive action separately. The line thus drawn is to some extent an arbitrary one, for offense and defense shade into each other almost imperceptibly. But the form of battle assumed as typical—that in which one army occupies a purely defensive position and the other attacks it—does furnish an opportunity to discuss methods, which may afterward be modified and applied to conditions as found.

Following this custom, let us trace the course of the artillery in such a battle, first from the standpoint of the attack, then from that of the defense.

A determined attack upon a prepared position must be preceded by a long period of reconnoissance, the attacking force gradually feeling out the position, and locating the weak points.

This is a more difficult matter now than ever before, since it must be managed from a greater distance. The defense will undoubtedly have numerous small detachments in front of its main position, some of them provided with artillery, to mislead and delay the attack. Each detachment will have to be looked after separately, and the result will be a series of minor actions, largely fought by the artillery—for the detachments will not wait for their opponents to come to close quarters. The issue of each such small attack will not be doubtful; but each one must be begun with much the same caution as a general engagement, for it will never be certain beforehand just when and where the main position will be reached.

For this reason all, or at least most, of these preliminary attacks will have to be preceded by the assembling of a formidable number of guns, all of which will be prepared to come into action at once upon the hostile batteries as soon as located. Care must be taken not to bring them under a decisive fire, either artillery or infantry, or they will suffer a loss totally out of proportion to the results to be obtained. Opportunities for enfilade fire will be frequent in this kind of work, and must not be wasted.

The guns may also, in this stage, have occasion to fire upon the enemy's infantry. The attacking infantry will be

constantly working forward, and occupying successive positions, which can, if necessary, be defended against counter-attacks. If these positions be occupied or commanded by the enemy, the artillery must aid the infantry to get possession of them.

Finally, perhaps after days of skirmishing, the reconnaissance period will approach an end. The enemy's heavy guns will begin to be felt, and the attacker's corresponding arm will seek positions from which to reply. The fire of the opposing field guns will grow stronger, and the front covered by them broader. It will be found no longer possible to continue the tactics of flanking out or driving in separate detachments, and gradually the main defensive position will outline itself, and the weak points become apparent.

It is to be supposed that the attacker is the stronger in artillery; this is indicated in the assumption of the offensive. Throughout the combat, it is for him to utilize this superiority by always having the preponderance at each point of contact.

So now, as in the reconnaissance period, he concentrates his guns. This does not, of course, mean that everything he has is drawn up in one grand line, but simply that the different units are so placed that each one can bring its fire effectively upon the designated target. The guns themselves may be widely separated; but they are all held in the hand of the commander, more firmly than ever before, by means of the field telephone.

How far the physical separation of the guns may go, without impairing their tactical concentration, depends upon the terrain and upon the circumstances of each particular case. In a small force, say a single division, batteries may have to stand alone; but they should never be divided, and if it is at all possible, battalions should be kept together. In Manchuria, the favorite unit was the regiment.

The battery commander will usually have his hands full with the technical direction of the fire of his battery. The tactical application of it belongs to the higher com-

manders. If, then, the battery be isolated, a double duty falls upon the captain, and, in proportion as he devotes attention to one, he must neglect the other.

Nevertheless it is true, as just remarked, that concentration of guns does not mean the formation of a continuous line; it means the control, by one commander, over many units, and the careful distribution by that commander, to the units, of particular targets or fields of fire; it means unity of action.

The phase of the combat now opening is the artillery duel. It is important for the attacker to cripple the enemy's artillery, his long-range arm, as much as possible before bringing his infantry into action. Referring to the general rule already given for the objective of artillery fire, we find these conditions: it has become necessary for the infantry to advance; at the outset it is the artillery of the enemy that is most dangerous to it; therefore that artillery becomes the target for the attacking guns.

It is thus desirable for the attacker to seek a general artillery engagement. For this purpose, he should deploy as many guns as can be used, from the outset, so as to avoid any risk of letting the defender enjoy even a temporary superiority. Enough batteries to cover the enemy's whole line with an effective fire should be placed in position, ready for instant use. Each unit in this mass should have its own field of fire allotted to it, and have orders to reply to any battery which may be discovered within that field. All being ready, fire is opened upon such batteries as have been located, and an attempt is made to force the defender to disclose his whole artillery position.

To get decisive results, a concentration of fire is necessary; and this concentration the attacker should usually be able to make. Keeping the enemy actively engaged, as just indicated, he will employ all his available remaining guns upon a single hostile unit, and silence it. The concentration will then be made upon another unit, that already silenced being left to the batteries assigned to observe that particular part of the field.

Formerly, this duel was a very distinct phase of the

battle, and no infantry ventured within range of the enemy's guns until a decided superiority was established over them. But now artillery range is so long that infantry must come within it, even while the duel is at its height, if it is to reap any advantage from the cannonade during its advance.

The artillery duel, then, shades gradually into the next phase, which is the preparation of the infantry attack.

It may, in fact, prove impossible to draw the defender into the artillery duel. If he chooses to keep his guns silent and concealed, the attacker has no choice but to send his infantry forward regardless of them. While this arm is seeking to gain a lodgment within striking distance of the position, the defender's artillery will be forced to open fire upon it; his position being thus disclosed, his fire may be answered in kind.

But however this may be, when the infantry advances to the attack a new duty imposes itself upon the artillery. It has now to prepare the approach to the particular point selected for attack.

It must direct as severe a fire as possible upon that point. But at the same time it cannot neglect the hostile guns placed elsewhere, or the advantage gained by its previous work will be lost. The duel will have been fought at long ranges—probably at least 3,000 yards, perhaps 4,000 or even 5,000. The war in Manchuria furnishes instances of artillery fighting, and very effective fighting, too, at 7,000 yards. At such ranges the possibility of putting permanently out of action the opposing batteries, concealed from view and having their *personnel* protected by shields, will be remote. They may be silenced, or forced to slacken their fire, but if left to themselves, they would soon be able to resume it.

A division of the artillery force thus becomes necessary. Certain batteries, including usually the heavy guns, are assigned to keep down the enemy's artillery fire, while the remainder devote themselves to preparing the infantry attack.

Those told off to the former duty will continue to

act very much as in the duel period, except that, the opposing fire having slackened, each battery can take care of a larger sector. When the enemy perceives what is being done, he will probably intensify his fire again as much as possible, and a second contest similar to the duel will take place. For this reason, care must be taken not to draw off too many batteries, and those that remain will have to exert themselves to the utmost. Rapid volley fire will be opened instantly upon any hostile battery that renews its fire.

The positions of the batteries constituting the target will by this time be well known, and such fire can be made effective immediately. If those batteries change position, their fire, when re-opened, will not be dangerous at first, so time will be available for ranging on them. It will be difficult for them to act by surprise in their new positions, for each part of the defender's line will be under close observation by some battery told off for that particular purpose, and they will be very quickly detected.

The batteries intended to prepare the infantry assault gradually withdraw from the duel, as they can be spared, and prepare to concentrate their fire upon the point selected. All possible preparations are made for opening fire, and ranges determined as accurately as possible, so that the fire, when begun, may be effective from the first.

All then open simultaneously, and keep the defender's fire down over the whole front of the attack by a continuous fire.

It has just been said that the heavy guns will naturally be found among the batteries observing the enemy's artillery positions. But use for them may be found at times among the preparation batteries. It will be found necessary or desirable to destroy material obstacles in the way of the attacking infantry, and if these are serious, the greater shell power of the heavy guns will be pressed into service.

While all this is going on, the infantry is pushing in, and making its final dispositions for the decisive attack; and when the preparations are completed, the assault is

launched. The duty of the artillery now changes from preparation to support.

The support of the attack consists of two things: the first is, keeping down the fire, both artillery and infantry, from that part of the line against which the assault is directed; the second, guarding the flanks of the attacking force.

For the second purpose, certain batteries are designated, either from those that have been assisting in the preparation, or from those that have been taking care of the enemy's artillery. The flanks of an attacking force are very vulnerable, and the enemy will undoubtedly try to take advantage of this, either by counter-attacks directed against them, or by fire action from favorable points outside of the threatened section.

In order to give the necessary protection, the batteries assigned to this duty act much in the manner of those which maintained the artillery duel after the preparation of the attack had begun; that is, each battery is assigned its field of fire, and makes its preparations to act instantly and vigorously against any part of it, noting ranges to prominent places, selecting its aiming-points, and keeping a vigilant watch of everything within its sector.

The guns which are told off to keep down the fire in front maintain a vigorous fire over the heads of the advancing infantry until the latest possible moment before contact; they then slightly increase their elevation and lengthen their fuses, and sweep the ground just in rear of the enemy's firing line, preventing reinforcement or withdrawal of it.

Just when the fire should be thus diverted from the firing line is a delicate question. As fuses, laying apparatus, and observing instruments are improved, this moment may be postponed; but even so, the answer is no mere matter of calculating the danger space and ceasing the fire when the troops reach the near edge of it. The moral effect upon the infantry has to be considered; troops can not be expected to advance with confidence very close to

the real danger line. On the other hand, if the fire ceases too soon, the defenders will be able to redouble the intensity of their fire. Many infantry officers say that they prefer to take some chances of getting a few shells among them from the rear, rather than dispense prematurely with the support of the artillery.

It has been laid down as a general rule that the fire must cease when the infantry comes within 500 yards of the target. But if this rule be followed, the artillery might almost as well not support the attack at all. A German officer, who observed the war in South Africa from the Boer side, holds that this distance must be reduced to 100 yards.

If, as is probable, the approach to the position is up a slope, or if the guns themselves occupy an elevated position, the fire may be safely continued longer than on level ground. And even when the guns have to increase their elevation, the howitzers, owing to the steep angle of fall of their trajectory, may continue to fire almost up to the moment of the last rush. This, it will be noted, is one of the most valuable uses of howitzers, and they should always be represented among the batteries assigned to this duty.

Some of the supporting batteries will go in with the infantry to close range, perhaps 1,000 yards or less. Several reasons will compel this. For one thing, the proper protection of the flanks may very likely prove impossible except from close range; if, for example, the enemy should be able to place a few flanking guns behind some obstacle, in such a manner that they could not be reached by frontal fire, they could cause great loss and confusion in the attacking force if no artillery were present to reply to them.

Another reason is the desirability of affording moral support to the infantry during the advance, through the presence of its "indispensable companion." The French, especially, attach great importance to this feature, and regard it as essential, "that the infantry should feel the constant and immediate support of the accompanying bat-

teries, and that these should reach the conquered position at the same time as the infantry."

It is said that the shields now attached to the guns render it possible to serve them under fire from closer ranges than formerly, in spite of the increased power of that fire; and that consequently the batteries should not hesitate to go in, more particularly as they, together with the infantry, will be under the powerful protection of the guns which remain behind, firing over their heads.

All this is quite true, as far as it goes, but it does not touch the real objection to this procedure of sending in the guns. The professed object is moral support; but if the guns make long stops to fire, and in so doing utilize the protection of their shields, they will soon lose touch with the infantry. If, on the other hand, they make several changes of position, advancing step by step with the infantry, they will, at each halt, waste at least a short time in ranging; moreover, during these movements, they will lose so many horses that they will soon be permanently stopped. In either case, the moral support vanishes.

There is something in the idea of moral support, but it ought not to be emphasized too much. Batteries must be sent in to close range, for this and other reasons, but it should be done with judgment, and after due consideration whether the conditions require it—not as a matter of course. The guns can not remain immediately with the infantry in any case, if they are to do any firing; and it would seem that their fire ought to have much the same moral effect upon their own infantry, whether delivered from a position 500 or 2,000 yards in rear of it. And if it is a mere matter of fire effect against troops in position, a range of 3,000 yards is as good as 1,000—better, in fact, for the greater angle of fall of the projectiles enables them to search cover better.

Such an advance at this stage can not be made off-hand. It being decided that it should be made, the ground over which it is to pass will have to be thoroughly, although rapidly, studied, positions and the routes to them selected, and every possible means taken for security.

The number of batteries to be sent should also be considered, in view of the terrain and of the object of the movement.

In executing the advance, batteries should move successively, so as not to cause a complete cessation of fire at any time. Each part of the line should advance under the protection of the fire of some other part.

If the attack succeeds, and the enemy is driven from his position, the victor has first to occupy and hold the captured ground, and then to make the most of his advantage by a vigorous pursuit. At this time, as an English writer (Captain H. T. Russell, R. F. A.) says: "Units will be inextricably mixed, prominent officers conspicuous by their absence, and this is the time when the commander of individuality and resource, who does not shirk responsibility, can make his mark and perhaps help to make history."

The first thing to be done is to complete the enemy's rout—prevent a counter-attack, and make as difficult as possible the formation of a rear guard.

Artillery will be pushed into the position as swiftly as possible, to support the infantry now in the act of occupying it. This is an instance where subordinate artillery commanders, occupying advanced positions, should move without waiting for orders, and come up at once.

The batteries farther to the rear come up more deliberately, first seeing that the ones ahead have made good their foothold in the captured position, and supporting them in the event of a counter-attack. Meanwhile the cavalry and horse artillery are working around the flanks, and preparing to begin the pursuit.

These arms naturally take the largest share of the work of pursuit. The field batteries assist in so far as they are ab'e, firing upon any bodies of the enemy that seem inclined to make a stand; but without express orders they should not go far beyond the captured position; they should rather remain there until the successful infantry has recovered from the disorder brought about by its own victory. The assistance of the guns may be needed during that process.

In the pursuit, artillery should not waste time on small or broken bodies, but should devote its attention to the main force. It should leave the capture of prisoners to other troops; it has no men to send back with them, if taken.

If the attack is repulsed, the responsibility for covering the withdrawal and checking pursuit rests upon the artillery, and primarily upon the batteries which are most advanced.

From the above description it will be noted that several changes of position will have to be made during the course of the action. These positions will be, in general: (1) the reconnoitering position, (2) the duel position, (3) the supporting position.

This classification of positions must not, however, be taken too literally, as a "sealed pattern" order of attack. Under some of these heads several changes of position in one action may be included; some of them may be omitted entirely, or rather one position may be made to serve for several purposes; some batteries may have occasion to occupy all these positions in succession, others will make fewer changes.

It has been remarked above that changes of position are always undesirable; and this is especially true in the attack, since changes cannot be so readily made under cover as in the defense. The difficulty increases as the range shortens, and in the later changes little or no protection can be found.

Changes should be made by echelon, part of the batteries moving under cover of the fire of the rest. If, as is usual, the old position is on the reverse slope of a hill, the best plan is to limber to the rear, first running the guns back by hand if direct fire is being used; a more or less covered line of advance to the new position may then be found, and the necessity of crossing the crest of the hill, on the sky line, avoided.

There is a tendency to consider the tactical defensive as the gainer by modern improvements in weapons. This may be so to some extent, but too much reliance should

not be placed upon such a theory. To quote from Meckel:

“During a long period of peace, there is generally a tendency to forget the lessons of war; to exaggerate the results of improvements in firearms and the importance of formations; and to attribute a certain superiority to the defensive. In reality, no one form of battle is superior to another. Their relative values depend entirely upon the terrain and upon circumstances.”

The battles in Manchuria would appear to support this idea. The defense has indeed grown stronger in the earlier stages of the battle, but when it comes to the decisive point, improved weapons really prove of greater value to the attacker.

The first step in battle is the establishment of contact. Each party seeks to gain information as to the force and dispositions of the other; but obviously the assailant is the more urgently in need of information. Contact can be gained only by fighting, and the defense here enjoys the great advantage of seeing without being seen, and of having his position carefully prepared beforehand. Later in the fight, these advantages gradually diminish.

The one advantage that in the nature of things always belongs to the defense is, that he can, in the form of battle selected as typical, reconnoiter, choose, prepare, and occupy his position at leisure.

The general characteristics desirable in an artillery position have already been noted. In defense, places must be found from which the guns, without in any degree impeding the infantry, may command all available positions and cover in front, both to protect advanced positions held by friends, and to prevent strong points being seized by the enemy. Provision must also be made for flanking fire, which may become highly important in the later stages of the infantry attack; here care is necessary, lest the flanking positions be themselves flanked.

Every artillery commander, of whatever grade, should carefully reconnoiter the ground assigned him. Not only the position to be immediately occupied must be examined, but several positions, having regard to the probable ne-

cessity of changing position during the engagement—for even in defense the artillery must make some changes, although better off than the attack. When the infantry assault begins, a new position will probably have to be taken up to meet it; and circumstances may compel other alterations in dispositions.

It would seem superfluous to say that artillery will often have to provide for its own security, by sending scouts to reconnoiter the ground beyond its immediate position; but there is no lack of instances where this precaution has been neglected, and batteries surprised by other troops that have worked up, concealed by some apparently insignificant fold of the ground. But barring such surprise, artillery need not fear any frontal attack. It is vulnerable in the flanks only.

Corresponding to the advantage which the defense possesses in taking position at leisure, is the disadvantage that he must be prepared to meet all possible attacks of the enemy. This constrains the defending artillery to scatter its force more, to cover dangerous places in the line. But the whole force must not be scattered in this way, or every part of the line will be weak. The most important points are occupied, and the remainder of the artillery held back until needed.

Fire control is simpler in defense than in attack, owing to the greater permanence of the positions. The field telephone may be used to an even greater extent. Regular range-finding systems may be established in the more important positions; a measured base line, angle-measuring instruments at the ends, and telephonic communication are the essentials of the system.

As remarked above, the first troops of the defense to engage the enemy will be small covering detachments in front. The use of these is twofold. In the first place, they force the enemy to deploy and show his strength, giving valuable information to the defender in time for him to profit by it. Secondly, they annoy him, causing him to make constant, useless and costly attacks, and gradually undermining the morale of his troops.

Such detachments should act in much the same manner as a rear guard; they should make a show of energetic resistance, but not allow themselves to be drawn into a serious engagement.

This being so, they should be strong in artillery, the long-range arm *par excellence*, and have only enough of the other arms to protect the artillery; one or two batteries, a battalion of infantry, and enough cavalry for patrols and messengers, would be a typical make-up.

Horse artillery accompanied by cavalry is eminently suited for this work, but unless an army were exceptionally strong in these arms they would be of more use on the flanks. Here detachments so constituted may perform a double service; they may do all that is outlined above, and also attempt to lead the enemy in a false direction. This is one of the few cases where dividing a battery may be good tactics. Swift and energetic, rather than powerful action is required; sharp attacks, from many points, in quick succession, may keep the enemy in doubt as to the force in his front.

All advanced parties will of course withdraw before any serious attack is developed, but skirmishers should be kept a few hundred yards ahead of the artillery positions, so that the artillery need not be distracted from its proper work to watch for local attacks upon its own lines.

By reason of their long range, heavy guns will be able to assist, from their main positions, in the later stages of the preliminary operations. These are usually placed near the flanks, both in order to deal with enveloping movements, and to cross their fire upon a frontal attack. They should be well dispersed, even batteries being sometimes divided. Their positions are more permanent than those of any other guns, and the telephonic communication may be more elaborated; and the high power of the guns permits their use with good effect. singly.

Unless a purely passive defense is contemplated, it is not advisable to open fire at very long range from the field guns in the main position. It is desirable to keep the

enemy in doubt as to the location of the batteries until he has come to fairly close quarters. No definite rule can be given as to the proper range, in yards, to be used; but perhaps it might be said that fire ought not to be opened, if it can well be avoided, at ranges over 3,500 or 4,000 yards.

Each battery should have its own sector of fire assigned as soon as the advanced detachments begin to find the enemy, and should remain in observation of all targets appearing in it, until some one of them comes to easy range, or until effective fire is opened from some battery within the sector. Enough batteries should be in observation to cover thoroughly with fire all probable lines of advance of the enemy; not more, as this would result only in disclosing more than is necessary of the position. The remaining guns constitute a temporary reserve, to be held limbered, ready for use as the enemy's plans become clearer.

This does not mean that there should be any hesitation in bringing batteries into action as soon as there is any need for them, whether they be in observation or limbered up. All are gradually sent into the firing line; there is no real reserve, as that term is understood in the other arms.

Usually this process will result in a general engagement with the attacking guns—the artillery duel. In this, the defense, although probably the weaker, may have a very good chance of success. The method of opening fire gradually and progressively, from concealed positions, may lead the enemy to underrate the force opposed to him, and to send his batteries into action before enough have been collected. In such a case, the defense might enjoy, temporarily, an absolute superiority, and beat the attacker in detail. In any case, he has the advantage of a carefully chosen position, occupied at leisure, and should be first in getting the range. If he can handle the enemy's artillery severely enough, the chances are that no infantry attack will be made.

It may often be to the defender's advantage, espe-

cially if he believes himself to be greatly inferior in artillery, to decline the duel, and save his strength for the infantry attack. With long-range guns and concealed positions, he may well succeed in holding the enemy at arm's length, never letting him get enough information about the position for a general engagement. The attacker may then, perhaps, conceal his own guns and play a waiting game—concentrate upon each battery as it is discovered, and finally force the defense to open fire all along the line to avoid being cut up in detail.

If this fails, or if he has not the time for it, he will, as we have already seen, have to send in his infantry. In the typical case, however, there would be an artillery duel, in some form or other, and the probable result would be that the defense would ultimately have to slacken or cease fire.

Unless the defense breaks off the duel prematurely, in order to induce the enemy to make a premature assault, the infantry will be getting under way before the duel approaches an end. The defense can not permit hostile infantry to maneuver unmolested under his guns, and so must assign certain batteries to fire upon it; he will use as few guns as possible for this purpose, however, for the enemy's artillery is still his most important target.

If the attack gains the upper hand in the duel, the defense must prepare to resist a determined infantry attack. It may or may not be necessary to move the batteries to avoid further loss in the mean time; but the artillery commanders now employ themselves in perfecting their dispositions for the next phase of the fight. Batteries are withdrawn from parts of the line where they are not likely to be needed, and a new mobile reserve formed, to be used as before.

The artillery has hitherto been the leader in the battle. As the attack progresses, it begins to come into action again: not now as the sole, or even the predominant arm, for it has shown itself unable to prevent an assault; but solely to assist the infantry in repelling that assault.

This being the task in hand, the advancing infantry will be the principal target; but it is not yet time to leave the hostile artillery entirely out of account. This is now turning a greater or less number of guns upon the point selected for the attack, and the defender should try to determine which are the batteries so directing their fire, and use some of his own guns against them.

The guns that have withdrawn from the artillery duel ought not to reopen their fire prematurely. Their target is to be the advancing infantry, and their object is to assist in repulsing its attack. If now they open too soon, the hostile artillery, not being yet compelled to protect its own troops from rifle fire, will be able to return with its whole power to the guns of the defense, and crush them. Both the artillery and infantry of the attack can then unite upon the unsupported infantry. There will have been two successive efforts at defense, each by only a part of the force, and each will have been overcome separately.

For these reasons, the artillery should hold its fire until the attacking troops come to rifle range. The guns of the attack will then be forced to divide their attention between the infantry and artillery, while at the same time the defender's fire is doubled in intensity.

It will be a delicate matter to come into action again, and much will depend upon the care which has been bestowed upon the preliminary reconnaissance. New positions will have to be used. The old covered emplacements will not usually command the ground over which the infantry attack is made, and the guns will have to move up, using direct fire and little or no concealment. Probably by this time the old emplacements will have been closely located by the enemy, so that the advantage of retaining them is minimized.

Besides, by coming into action in a new position, the element of surprise is introduced. A cannonade from an unsuspected quarter, especially if a cross fire can be brought to bear, should have a stopping power entirely disproportionate to its volume.

As the direction of the attack becomes clearer, more and more guns should open, until, by the time it has fully developed, all are in action. And, as the decisive moment approaches, every gun should fire upon the infantry alone, neglecting the hostile guns.

Each gun is, as the phrase goes, "its own reserve." That is to say, its maximum rate of fire is seldom used, and a battery can at almost any time double its rapidity. But at the crisis of the attack, this reserve, with all others, is thrown in.

If the attack is repulsed, the defender will usually try to take the offensive in his turn, and the guns will act as already indicated for pursuit.

If the attack is successful, a counter-attack will be attempted. In this, the artillery has, first, to hold in check the hostile batteries and prevent their advancing to the position; and, secondly, to turn such guns as it may upon the penetrating infantry. The enemy will probably press his infantry strongly into the breach, and if, at the proper moment, a rapid artillery fire at short range be poured into the flank of this mass of troops, the effect will be destructive in the extreme.

When the enemy's success bids fair to be more than a local one, the commander-in-chief will try to withdraw some of his guns in time to establish a rallying-point in rear. Such as are not ordered back cover the withdrawal and continue to make an unshaken stand. A withdrawal will be a difficult matter after the infantry assault is well advanced, and can be successfully made only if the ground is favorable. As for the guns that remain behind, it may be possible to save them, or a part of them, if a temporary success can be gained; if they are lost, the loss under such circumstances is to the credit of the *personnel*. The old Drill Regulations say, "the loss of well-served guns in the defense of a position, or in close support of the other arms, is honorable."

In covering a retreat, the duties of artillery are obvious. Its most dangerous enemy is artillery, or especially horse artillery accompanied by cavalry. Its mission

is to gain time, so that order may be restored and a rear guard formed. This it will naturally do by falling back slowly from position to position, moving by echelon, and holding the enemy by its fire whenever possible.

A few words concerning artillery on the march may well be added here.

Two considerations determine the position of artillery in an advancing column. It must be near enough the head to be quickly available when needed, but not near enough to risk being caught in column of route by hostile artillery fire.

These requirements evidently need careful balancing. Under present conditions, artillery caught in column of route within 4,000 yards of a hostile battery would be very roughly handled. The infantry, then, must provide the artillery with a sufficient maneuvering zone to avoid this risk, and a part of the guns should march as near the head of the main body as is consistent with this requirement.

As a long column of guns would be very vulnerable in flank, it should be broken by bodies of infantry placed between units. Many guns will thus be left far from the front, and the artillery must overcome this disadvantage by being prepared to cover considerable distances at a rapid gait. Every effort should be made to clear the roads for it when it is needed at the front; the Germans provide for this by having a special bugle-call, "Bear to the right (or left)," included in the drill regulations of all arms. But artillery commanders in rear may themselves push ahead when they expect to be needed, without waiting for orders, going across country if the roads are not cleared for them. This must, of course, be done with judgment; but on many occasions great results have been obtained through timely pushing ahead by enterprising artillery commanders.

This all applies, of course, to large units of artillery, marching with the main body. In a force of some size, however, say a brigade or more, a small amount of artillery can be moved up into the reserve of the advance

guard without undue risk. Its action there depends upon the object in view.

Some writers favor its being dispersed widely, covering as broad a front as possible, with the idea of deceiving the enemy as to the force and intentions of the command. Others prefer that it be kept well in hand, in order to facilitate control over it, and also to allow reinforcing batteries to come into line with it without mixing tactical units.

If it be necessary to brush aside a weak opposing force, the advance guard artillery will go in as close as possible before opening fire; the advance guard commander should be pretty certain of his ground before ordering this, however. If the object be simply delay, the artillery opens at longer ranges, firing slowly and holding back the leading elements of the enemy.

If there is any chance of a general action following, the advance guard artillery takes care so to select its positions as to facilitate the deployment of the guns of the main body.

In a retrograde movement, the artillery of the rear guard has a difficult task, in that it must remain in position long enough to let the main body get on, but not long enough to become seriously entangled itself. In general, the rear guard will be stronger in artillery than an advance guard of the same size; and the guns can act on'y by retiring in echelon from one position to another. Occasionally they might get an opportunity for a brilliant success by waiting in a concealed position well out on a flank; but such an undertaking is risky, and could not often be attempted.

The guns of the main body are widely separated from those of the rear guard, pushing on for positions in rear. If the commander still hopes to make a stand, he must get his guns in position somewhere as soon as possible, and rally his infantry under their protection; if he is not in a position to risk a fight, he has nothing for them to do, and will get them out of the way as fast as possible, clearing the roads for the rest of his force.

In a flank guard, mobility is the great essential. The

guns form in two groups, and, if a fight is forced, take successive positions facing to the flank; the group in rear limbers up at the proper moment and passes the other. This is a dangerous proceeding, and the route to be followed requires some consideration.

Guns would be assigned to an outpost only in a large force. They usually remain with the reserve, but in special cases go farther forward. Such cases might occur if the outpost were one thrown forward to hold ground on which it was intended to fight a general action; or if a defile, through which any attack must come, were within range; or if favorable positions for the enemy's guns were observed beyond rifle range of the line.

Outpost duty is extremely wearing on artillery, since the horses must remain in harness; this causes rapid deterioration, which no amount of care can prevent.

SUMMARY 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 VII.

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 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 with a large proportion 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. 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.* In discussing the Japanese success at Mukden, Taburno says that their victory was not due "to the fighting or numerical superiority of their army, or their skillful plan of operations, but to their knowledge of our psychology."** 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 defens-

*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."

**"The Truth about the War."—J. Taburno, p. 112, et seq.

ive 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 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.*

Increased accuracy and range of small-arms have greatly diminished the chances of success in a frontal attack; the comparative invisibility of the firer, due to the neutral color of his uniform and the use of smokeless powder, also adds materially to the power of the defensive. Without superiority of fire, we may consider the frontal attack as impracticable, but frontal attacks are not impossible, as has been recently demonstrated by the Japanese in Manchuria. To be successful, the assailant must gain superiority of fire and be willing to pay the price of victory. In an attack all along the line, this superiority of fire is impossible unless the assailant greatly outnumbered his adversary; and even then many of the advantages of the initiative are abandoned. The frontal attack made by General Grant at Cold Harbor (June 3, 1864) is an undeniable blot upon the reputation of that great command-

*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.

er. The result was a repulse with terrible slaughter, while the losses of Lee were insignificant. General 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."*

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-

*"Memoirs," Vol. II., p. 276.

attacks.* The neutral color of the uniform which hides the firer on the defensive, at the same time inures to the advantage of the offensive in concealing turning movements.

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 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 both 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,

*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.)

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 left (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. 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 rencounter 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.

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 bat-

tle 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 communication with Paris and effect a junction with the army of MacMahon, 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 MacMahon.

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 the other flank 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.”

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 reli

*Jomini’s “Art of War” (Mendell and Craighill’s translation), p. 187.

**See the “Service of Security and Information.”

able 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 intention 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 opening fire 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 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 for commands which are scattered, or larger than a division, the written or telegraphic order will be the rule.

There are good reasons for adopting an almost invariable model for orders. In this way information may be so grouped that the eye will instantly detect any omission.

In orders prescribing operations, the Field Service Regulations, U. S. Army, 1905, recommend the following sequence:

1. Information concerning the enemy and our other troops in the vicinity.
2. Intentions of the commanding officer.
3. Duties of the various fractions of the command.

4. Orders for baggage trains, ammunition columns, and field hospitals.

5. Location of the commander at the beginning of the operation; also, when necessary, place for delivering messages.

Such information is published to the command in orders in a separate series under the caption of "Field Orders."

The following model may be taken as an illustration of an order for attack:

Field Orders
Number ().
(*)

Official designation of issuing officer's command.

Place, Date, Hour.

1. *Detailed information of the enemy* and of our supporting troops.

2. *Plan of the commander* (usually indicating a flank to be attacked). The advance guard is now informed that its functions as such have ceased.

3. *Disposition of troops.*

(a) *Orders for the artillery*, (first position, first target, generally the hostile artillery).

(b) *Orders for the infantry*, (indicating the general means to be used in the secondary attack, specifically the direction and objective of the main attack; name of the officer charged with the main attack).

(c) *Orders for the reserve* (giving troops and position).

(d) *Orders for the cavalry* (usually in force on one flank, while the opposite flank is covered by patrols).

4. *Orders for the ammunition wagons* and for the ambulance company section (when early provision can be made).

5. *Orders for the heavy baggage.*

6. *Place of the commander* (usually near the first position of the artillery).

Manner of communicating the order.

Signature.

*The distribution of troops is not given in the margin of this order as it already appears in the order of march. Ordinarily the

Orders should be brief, not couched in uncertain terms, and should not trespass on the province of the subordinate. If the subordinate officer 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 occasion (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."*

Taburno says of General Kuropatkin that he was not content unless in active command of troops, and frequently led independent operations in person, thus reflecting on the competency of his subordinate commanders.**

THE COMMANDER.

The position of the commander on the field of battle cannot be prescribed. He should be so located that he can receive promptly messages from any part of the field and thus retain control. Owing to the vast extent of the modern battle-field, it is impossible for the commander to view in its entirety the field over which his command is operating. The improvement in field communications renders this view no longer necessary. The telephone and

distribution of troops is shown in marching orders only, but it may be convenient to write in the margin a list of the troops employed.

*"Memoirs," Vol. II., p. 214.

**"The Truth about the War." p. 109.

telegraph keep him in immediate touch with his subordinate commanders. Staff officers and reliable aides keep him informed of the operations of portions of his command with which he is not in close communication. These officers may, or may not, be given discretionary powers 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 aides 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 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

*"Memoirs," Vol. II., p. 225.

**"Battles and Leaders of the Civil War," Vol. IV., p. 708.

the orders of the 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 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 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 Hocker, being disabled at the Chancellor house, left the front of the army without notifying his second in command, General Couch, 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 MacMahon 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 MacMahon. 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.

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. It must be observed that there is a difference between the general reserve of a great army and the "main reserve" or "third line" of a smaller body.

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 action. To hold it unemployéd 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 withhold- ing 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 the Confederates were exhausted by the struggle against Sumner and Hooker on their left and Burnside on their right, McClellan had in reserve the corps of Fitz-John Porter, numbering 12,000 men, which he might have hurled against Lee's 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 his last chance of victory 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

*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 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 *preparatory stage*, the *decisive action*, and the *completion*, the last including occupation of the position, the *pursuit*, or the *repulse*, and consequent withdrawal of the assailants.

The Preparatory Stage.—While making its reconnoissance, the advance guard endeavors to drive back the enemy's advanced troops covering his front. The first serious resistance which will be encountered will be from his advanced posts which he will have established to mislead and delay the attack, and some of which he will have occupied with guns. Owing to its mobility and its position near the head of the column, the artillery of the attack will be the first arm to arrive from the main body. It will open fire upon such of the enemy's advanced posts as may have been located by the advance guard, and by concentrating upon each in turn a superiority of fire will force their abandonment, and thus eventually develop the enemy's main line of defense.

During this reconnoissance by the artillery, the infantry of the attack is making its deployment and advancing. Formerly, the infantry waited until the opening of the artillery duel before making any considerable advance against the hostile position; but now, owing to the great range of the modern field piece, the infantry must advance within dueling range during the preliminary reconnoissance by the artillery. The former will thus engage the advanced infantry of the defense and a succession of minor engagements will ensue, these, in a battle of great magnitude, lasting for days. The infantry of the attack will endeavor to gain all positions reconnoitered

by the artillery, entrenching itself as soon as possession is gained.

During this phase of the action, the cavalry of the attack, which has been reconnoitering far to the front and engaging the enemy's cavalry, clears the front. It continues its reconnaissance, endeavoring to locate the enemy's flanks, protects the flanks from attack by the hostile cavalry, and maintains a mounted reserve in rear of the attacking force, which can be sent rapidly to any portion of the field to fill gaps in the line of battle, or to reinforce the infantry against counter-attack.

The artillery now enters the duel, during which, by concentrating its fire upon the hostile batteries, it devotes its efforts toward silencing the enemy's guns. All of the artillery of the attack now comes into action, some of the batteries assisting the infantry in its continued advance. The infantry will now work its way from one point of support to another, intrenching after each advance until it finally reaches a point from which it can face the enemy in his main position at sufficiently close range to hold him there. The fire of the artillery and the advance of the infantry should be so conducted as to develop gradually the enemy's position, disclose the weak points of his line, and force him to send in his reserves.

The Decisive Action.—The enemy's line having been developed and the point of attack having been decided upon, the artillery must be placed in such a position as to bring to bear a most intense fire upon this point, and support the infantry assault, at the same time keeping down the fire of the enemy's guns. Under the protection of this fire, the troops engaged in the assault begin their final advance. One reinforcement after another is now sent forward at the decisive point, not only replacing losses, but each by its arrival pushing the firing line nearer to the enemy's position. While the decisive action is in progress, the troops at other parts of the general line make vigorous attacks, except such as have orders to act as a containing force; thus, if the principal attack should fail, success may still be achieved at other points. The approach of the reinforcements should be so timed and

conducted as to escape the observation of the enemy, and the body of troops which is to deliver the decisive stroke should be in full vigor at the time of conflict. When the infantry has advanced near enough to the position to be able to reach it in one more dash, the attack finally culminates by the entire first line being merged in the firing line, opening a rapid magazine 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.

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.

For a sustained effort in the decisive action, the troops must be so arranged that reserve after reserve can be pushed to the front. As long as there is a chance of success, the commander-in-chief should not hesitate to utilize his last available man for a final effort.

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 a third line (which should still retain its formation), to occupy the captured position without delay, furnish a cover behind which the first and second lines may be re-formed, and repel a counter-charge. The artillery is also rushed forward into the captured position, where it takes the most advantageous position for repulsing a counter-attack, and to fire on the enemy's artillery covering his retreat. Thus at St. Privat, the Germans,

after driving the French from the position, occupied it immediately with 138 guns. Strong points will be occupied, all available cover being utilized and hastily improved; shelter trenches will be constructed, and a portion of the forces will establish itself in a temporary defensive attitude as quickly and as strongly as possible. As long as there is danger of an offensive return, strengthening of the position must continue. 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.

The Pursuit.—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 all available troops and 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 question 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.

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.

SUMMARY.

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.
- IX. Keeping a formed body of troops in hand for the occupation of the position, to conduct the pursuit, or to cover the withdrawal in case of repulse.

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 untrained to be 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.

Whatever the reason for adopting a defensive attitude, it certainly involves the disadvantage of loss of initiative. A partial compensation may be found in an efficient system of observation and of rapid transmission of intelligence, ample reserves free to move to the threatened point, and strong rallying positions in rear of the line of defense.

The troops for defense will be generally divided into two principal parts: one for occupation of the intrenchments, including local reserves; the other the general reserve for reinforcing parts of the line and for the delivery of the decisive counter-attack, or of the offensive return.

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 front covered by a river is not generally to be recommended. It will, to be sure, usually afford complete protection 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, Villeroy had "paralyzed half his army" behind the Anderkirch and Gette rivers, and was unable to use it when Marlborough 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 McClelland 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

*For a description of these obstacles, see Beach's "Manual of Military Field Engineering."

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 position 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.

The experiences of the British in South Africa tend to show that about one man to a yard of front will be sufficient. With the dispersed formation of the present day, and the increased range of modern firearms, fewer men will suffice to hold the same extent of ground than formerly. When the strength of the defense and the attack is spoken of, it must not be forgotten that nowadays strength implies amount of fire rather than number of men.

In a close country this number would undoubtedly have to be greatly increased. 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

*Official Report of General J. D. Cox, Commanding 23d Army Corps.

remaining portion of the line is occupied with small, unimportant detachments."

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.

All lines on the defensive should be strongly intrenched. The reverse slope of a hill affords no protection against modern artillery fire. If time permits and no adequate natural cover exists, covered approaches should be constructed so as to allow the reinforcement of the firing line without exposing the reinforcing troops to hostile fire.

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 counter-stroke. 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 instructed 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 Fredéricksburg 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

*Webb's "The Peninsula," p. 100.

**"Battles and Leaders of the Civil War," Vol. III., p. 97.

returns; but they must not constitute obstacles to the free movement of troops within the position. Fulfilling this condition, 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.

Commanding ground from which the enemy can look into or even enfilade a part of the position is highly dangerous for the defense. Salients in a position, if exposed to concentrated artillery fire, are a source of weakness.

In order to conceal the main position as long as possible, advanced lines may be established in front of or beyond the flanks of the main trenches. They serve to prevent reconnaissance, force the enemy to make a premature and perhaps a false deployment, and may cause him to come under the fire of the main position unexpectedly. The retreat of this screen must not mask the fire of the principal position. Ranges should be measured and marked, and the troops made familiar with the distances.

The Ground in Rear of the Position.—The ground in rear of the position should have sufficient depth for the reserves, for the general reserve, for the mounted troops, and should offer a series of good defensive positions which could be taken up in the event of retreat; 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.

*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."

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. General 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 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 possess the following requirements:

- I. Good view to the front, the flanks, and in the position itself.
- II. Clear field of fire to the front and flanks from commanding ground if practicable.
- III. Extent suited to the size of the command.
- IV. Location such as to make the enemy attack or abandon his advance.
- V. Ground in front, such as will impede progress of assailants, but without cover against fire and unfavorable for intrenchments.
- VI. Concealment from view of the enemy and shelter from his fire for all of the defender's forces.
- VII. Flanks resting on ground either naturally strong, or capable of being made so artificially.
- VIII. Sufficient depth of position and good communications laterally and to the rear.
- IX. Favorable conditions of ground for assuming the offensive in the decisive counter-attack.

- X. Water of good quality in sufficient quantity for the need of the troops.
- XI. Line of retreat running straight to the rear and behind the center of the position. In case a flank position parallel to the enemy's line of advance is assumed, the flank nearest to the enemy should rest on an impassable obstacle and the ground should permit of a line of retreat perpendicular to the front for some distance in rear of the position.
- XII. The terrain should be adapted to the action of that arm in which the defender is proportionately strongest or superior to the enemy.

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.

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.

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.

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.
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

*See "The Service of Security and Information" (third edition), p. 215.

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.

FORMULATION OF THE PLAN OF DEFENSE.

As in the offensive, the information in regard to the movements and probable intentions of the enemy is gained by reconnaissance, 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 reconnaissance 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.

The following model serves as an illustration of an order for the occupation of a defensive position.

Field Orders
Number ().

Official designation of issuing officer's command.

Place, Date, Hour.

1. *Information of the enemy and of our supporting troops.*

2. *Plan of the commander, (position to be defended; formal dissolution of the order of march).*

3. *Disposition of troops.*

(a) *Orders for the artillery, (position, target, and amount of intrenching).*

(b) *Orders for the infantry of the first line, (division of front*

into sections and assignment of troops, amount of intrenching).

(c) *Orders for the reserve* (troops, position).

(d) *Orders for the engineers* (defensive works, bridging to be done in the rear).

(e) *Orders for the cavalry* (usually covering the most exposed wing with the main force, patrols being principally employed on the other flank).

4. *Orders for ammunition carts,* and field hospital.

5. *Orders for the heavy baggage.*

6. *Place of the commander.*

Signature.

Manner of communicating the order.

The defense consists of the *preparatory stage*, the *decisive action*, and the *completion*; the last includes the *counter-attack* or the *withdrawal* from the position.

During the preparatory stage, bodies of cavalry are used incessantly in scouting and in driving back reconnoitering parties of the enemy. As soon as the main line of the enemy's advance becomes known, the cavalry will clear the front—a portion with horse artillery taking post near the flanks to discover any attempt on the part of the enemy to conduct a turning movement, or ready to attack the flanks of the enemy should occasion offer. The main portion of the cavalry with horse batteries is assembled with the general reserve in rear of the line to prevent reconnoissance, to protect the flanks, or to join with it in a counter-attack or to cover a retreat.

In the preparation for the main attack, the enemy of necessity will first assail the advanced posts which have been occupied for the purpose of checking him and concealing the true defensive line. It is in the reconnoissance of these advanced posts that the hostile batteries will first come into action. If it has been decided that the artillery of the defense is to engage in the duel, fire will be opened on the enemy's guns at this stage by batteries designated for the purpose. As a rule, the guns in the main line of defense are not brought into action until the general features of the attack are developed, only such

being employed as may be necessary to assist in the protection of the advanced posts, in order to avoid betraying the nature and extent of the true position, and to compel the enemy's infantry to deploy early in the action. Any advance of the hostile batteries must be opposed by the guns of the defense, fire being directed at the advancing echelon as well as keeping down the fire of that remaining in position. As soon as the points of concentration of the enemy's artillery are known, the reserve batteries of the defense are brought up and a converging fire is opened upon them.

Should the artillery of the defense decline the duel, the batteries will not open fire unless especially favorable targets are presented, such as artillery in motion within effective ranges; although designated batteries must open fire upon the enemy's infantry columns whenever they appear.

The advanced troops, when compelled to withdraw, should retire along designated routes, which would be so located as to prevent masking the fire from troops in rear.

The Decisive Action.—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 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 general reserve 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 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 rencounter; 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 posi-

*See "The Service of Security and Information," Chapter IV.

tion. The night of November 15th was accordingly fixed upon; but a snow-storm 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.*

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 column 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

*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; 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.

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.*

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 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.

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

*General Griffin, in a paper contributed to the Massachusetts Historical Society, quoted by General Humphreys in "The Virginia Campaign of 1864-65," p. 217.

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.

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. In Manchuria, the Japanese habitually made movements of troops by night in order to reinforce the advanced lines or to bring up reserves from the rear, thus utilizing the darkness to cross zones which in daylight would have been impassable.

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 VIII.

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 transport 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 escort wagon, drawn by four mules, is the standard means of transportation.* Being of light construction, it is 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 better be 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.

*Field Service Regulations, par. 396.

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. 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 to two and one-half 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, diamond,* oval, or circle.

*See Field Service Regulations, 1905, par. 570.

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 2 infantry soldiers for every wagon, 1 mounted soldier for every 8 wagons, and 1 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 25 cavalry may be assumed as the smallest allowable escort for a train of 50 or 60 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 probably 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

*Furse's "Military Transport," p. 264.

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. 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 ob-

servation, 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 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 ar-

rangements 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 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 around. 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 corralling. 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 lines 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, 37 of which were loaded with money.*

THE ATTACK OF CONVOYS.

The most favorable time for attacking a convoy is when it is passing through a wood, a defile, or over a bridge; when it going around a sharp bend in the road, when ascending or descending difficult slopes, or passing over bad pieces of road; when the convoy is beginning to form corral; when the teams are being watered; or whenever the conditions are such that the escort cannot take rapid measures for defense. The assailant should endeavor to surprise the convoy while it is in a difficult situation.

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 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

*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.

**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-

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 1 infantry soldier to every 10 prisoners; cavalry being added to the escort, if practicable, in the proportion of 1 trooper to every 10 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 size, preferably 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

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.

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

*The British in South Africa and both the Russians and Japanese in Manchuria successfully employed armored trains for their convoys by rail.

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 an 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 convoyed 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 developed on troops, especially on rivers and canals in dangerous dis-

tricts, 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.

CHAPTER IX.

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 power 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 gunpowder 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. 7.)

Figure .7.

Ballalion 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 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 8 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 8, 9, and 10 show the manner in which Frederick's army habitually encamped

*Grivet says that Frederick's infantry soldiers were able to fire six shots a minute ("Etudes sur la Tactique," p. 19). Considering the musket then in use, this seems incredible, though they certainly fired with a rapidity never known before.

Figure 8.

Fredrick's Army in Line of Battle or Encampment.

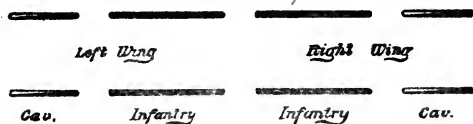


Fig. 9. *Marching by the Flank*

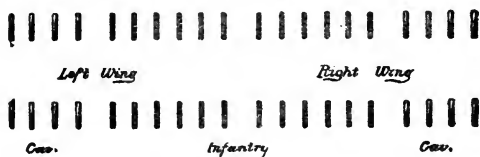
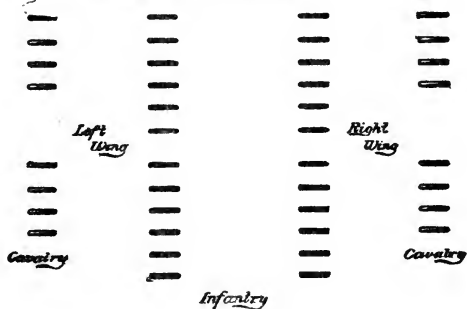


Fig. 10. *Marching to the front*



in two lines and marched in two columns by the flank, or in four 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 fire-arm. 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 harass 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 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 intro-

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

duction 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 Méné-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 discipline, 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 ad-

*Although the American Revolution presented the first instances of the practical employment of skirmishers, their extended use had, it is claimed, been advocated by Méné-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," Chapter IV.

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

mitted 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

Figure 11.

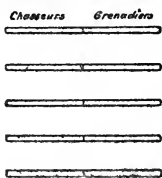
Battalion in Column

Figure 12.

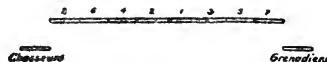
Battalion in Line

Figure 13.

Skirmishers*Demi-Brigade in Battalion Columns*

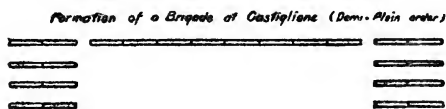
covering the entire front with a chain of skirmishers. Each company was formed in three ranks. (See Figures 11, 12, and 13.)* When the battalions were formed in two

*Figures 11 to 19, inclusive, are from Grivet's "Etudes sur la Tactique."

lines, those of the second were opposite the middle of the the intervals of the first.

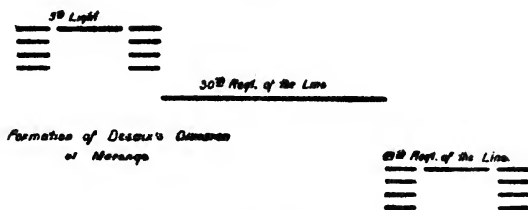
This system (known as the French, or perpendicular, tactics) was habitually used in Napoleon's earlier campaigns. At Castiglione the demi-brigades of Masséna's division were each formed with the center battalion deployed and the flank battalions in column by division. (See Fig. 14.)* At Arcola, Augereau used the same forma-

Figure 14.



tion. 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 Masséna's had been at Castiglione, and the second deployed. (See Fig. 15.) 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 15.

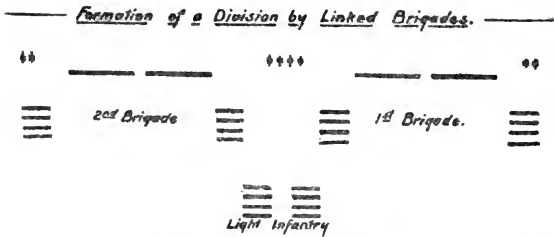


In 1805 Napoleon made some important changes in the organization of his army, instituting the army corps, and substituting for the demi-brigade the two-battalion regiment. The brigade consisted of two regiments; and

*At this time the number of companies in a battalion had been reduced to 8.

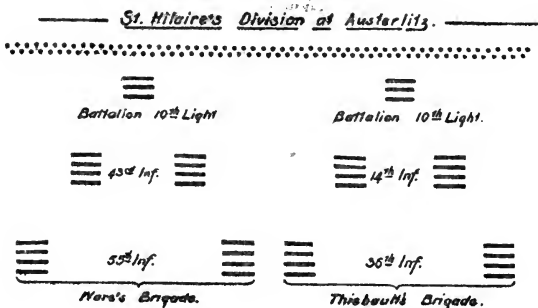
the division, of two brigades and a regiment of light infantry. The "perpendicular" system of tactics was now at the height of its perfection. Recognizing the difficulty of effecting the passage of lines in action, and desiring that the reinforcement of the first line by the second might not cause an 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 16.)

Figure 16.



At Austerlitz, St. Hilaire's division was formed for assault as shown in Figure 17. Soult's other divisions, as well as those of Bernadotte, were similarly formed.

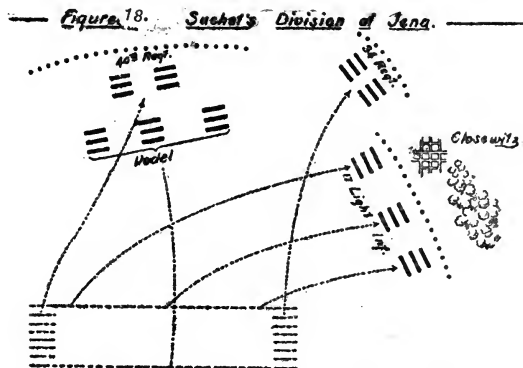
Figure 17.



In 1806, in the period between the campaigns of Aus-

terlitz 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 Figure 18, 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 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 columns, each consisting of a division in a column of battalions, each in close column by division.** In the meantime the Russians had

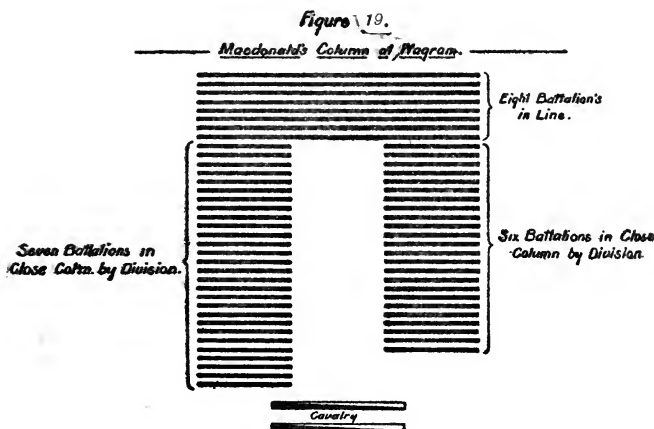
*At Marengo the French numbered less than 30,000; at Wagram they numbered 150,000.

**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).

ORGANIZATION AND TACTICS.

begun to imitate the successful French tactics, and in this battle their tactical formations were actually superior to those of their opponents; Benningsen forming his divisions after the manner of Masséna 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. 19.) This column broke the Austrian line, though at the cost of enormous losses on its own part.



In the Russian campaign a return was made to 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 forma-

tions, 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.*

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-

*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 General 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 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.

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 Peninsula 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 re-formed 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 Masséna'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 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

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

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 Davout 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 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

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

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 60 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 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

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

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 tactics. 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.

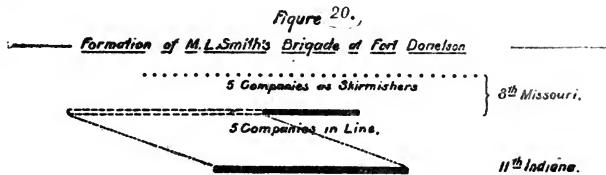
The War of Secession.—The War of Secession, celebrated for its long duration, its stubborn battles, and its enormous loss of life, is also remarkable as a turning-point of tactics, there being scarcely a feature of the tactics of the present day that did not have its germ, its prototype, or its development 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 fire-arms 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.

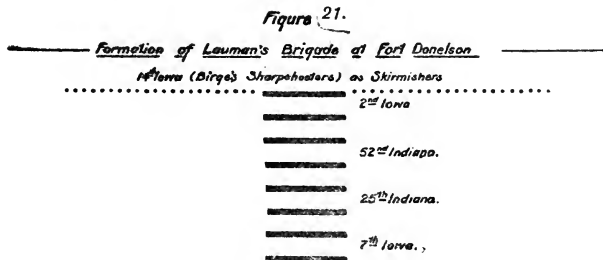
The first instance of attack by rushes was at the battle of Fort Donelson, February 15, 1862. General Morgan L. Smith's brigade, consisting of the Eighth Missouri and Eleventh Indiana, was formed for attack with both regiments deployed, the former in front and preceded by five of its companies as skirmishers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

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

emy's position was carried with but slight loss. (See Fig. 20.)



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 Fig. 21.)

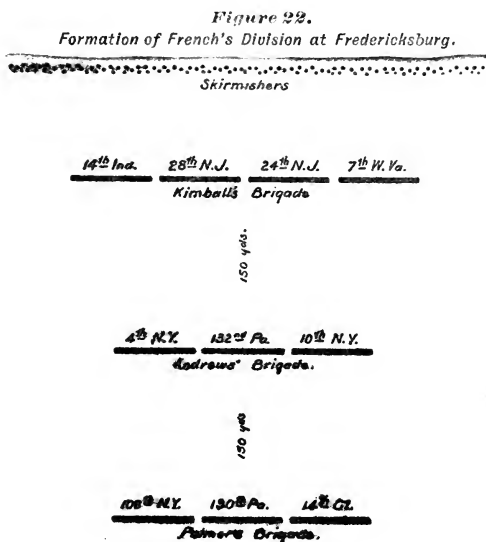


This attack succeeded also, but with a loss of nearly twice as many men per regiment as Smith's brigade incurred.

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 22.) Han-

cock's division, in this battle, 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.

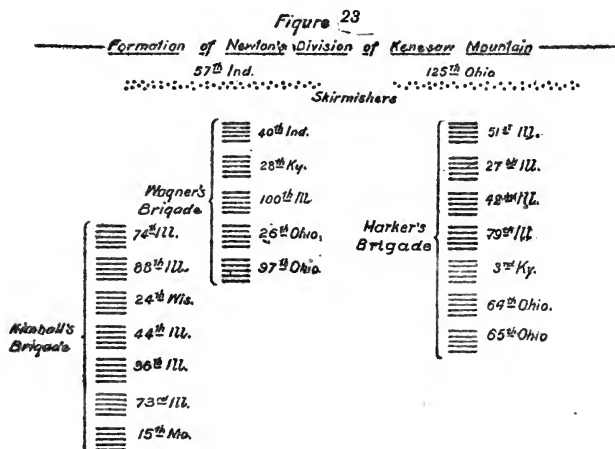
Though the attack formations varied considerably in matters of detail, the following may be given as the one



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, infre-

quently 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 23. Seven of the eight regiments composing Harker's brigade were formed one behind another, each in close column by di-



vision. At a deploying interval from Harker, five regiments of Wagner'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 irregu-

larity 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 makè 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 enormous losses, though temporarily successful in the latter instance.

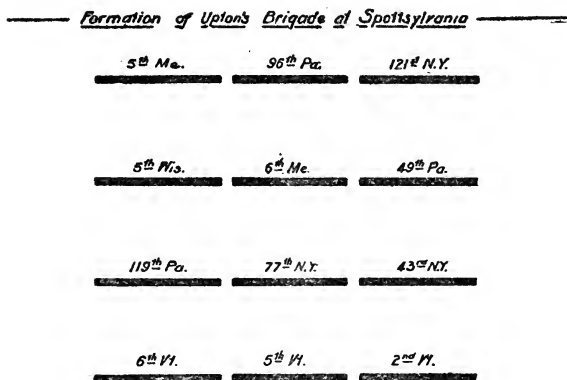
In the attack of Hancock's corps on the Confederate position at Spottsylvania, Barlow's division was formed in two lines of masses, each regiment in close column by division. Brooke's and Miles' brigades in the first line, Smyth's and Brown's in the second. Birney's division was formed in two deployed lines on Barlow's right. Mott's

*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."

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 24. The result of this charge also shows the inevitable mingling of successive lines whenever stubborn resistance is encountered. The 121st New York and

Figure 24.



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 await 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 mella. 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. Even the skirmishers were in the habit of rolling logs together, or of making a lunette of rails with earth in front to cover their bodies.** In many cases the intrenching was done while the troops were under heavy fire.*** At Mud Creek, Georgia.

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

**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 bom-

June 16, 1864, Baird's division, in a comparatively open field, intrenched itself under fire within 400 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 battalions 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

bardment 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."

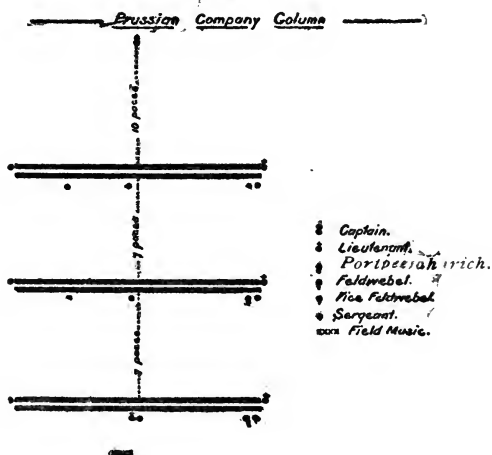
*"Battles and Leaders of the Civil War," Vol. IV., p. 409.

**The Prussian company consists of 250 men, and the battalion is composed of four companies. In 1866 the Prussian in-

with much disorder and a melting away of the columns designed for 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.*

fantry was formed in three ranks; but the company column consisted of three platoons of two ranks each, as shown in Figure 25. The captain's position was in front of the first platoon. The lieu-

Figure 25.



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 *port-befehlrich* 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.

*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:

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 Prussians 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

“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.

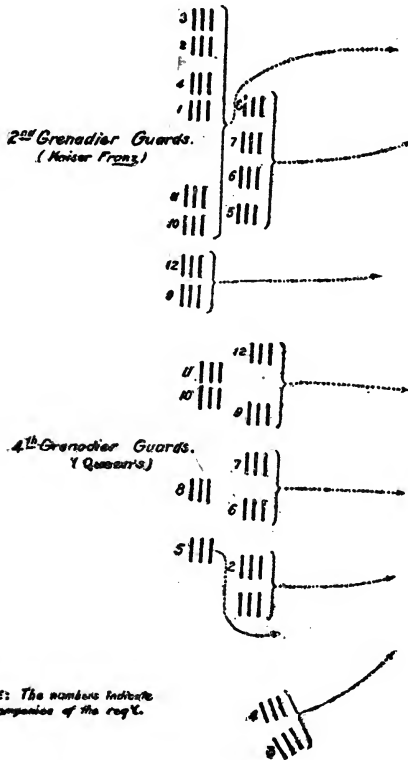
“Marching upon the enemy, be careful, then, whatever happens, not to halt to reply to his fire. The time thus lost will cause the attack to fail and will lead to disorder. In a critical moment, on the contrary, always accelerate your march. . . . If circumstances require that you should wait firmly a 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.

company columns in the first line, and 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 26.) The attack by the Kaiser Franz

Figure 26

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



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

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 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 direc-

tions, 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."

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 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

The three platoons constituting the company column were termed "*züge*," 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.

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 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 state-

*Boguslawski.

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

ment 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.

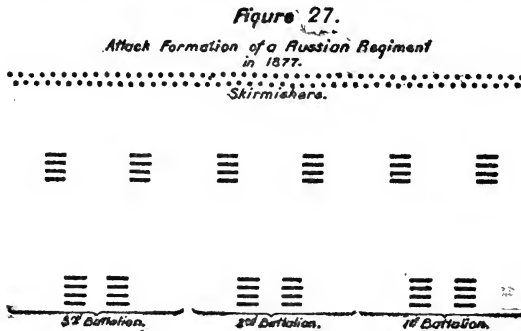
The Turks, armed with the Peabody-Martini rifle, a weapon vastly superior to any heretofore used, were able to pour out upon their adversaries a fire of unprecedented severity; while the adoption and development of the American system of hasty intrenchments gave them, at the same time, a shelter from 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 Prussian 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.

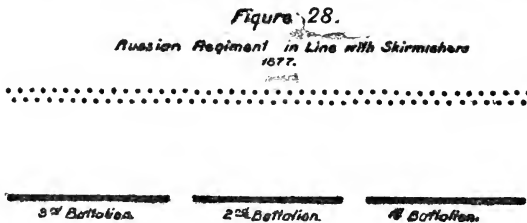
*"Russian Campaigns in Turkey," p. 422.

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

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 440 paces. (See Figure 27.)



Another formation 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 28.) "In no instance, however, does it appear that

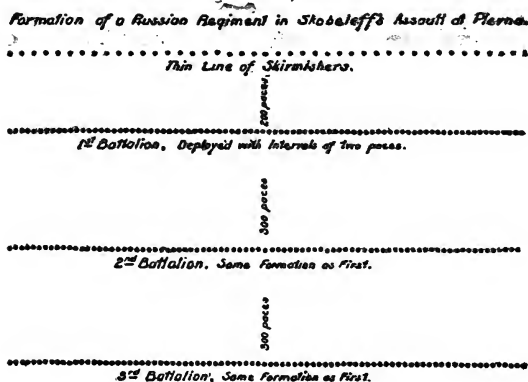


there was more than one line of skirmishers; behind them the troops marched with dogged bravery, in solid line of two ranks, shoulder to shoulder, or in company columns with platoon fronts, far inside the line of rapid effective fire; and they continued this march until the fire caused a break in their 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 2 paces, and the distance between battalions being about 300 paces. The leading battalion deployed its rifle company 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 29.)

Figure 29.



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

The experiences of the British in South Africa and of the two great contending armies in Manchuria have but confirmed the contention of Skobelev. The broad principles which govern infantry attack formations remain unaltered. Dispersion combined with depth are these four-

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

***Ibid.*, p. 450.

dations—dispersion so as to offer a minimum target to the enemy's fire and insure elasticity—depth to allow of a constant stream of reinforcements to fill up gaps in the front line. But it is in their application that these principles have undergone a change to the extent of wider intervals between the skirmishers and greater distances between the successive lines.

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 no longer appear in the forefront of the action.

CHAPTER X.

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.

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

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 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 musketeers, 20 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 20 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 cav-

alrymen, 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 70 men each, grouped them into regiments consisting 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 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 battle-field. 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.

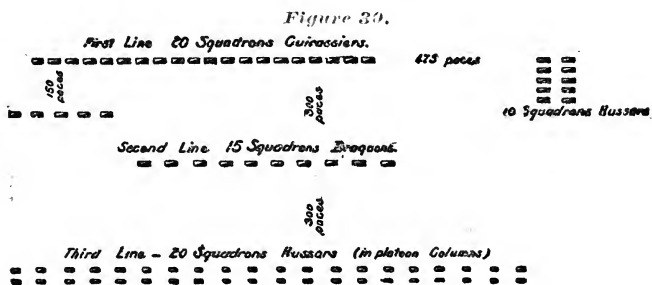
The greatest care was taken in the instruction of the recruits and the training of the horses, and the cavalry was brought to such a state of perfection that it is said that 8,000 or 10,000 horsemen could charge together, boot to boot, for many hundred yards, halt in perfect order, and immediately begin a new charge. Frederick also introduced the formation from column 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 70 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 10 paces between squadrons, and the second composed of dragoons, with intervals of 60 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. 30.)

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 reform 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, dismounted, 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 70 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 keep-

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

ing the 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 musketoon. 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

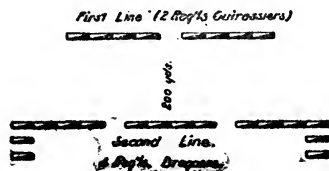
which there were four corps of reserve cavalry, under Murat. This enormous force, aggregating 80,000 sabers, and constituting one-sixth of the entire army, consisted of cuirassiers, dragoons, lancers, and chasseurs à cheval, all in a high state of efficiency, resulting from the experience of many campaigns.

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 50 or 60 paces. Murat habitually formed the reserve cavalry for attack with two regiments of cuirassiers in the first line, with an interval of about 12 paces; four regiments of dragoons or chasseurs in second line, about 200 yards in rear of the first, three regiments being in line, with intervals of about 18 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 played 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. 31.)

In the battle of Eckmühl, April 22, 1809, the reserve cavalry was formed with sixteen squadrons of Würtem-

Figure 31.

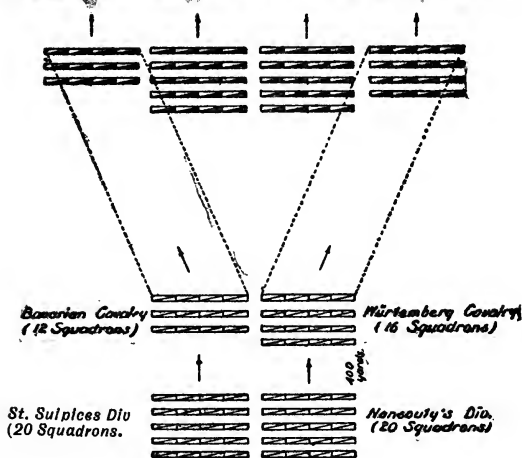
— *Murat's habitual formation of a Division of Reserve Cavalry.* —



berg and twelve of Bavarian cavalry in the first line, each body formed in column of deployed regiments. At 400 yards 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 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 Figure 32.)

Figure 32.

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



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 18 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.

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, 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

*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.

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 *mellay* 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 *mellay* consisted of a prolonged and desperate contest of steel against steel. The 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 4 guns to every 1,000 cavalry.

*Letter to the Minister of War in 1811.

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

***Thiers.

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 tight'y 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, 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.

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

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

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, 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

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

**De Brack (translated by Carr), p. 328.

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 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

*"The War in the Crimea." p. 76.

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"; each regiment was given two additional troops; 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 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

*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,"* p. 29.

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 4 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 unequaled.

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 1,000 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 90 men and gained about 300 recruits on the raid.

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

When Sherman began his campaign in Georgia, in 1864, his communications from Louisville to Chattanooga, a distance of about 335 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, 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 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

*"Memoirs," Vol. II., p. 52.

***Ibid.*, p. 30.

****Ibid.*, p. 141.

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 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

*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,"* p. 81.

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

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

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 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

*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.

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 (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 reconnaissance, 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.

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

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

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.

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

*In a letter to the author, General J. H. Wilson says: "I think you are in error in a statement that 'as the cavalry improved more and more reliance was placed by it on the saber.' I should say that just the reverse was the case. At the outset the saber was everything; at the end it had found its true place for occasional use only." The views of General Merritt and General Wilson on this subject are diametrically opposed. Each of these distinguished commanders had long and varied service in the handling of cavalry, and each doubtless expresses the result of his own observation and experience.

the Confederate infantry, the first cavalry division capturing in the three charges 775 prisoners, 70 officers, 7 battle-flags, and 2 guns. Simultaneously with the successful attack of Merritt on the enemy's left flank, Wilson drove back and turned the Confederate right, cleared the main road to the front and captured the enemy's main line of works. 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

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

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 cava'ry, 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 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

*Gordon's corps originally formed the rear guard of Lee's army; but that corps having been defeated by Humphrey's 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, p. 97.

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 intrenched 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.

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

**"Battles and Leaders of the Civil War," Vol. IV., p. 469.

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 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

*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."

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

made by General J. H. Wilson, in the spring of 1865. Wilson's command, numbering about 13,000 cavalry and 18 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, 24 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 Altamaha 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.

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

*Each regiment had, in addition to its four field squadrons, a depot squadron.

**"Prussian Official History" (translated by Wright and Hozier), p. 161.

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 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

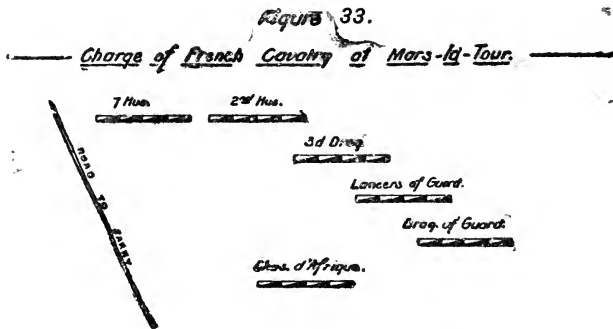
*Borbstaedt's "History of the Franco-German War" (translated by Dwyer), pp. 549-50.

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, everyone 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 completely 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 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 the second line a regiment of dragoons was echeloned to the right of the first; in the 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 the fourth line; and in the fifth line a regiment of chasseurs d'Afrique was echeloned behind the left flank of the fourth. (See Figure 33.)

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 mellay. 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, 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 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

*Sheridan's "Memoirs," Vol. II., p. 401.

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 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,

*See essay on "Mounted Riflemen," by Captain J. R. Lumley, late Thirteenth Prussian Uhlans, in *Ordnance Notes*, No. 169.

**"Operations of War," p. 362.

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 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 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 85 squadrons of regular troops, armed with saber and Winchester rifle. In addition to these were considerable numbers of irregular cavalry, known as bashi-bazouks, 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

*"Instructions for Cavalry" (translated by Bell), p. 186.

other damage as might be possible. The force under Gourko's command consisted of 8,000 infantry, 4,000 cavalry, and 32 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 11 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 32 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

*Greene's "Russian Campaigns in Turkey," p. 174.

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 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.**

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:

*Greene's "Russian Campaigns in Turkey," p. 183.

**Official Report of General Estanislao del Canto, commanding the Congressional army.

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.

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 XI.

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 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 bombardas, 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

*The old Scotch chronicler, Robert Lyndsay of Pitscottie, 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."

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 hand-spikes 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 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

*For an interesting description of this famous gun, see Gibbon's "Decline and Fall of the Roman Empire," Chapter LXVIII.

**So classed from the weight of the projectile.

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 70 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 probably the first important action ever won by artillery.

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 gendarmery, 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 contemporary, Maurice of Nassau, reduced the number of calibers in the Dutch artillery to four; namely, 48-, 24-, 12-, and 6-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 1 gun to every 1,000 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 cannoners 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 6 to 1,000 men of the other arms.

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 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 4 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).

*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 yron, stuffed with fire-works, or wild-fire; whereof the bigger sort for the same had screws of yron 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.*

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 40 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 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

*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.

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 50 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 Rossbach (November 5, 1757), 18 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 (October 14, 1758) by an Austrian attack in the early morning, he was saved from

*"Batailles et Principaux Combats de la Guerre de Sept Ans," page 9.

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 5 to every 1,000 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. 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,

*"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 have 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.

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 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 into 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 ornamen-

tation 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 pieces, 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.

*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.

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 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 8 to 6. 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 15

guns each and a reserve of 6 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 artillery 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 60 guns of the Guard and 40 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 Ordino't 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 80 guns obliquely on his right, where they enfladed 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.

*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.

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 80 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 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 $2\frac{1}{2}$ guns to 1,000 men of the other arms; at Wagram it was nearly 4. 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 12 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 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 the 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.*

*"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

A great improvement in the effectiveness of the British 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

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.

*Alison.

***Ibid.*

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 cannoneers and drivers. In 1829 the French followed the lead of the British in this 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 was 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 equally 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 Balak-

lava 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 22 pieces so as to enfilade the right flank of the Allies; and they finally brought into line 94 guns, of which number 54 were field guns of the heaviest caliber. The British opposed to this formidable battery 36 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

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 37 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 8 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 organi-

grooves, having a twist of one turn in 26 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.*

zations, until in the Army of the Potomac alone the number of light batteries numbered 92, 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 6 pieces, though in the latter part of the war the number was reduced to 4. 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 12 batteries, and was divided into two brigades, each commanded by its senior captain. Later in the war the horse artillery consisted of two brigades of 8 and 10 batteries respectively; the former being detached with the cavalry

*Ranges obtained at the Washington Arsenal, in 1865, with elevations of 10 and 5 degrees respectively.

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 4, and in others as high as 12. 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 4 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, 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 organ-

*There was at first a large artillery reserve, but, early in 1863, it was broken up and the batteries were distributed among the corps

izer and a commander of artillery places 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 50 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 60 pieces," skillfully posted and directed by General Hunt. Of this battle General D. H. Hill, of the 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,

*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.

more than half the casualties were from field pieces—an unprecedented thing in war.”*

At the battle of Stone's 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 Breckinridge, 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 58 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 58 guns almost simultaneously on Breckinridge'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 effect of this tremendous fire being supplemented by a charge of four brigades of infantry, Breckinridge 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 22 guns in a continuous battery, and met Stonewall Jackson's attack with

*"Battles and Leaders of the Civil War," Vol. II., p. 394.

***Ibid.*, Vol. III., p. 633.

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 80 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.*

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 ob-

*"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."—General Hunt, in *"Battles and Leaders of the Civil War,"* Vol. III., p. 375.

jective 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 100 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 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 General Hazen, in his attack on Fort McAllister (December 13,

*General Hunt, in a paper on "Artillery Administration," read before the Massachusetts Historical Society, in 1888.

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 4 batteries were assigned to each infantry division, and in the First Army (commanded by Prince Frederick Charles) there was a general reserve of 16 batteries, besides which one of the corps had a reserve of 4 batteries. In the Second Army (commanded by the Crown Prince) there was no general artillery reserve; but each corps had a reserve of from 5 to 7 batteries. Two horse batteries were attached to each cavalry division, and one of the cavalry corps had an addi-

tional horse battery as a reserve. There was accordingly a combination of divisional, corps, and reserve artillery. Each field battery contained 6 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 guns 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 8 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 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.

*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.

***Three of the corps had, however, but five batteries each.

At Trautenau (June 27, 1866), though the Prussians had 96 guns, they brought only 32 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 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 artil-

lerists 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 4 batteries of field artillery, and in each corps the "corps artillery" consisted of 4 batteries of field and 3 of horse artillery, making a total of 15 batteries, aggregating 90 guns, to each corps.*

Each cavalry division had 2 batteries of horse artillery. The guns were all steel, breech-loading rifles, 3- 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 the artillery was divided into divisional and corps artillery and an artillery reserve. The first consisted of 3 batteries of guns and 1 of mitrailleuses to each infantry division, and a battery of horse artillery to each cavalry division; the second consisted of 5 batteries to each corps; and the artillery reserve was composed of 96 guns. Each battery of guns

*The entire artillery of an army corps, as given above, consisted of one regiment, divided into three *abtheilungen* 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.

and mitrailleuses containing 6 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 72 to 108, and the number of mitrailleuses from 12 to 24. 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 37 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 3 guns 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 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 piece-meal, 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 in-

fantry 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."**

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 84 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

*"The German Artillery in the Battles near Metz," by Captain E. Hoffbauer (tr. by Hollist), p. 82.

**Hoffbauer.

***See p. 106 *ante*.

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. General Douay, commanding the French VII. Corps, declares: "Our adversaries 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 Bazeilles, 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 de-

cisive 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 8, and those of the latter 6 guns. The field batteries were organized into brigades of 6 batteries each, and one of these brigades was attached to each infantry 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 64 guns upon a portion of the Turkish lines, and after an effective cannonade of six hours at

*"The Franco-German War" (tr. by Dwyer), p. 154.

**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.

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 72 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 time without producing any substantial result, and the total losses inflicted by it were probably but little over 1 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 had been no conflict of sufficient magnitude to bring into use any consid-

*"Russian Campaigns in Turkey," p. 454.

erable 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 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.

APPENDIX I.

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 may the subject of tactics be divided (2.)
4. What furnishes the connecting link between strategy and tactics, and why? (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 are the advantages of the battalion as a tactical unit in our service? (4-5.)
 9. State the subdivisions of the battalion down to and including the squad. (5.)
 10. What organization is the administrative unit, and why is it so regarded? (5.)
 11. What is the necessity for grouping the battalions into regiments? (5-6.)
 12. What is the composition of the brigade? (6.)
 13. What is the tactical unit of artillery, and how many guns does this unit contain? (6-7.)
 14. How is artillery united into larger organizations? (7.)

15. What is the tactical unit of cavalry in our own and in other armies? (7.)
16. In cavalry what kind of organization is the regiment, and of what does it consist? (8.)
17. What is the organization of foreign cavalry regiments? (8.)
18. What is the largest independent cavalry organization in our service? (8.)
19. State the composition of the cavalry brigade, division, and corps. (8-9.)
20. State the composition of an infantry division. (9-10.)
21. What kind of unit is an army corps, and what should it constitute? (10.)
22. In the United States, who grants authority for the organization of corps, and how are they numbered? (10.)
23. What is the ordinary strength of an army corps in round numbers? (10-11.)
24. What considerations govern the strength of an army corps? (11-12.)
25. What considerations govern in the grouping of army corps into armies? (12.)
26. Upon what does the question of the proportion of the three arms depend? (12-13.)
27. State the rule for the proportion of artillery in general and under unfavorable conditions. (13-14.)
28. How and why does the proportion of guns to infantry vary during the campaign? (14.)
29. In general terms, how much artillery should an army have? (14.)
30. How does the proportion of cavalry vary, and what should be the rule with us? (14-15.)

SPECIAL TROOPS.

31. What are the special troops of our own and other services? (15.)
32. What are the duties of engineer troops in the United States Army? (15-16.)
33. What is the capacity of the bridge train of a German army corps? (16-17.)
34. How are the bridge trains of our Army organized and handled? (17.)
35. State the strength, duties, and equipment of the signal troops. (18.)

36. State the medical force attached to a regiment of infantry, squadron of cavalry, and battery of artillery. (18.)
37. State the medical staff of a brigade and of a division. (18-19.)
38. State the sanitary organizations of a division and their duties. (18-19.)
39. Describe the purpose and position of general hospitals, and the supervision of them by the army commander. (19.)
40. What is the method pursued in the United States in providing for the military police of the Army? (19-20.)
41. Describe the qualifications, equipment, and duties of mounted couriers. (20.)

THE TRAIN.

42. What is the amount of small-arm ammunition with which the infantry should be promptly supplied, and how is it carried? (20-21.)
43. What is the amount of artillery ammunition carried for field batteries? (21.)
44. What is the amount of ammunition carried for horse batteries? (21.)
45. How is the ammunition column commanded, how is it divided, and to what is it attached? (21.)
46. The *personnel* of the ammunition column is composed of what? (21.)
47. What supplies accompany the troops, and how are they carried? (21.)
48. What is the standard army wagon, and how much does it carry? (21.)
49. What is the allowance of wagons for corps, division, brigade, and regimental headquarters. (21.)
50. What is the allowance of transportation for a battalion of infantry or artillery, or a squadron of cavalry: for company, troops, or battery? (21-22.)
51. What is the allowance for all other troops? (22.)
52. What do the company and troop wagons carry, and how is the average weight reached? (22.)
53. What constitutes the regimental train? (22.)
54. What constitutes the light train? (22.)
55. How are the ammunition wagons distributed? (22.)
56. How may the allowances of transportation be changed? (22.)
57. State the organization of the supply column: wagon train, and pack train? (22-23.)
58. How are the supply columns handled, and what do they carry? (22-23.)

59. What is the reserve supply column? (23.)
60. State the location of all trains on the march. (23-24.)
61. What is the total transportation of the division? (24.)
62. What the best means of obtaining an efficient train service, and why? (24-25.)

THE STAFF.

63. What are some of the duties of a commanding general, and how is he relieved from a portion of them? (25-26.)
64. State the duties and responsibilities of a chief of staff. (26-28.)
65. What officers should be under the command of the chief of staff, and what officers constitute the military staff? (28.)
66. What are the duties of the provost-marshal general? (28-29.)
67. What are the duties of the chief signal officer? (29.)
68. What are the duties of the chief of artillery? (29.)
69. What are the duties of the chief of cavalry? (29.)
70. What are the duties of the chief engineer? (29-30.)
71. State what officers compose the administrative staff, and give the duties of each. (30-31.)
72. Through what channel should the correspondence of the staff departments be conducted? (31-32.)
73. Describe the responsibilities of officers of supply departments in the French Army since reorganization. (31-32.)
74. What is the rule as to the number of persons on a staff? (32.)
75. Of what officers should the staff of an army corps consist? (33.)
76. Of what officers should the staff of a division consist? (33-34.)
77. Of what officers should the staff of a brigade consist? (34.)
78. How should clerks and messengers be obtained for the several headquarters? (34.)
79. State the composition of the division (its different units), and its aggregate strength. (34.)

RANK AND COMMAND.

80. State the proper rank of the commanders of the different organizations. (35.)
81. What has been the practice in the United States Army, and what are the objections to such a system? (35.)

RECRUITMENT.

82. What is the necessity for recruiting? (35-36.)
83. Give the two general methods of recruiting an army, and discuss each. (36-37.)

DISCIPLINE.

84. Define discipline. (37.)
85. What two general means are there for promoting discipline, and which is usually the better? (37-38.)
86. In what are the best evidences of true discipline found? (39.)

CHAPTER III.

CHARACTERISTICS OF THE THREE ARMS.

INFANTRY.

87. State the powers and limitations of infantry. (43.)
88. Describe the arms and the action of infantry. (43-45.)
89. What is the pace of infantry under various conditions? (46.)
90. State the essential qualities of infantry. (46.)

CAVALRY.

91. Of what does the action of cavalry consist? (47.)
92. When is shock action of value, on what does its effect depend, and how is it supplemented? (47.)
93. Why must cavalry be armed with the carbine, and what opportunities are afforded for dismounted fire action? (47.)
94. When may mounted fire action with the carbine be used? (47-48.)
95. Why is the independent action of cavalry of special importance, and of what does it consist? (48.)
96. How is cavalry divided and classified? (48-49.)
97. Describe heavy and light cavalry and their uses. (49.)
98. Describe medium cavalry. (49.)
99. Describe the equipment of the various classes of cavalry. (49.)
100. How is all cavalry now armed and trained? (49.)
101. To what type are all cavalymen approaching? (49.)
102. Give the present requirements of cavalry. (49-50.)
103. What are the arms of the trooper in the United States and Europe? (50.)
104. What is the pace of cavalry under various conditions? (51-52.)
105. State the powers and limitations of cavalry. (52.)
106. Discuss the subject of mounted infantry. (52-53.)

ARTILLERY.

107. How is artillery primarily divided? (53.)
108. What does siege artillery embrace? (53.)

109. What does heavy field artillery include? (53-54.)
110. What does light field artillery comprise? (54.)
111. For what is horse artillery especially designed: what is its essential characteristic, how is it armed? (54-55.)
112. State the use of mountain artillery. (55.)
113. What are the arms of artillery? (55-56.)
114. What is the pace of artillery under various conditions? (56.)
115. What are the powers and limitations of artillery? (56-57.)
116. What are the ranges of field artillery and how are they classified? (57.)
117. How is artillery classified as to its trajectory? Describe each kind. (57.)
118. How is artillery fire classified as to direction? Describe each kind. (57-58.)
119. What projectiles are used by field artillery? Describe each. (58-59.)
120. Give the classification of fuses? Describe each. (59.)
121. State the use of the different projectiles. (59-60.)
122. For what are field mortars designed? (60.)
123. Define rapid-firing guns. (60.)
124. Define machine guns, and discuss their use on the field of battle. (60-61.)
125. What two kinds of cover may be obtained for field guns? (62.)
126. Describe the gun shield. (62.)

CHAPTER IV.

INFANTRY IN ATTACK AND DEFENSE.

127. Discuss the general theory of the infantry attack. (63-67.)
128. How have the functions of the skirmishers changed, what difficulty has accordingly arisen, and what measures are taken for obviating this difficulty? (67-68.)
129. What should each man be instructed to do when separated from his squad, and how should new squads be formed? (68.)
130. State what is meant by "fire discipline," and give the five rules required by it. (68-69.)
131. Why is the observance of the simple rules which regulate fire discipline a matter of great difficulty in battle? (69.)
132. Upon what will the time of beginning the firing depend, and why is long-range firing generally to be deprecated? (70-71.)

133. How may long-range fire be forced upon the assailant, and what should he then do? (71.)
134. When long-range fire is used by the assailant, it will generally be by what troops, and how? (71.)
135. If possible, the attacking infantry should advance how close to the enemy before opening fire, and how close can it usually advance? (71-72.)
136. How must the attacking infantry obtain protection at the longer ranges? (71.)
137. 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. (72-73.)
138. If good results are to be obtained from individual fire, the discipline must be such as to insure what? (73.)
139. How is individual fire classified? Describe each class. (73-74.)
140. How is protection from the enemy's fire obtained? What qualifications must the cover possess? (74.)
141. In regard to cover, what two things should the men be taught? (74-75.)
142. Why are rushes necessary, what regulates their distance, and how are they made? (74-76.)
143. Why should the fractions of the line alternately rushing be large? (76.)
144. What measures should be taken to delay and minimize the unavoidable evil of the intermingling of different organizations on the firing line, and at the opening of the fight what proportion of the men should be in the firing line? (77.)
145. Why should great care be taken to give the proper direction to the firing line when it first moves to the attack? (77.)
146. The firing line is essentially what? (77-78.)
147. How and why are scouts used in an infantry attack? (78.)
148. What is the two-fold object of the support? (79.)
149. State the considerations which affect the strength of the support. (79.)
150. What is usually the distance of the support from the firing line at the beginning of the fight, and how do the considerations of terrain and fire affect this distance? (79-80.)
151. When is the use of small columns in the support generally practicable, and when should each extension of the support from column or close-order line be made? (80-81.)
152. Describe the reinforcement of the firing line from the support. (81.)

153. Why is the choice of the time of reinforcing the firing line a matter of great importance? (82.)
154. State the general objects of the reserve? (82.)
155. How should the reserve be formed, and where should it be held relatively to the troops in front? (82-83.)
156. What should be the distance of the reserve from the bodies in front at the beginning of the attack, and how does this distance change as the attack progresses? (83.)
157. How must the distance of the reserve from the firing line compare with the distance of the latter from the enemy? (83.)
158. How and when are reinforcements sent forward from the reserve? (83-84.)
159. What should be the strength of the reserve in proportion to the firing line and support; and what should the strength always be at the opening of the fight? (84.)
160. What are the objects of the second line? (84.)
161. What should be the strength of the second line, its distance from the first line, and who should command it? (85.)
162. What are the duties of the third line, and by what other line are these duties sometimes performed? (85-86.)
163. Who commands the third line, what is its distance from the second line, and what is its strength? (86.)
164. Describe the method of attack by a regiment of infantry. (94.)
165. Describe the method of attack by a brigade of infantry. (94-96.)
166. Give the general rules to be observed in conducting an infantry attack. (96.)
167. Define the three distinct phases of the infantry attack. (96-97.)
168. What is requisite for the success of a front attack, and what advantages are gained by a flank attack? (98.)
169. Why is a combination of front and flank attacks necessary, and why does this combination promise success? (98.)
170. In what two ways may a flank attack be made? (98-99.)
171. Define a turning movement, and state what is necessary in order that it may be successful. (99.)
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. (99-100.)
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? (100-101.)

174. Describe the general characteristics of the defense. (101.)
175. When and how should the defensive position be occupied by the firing line? (102.)
176. Why can long-range fire generally be more effectively used by the defenders than by the assailants? (102-103.)
177. What should be the objective of the fire of the firing line on the defensive? (103-104.)
178. Discuss the subject of the support in defense—its distance from the firing line; when it begins to reinforce the firing line; when it will probably be entirely absorbed; its strength relative to the firing line; and how it may be employed to increase the volume of fire or extend the front at the beginning of the fight. (105.)
179. Discuss the subject of the reserve in defense—how it is usually posted; the consideration of shelter; distance from the support; its relative strength; when it should reinforce; its use in counter-attacks. (105-106.)
180. Discuss the subject of the second line in defense—its functions; its location; the consideration of shelter; distance from first line; when it should charge; distance from firing line at crisis of fight. (106.)
181. Discuss the subject of the third line in defense—its functions; when and how counter-attacks may be made; what the third line constitutes; where it should be stationed. (107-108.)
182. What considerations affect the relative strength of the three lines? (108-109.)
183. State the first and most important requisite of an infantry position; the next in importance; an especially desirable position, and why a position on a steep hillside is not desirable. (109-110.)
184. How should a position on a hill be occupied? (110-111.)
185. To what should the position be suited in its extent, and what may be constructed in front of it? (111.)
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. (111-112.)
187. Discuss the subject of hasty intrenchments for infantry. (112-113.)
188. Discuss the relative advantages of the offensive and defensive. (113-114.)
189. Discuss the subject of withdrawal from action. (114-116.)

190. Discuss the supply of infantry ammunition on the field. (116-117.)
191. Describe how infantry should receive cavalry—if in battle formation; if in skirmish line; if attacked in flank; if in line; if short of ammunition or shaken by heavy losses. (117-118.)
192. What are the first duties of an infantry commander opposed to cavalry? (118.)

CHAPTER V.

CAVALRY IN ATTACK AND DEFENSE.

193. Discuss the tactical use of cavalry on the battlefield; what arm will be used and under what circumstances. (119.)
194. What is the essential distinction between cavalry and mounted infantry? (119-120.)
195. What is the true function of modern cavalry? (120.)
196. 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. (120-123.)
197. Draw a diagram representing the normal attack formation of a brigade of cavalry. (123.)
198. What are the advantages and disadvantages of charging in single rank and in double rank? (122-124.)
199. Discuss the conduct of the cavalry charge—the pace at which it is made; the distance covered by the charge; the pace and conduct of the support and reserve; the positions of the officers; the duty of unoccupied detachments; what is done when the charge is successful, and what when it is unsuccessful. (124-126.)
200. Discuss the influence of the terrain on a cavalry charge. (126-127.)
201. Describe the use of ground scouts and combat patrols. (127-128.)
202. Discuss the subject of flank attacks in cavalry charges—their effect; the two ways in which they may be made; when the charge on the enemy's flank in conjunction with a front attack is most effective. (128-129.)

203. Why is it the first consideration in a cavalry attack that the charge should be opportune? (129.)
204. What are the necessary qualifications for a good cavalry leader? (129.)
205. In the charge in column, what should be the distance between the subdivisions; their formations; what does the charge in column of subdivisions produce; and when is it preferable to a charge in line? (130-131.)
206. How should the charge in column of fours be made? (131.)
207. How is the charge as foragers conducted, and under what circumstances may this method of charging be advantageously employed. (131-132.)
208. Why will the number of cavalry battles probably be greater in the future than it has been in the past? (132.)
209. What circumstances may justify the charge of a small force of cavalry upon a large one? (132.)
210. When are the best opportunities offered for an attack upon the enemy's cavalry? (133.)
211. By what bodies will the combats of cavalry with cavalry generally be fought? (133.)
212. State the different circumstances under which cavalry may be used with effect in charging infantry. (133-134.)
213. Discuss the conduct of a cavalry charge on infantry—formation of cavalry when infantry is in masses or close-order line; when infantry is in extended order; the line that the cavalry should take, and where it should strike the infantry; direction from which it should approach if striking infantry in front; effect of a slight slope; when the gallop should be taken; what the cavalry must be careful not to do in regard to its own infantry and artillery. (134-135.)
214. Why is the use of cavalry against infantry not a thing of the past? (135.)
215. State the cases in which artillery may be attacked by cavalry. (135-136.)
216. What should be the method of attack by cavalry upon artillery; and what measures should be taken on capturing a battery? (136-137.)
217. How may shock action be used as a part of a general defensive plan? (137.)
218. State the purposes for which dismounted action of cavalry may be usefully employed. (138-139.)

219. To what is the increased value of dismounted action solely due? (139.)
220. How does cavalry prepare for dismounted action; what kind of reserve is retained; what is the proportion of men dismounted, and how does it vary; when may the horseholders dismount; where should the horses be held, and how are the dismounted men maneuvered and fought? (139-140.)
221. When may mounted skirmishers dismount and retain their horses on the line? (140.)
222. How is the offensive action of dismounted cavalry conducted? (140-141.)
223. How is the defensive action of dismounted cavalry conducted; if opposed to mounted cavalry; if opposed to infantry? (141.)
224. When may mounted fire action with the carbine be employed, and in what formation should the cavalry be when using it? (142.)
225. State the objects for which cavalry raids may be undertaken. (142-145.)
226. When are raids practicable, and why should they not be undertaken without an important object? (145-147.)
227. Describe the composition and preparation of a raiding force. (148-149.)
228. Discuss the conduct of a raid. (150-151.)
229. Against what will the principal destructive efforts of a raiding force be directed, and how should the destruction be effected in each case? (151-152.)
230. What does the tactics of cavalry embrace? (152.)

CHAPTER VI.

ARTILLERY IN ATTACK AND DEFENSE.

231. Discuss the general theory of the employment of artillery in attack. (153-155.)
232. Who is responsible for the technical handling of field artillery? (156.)
233. How is artillery fought, and what effect has the change in matériel had upon the selection of the artillery position? (157.)
234. State the principal requirements of a good artillery position. (157-158.)

235. Upon what does the relative importance of these requirements depend? (158.)
236. What reconnaissance should be made of the ground before it is occupied by artillery? (158-159.)
237. How are the guns brought into the position? (159.)
238. Discuss changes of position? (159.)
239. By whom is the fire of all the guns supervised? Under what circumstances may fire be opened without his orders? (159.)
240. What is the objective of artillery fire? (159.)
241. Describe the preliminary reconnaissance of the hostile position. (160-161.)
242. What is meant by concentrating guns; and what is the smallest tactical division which should be employed? (161.)
243. What commander is responsible for the tactical handling of the artillery? (161-162.)
244. Describe the artillery duel. (162-163.)
245. What is done in case the defender declines the duel? (163.)
246. Describe the method of handling the artillery in the third phase of the action. (163-168.)
247. How do the batteries advance from one position to another? (168.)
248. Describe the occupation of the hostile position; and what batteries are employed in the pursuit. (168.)
249. What should be the target of the guns in the pursuit? (169.)
250. Describe the action of the artillery in case the attack is repulsed? (169.)
251. What succession of changes of position will, in general, be made by the artillery? (169.)
252. What advantage is possessed by the artillery of the defense? (170.)
253. How should the guns be placed on the defensive? (170.)
254. What changes of position are made by the artillery of the defense? (170-171.)
255. What precautions against surprise must be taken by batteries on the defensive? (171.)
256. Under what disadvantage is the defender placed as regards the distribution of his guns; what advantage accrues relative to fire control? (171.)
257. Discuss the occupation of advanced positions, and what batteries should be employed? (171-172.)
258. Where are the heavy guns of the defense placed? (172.)
259. At what ranges should fire be opened? (172-173.)

260. How are targets assigned to batteries? (173.)
261. Describe the artillery duel from the standpoint of the defense? (173-174.)
262. Describe the third phase of the action on the defensive. (174-176.)
263. What reserve is used on the defensive? (176.)
264. Describe the duty of the artillery in case the attack is successful. (176.,
265. What is the duty of the artillery in covering the retreat? (176-177.,
266. What considerations govern the position of artillery in an advancing column? (177.)
267. How is the artillery placed on the march? (177-178.)
268. Describe the action of the advance guard artillery on encountering the enemy. (178.)
269. How is artillery employed in rear guards on the march? (178.)
270. How is artillery employed by a retreating column on the march? (178.,
271. How is artillery employed in flank guards on the march? (178-179.,
272. How is artillery employed in outpost duty? (179.)
273. Give the summary of the general principles governing the employment of artillery in battle. (179-180.)

CHAPTER VII.

THE THREE ARMS COMBINED.

THE OFFENSIVE.

274. What decisions and arrangements constitute the plan of battle? (181.)
275. How is the question of the offensive or defensive usually settled; what will often be the condition of large armies in regard to the offensive and defensive on different parts of the field? (181-182.)
276. Where the choice of the offensive or defensive rests with the commander, what questions should he carefully weigh? (182.)
277. 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. (184.)

278. Why are flank attacks necessary; with what are they usually combined; and what has led naturally to this form of combined attack? (185-186.)
279. While acting aggressively against the enemy with the reinforced part of the line, why and how must the other part be protected? (186.)
280. What may generally be said about an attempt to attack simultaneously both flanks of an equal force? (186-187.)
281. What is the effect of piercing the enemy's front; and why is this plan very difficult under modern conditions? (187.)
282. What is meant by the term "order of battle"? (187-188.)
283. What are the three orders of battle; and how is each brought about? (188.)
284. State the advantages and disadvantages of the concave order of battle. (188-189.)
285. When is the convex order of battle necessary on the offensive; and what are its disadvantages? (189.)
286. Whatever the order of battle may be, what must the army be prepared to do in case of a successful attack? (189.)
287. In determining the point on which the main attack is to fall, when should tactical, and when should strategical, considerations be given the greater weight? (189-190.)
288. 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. (190-191.)
289. 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? (191.)
290. 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. (191-193.)
291. How is the information gained on which a general bases his plan of battle? (193-194.)

292. What should the order set forth clearly; and in what sequence? (194-195.)
293. Give the model order for an attack. (195.)
294. 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. (196-199.)
295. Discuss the reserve—its object, its size, the local reserves, the general reserve, the time of employing the reserve. (199-200.)
296. 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. (200-201.)
297. Describe the preparatory stage of the attack. (201-202.)
298. Describe the decisive action in the attack. (202-203.)
299. Describe the occupation of the hostile position, and the pursuit after a successful attack. (203-205.)
300. How should the withdrawal be conducted after a repulse? (205.)
301. State the special points to be considered in preparing and carrying out an attack by a force consisting of all three arms. (205-206.)

THE THREE ARMS IN DEFENSE.

302. 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? (206.)
303. What circumstances may render a purely defensive action sufficient? (206-207.)
304. How are troops divided on the defensive? (207.)
305. Discuss the features and conditions of the ground in front of a defensive position. (207-210.)
306. What is one of the very first requisites of a defensive position, and how many men may be allowed to each yard of front? (210.)
307. What cover may generally be found in a defensive position, and what must be provided? (211.)

308. What advantage do intrenchments give to a commander; into what two zones may the field be divided for defensive purposes, and how should the intrenchments be constructed on each? (211.)
309. When, and by whom, should the intrenchments be constructed? (212.)
310. What conditions are necessary, in order that strong points may be advantageously held in the line itself? (212-213.)
311. How should the flanks be supported, and why is it not desirable to rest them upon impassable obstacles? (213-214.)
312. Why does an impassable obstacle intersecting the position constitute a serious defect in it? (214.)
313. What should be the nature of the ground in rear of a position? (215.)
314. Why is a position with a river at its back generally a bad one, and when may such a position be an admissible one? (215-216.)
315. State the requirements of a perfect defensive position. (216-217.)
316. What orders of battle may be adopted on the defensive, and which is generally the best? (217.)
317. When is the concave order of battle peculiarly suited to the defensive, and what is the indispensable condition in this case? (217.)
318. When may the convex order of battle be advantageously used on the defensive? (218.)
319. How is the crotchet order of battle produced, and what are the objections to it? (218.)
320. Notwithstanding its disadvantages, when may the crotchet order of battle be adopted with advantage? (218-219.)
321. State how the commander on the defensive gains the information on which to base his plans, and when and how he formulates his orders? (219.)
322. Give the model for orders directing the assumption of the defensive. (219-220.)
323. Of what three stages does the defense consist? Discuss each. (220-222.)
324. What are the advantages and disadvantages of a night attack? (222-223.)
325. 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? (223-224.)

326. 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? (224.)
327. 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? (226.)
328. Discuss the use of the different arms in night attacks. (227-228.)
329. Under what conditions will actual attacks at night, by large forces, be advisable? (228.)

CHAPTER VIII.

CONVOYS.

330. How is the transport supplying an army primarily divided? (229.)
331. How are the convoys broadly classed? (229.)
332. In what different ways is transportation on land effected, and what are the two chief methods? (229-230.)
333. What kind of animals and wagons are employed in the wagon-trains in the U. S. service? (230.)
334. Discuss the organization of a wagon-train—under whose command it should be; of what the *personnel* of the train should consist; who commands the train and escort, and what his qualifications and equipment should be; how the train should be divided and subdivided; how the wagons should be arranged according to their contents; how drivers should be armed; what each section should be provided with; the strength and duties of the police guard. (230-231.)
335. Discuss the march of the convoy when the transport is by wagon—average speed; what should be done when the road is wide enough; with what the train should be supplied, and what each wagon should carry; inspection; broken-down wagons; distances between wagons and sections; halts; hour of starting. (232-233.)
336. Discuss the selection and occupation of camps for convoys, describe the several methods of parking the wagon-train, and state when each method should be used. (233-234.)
337. 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 part is the convoy usually divided? (234-236.)

338. Describe the functions of the advanced cavalry of a convoy—in open country, where it should march and the precautions it should take; at a bridge; at a defile; when the enemy is encountered; in a close country. (236-237.)
339. Describe the advance guard of a convoy—its strength; where it marches; its duties; its formation; by what it should be accompanied; its reserve; at bridges and defiles; what the advance-guard commander should constantly observe, and what he should do if attacked. (237-238.)
340. State the composition, distribution, and general functions of the main body of the escort of a wagon convoy. (238-239.)
341. State the strength and duties of the rear guard of a wagon convoy. (239.)
342. Discuss the defense of the convoy—when convoy is not surprised and enemy is not in superior force; if the enemy be repulsed; if attack be made by irregular troops or armed inhabitants; the passage of a defile; when enemy is reported in strength; when enemy is in position at the entrance of a defile; when main attack is made on one flank; when attack is on both flank; when enemy bars the road in front; when strength of enemy makes it necessary to form corral; intrenchments; if enemy should carry first position; when cargo consists of ammunition; when the defeat of the escort seems certain. (239-242.)
343. Summarize briefly the principles of attack on a convoy. (242.)
344. Describe the strength, composition, and conduct of convoys of prisoners. (243-244.)
345. Discuss the subject of convoys by railroad—the usual method of insuring safety; when this is impossible or insufficient; the composition of a pioneer train; the train to be guarded; if enemy has destroyed or obstructed the track; if track be undisturbed and enemy without artillery; when it is not practicable to have the convoy preceded by a pioneer train (244-245.)
346. How should railroad trains be convoyed in railroad riots? (245.)
347. Discuss the subject of convoys by water. (245-246.)



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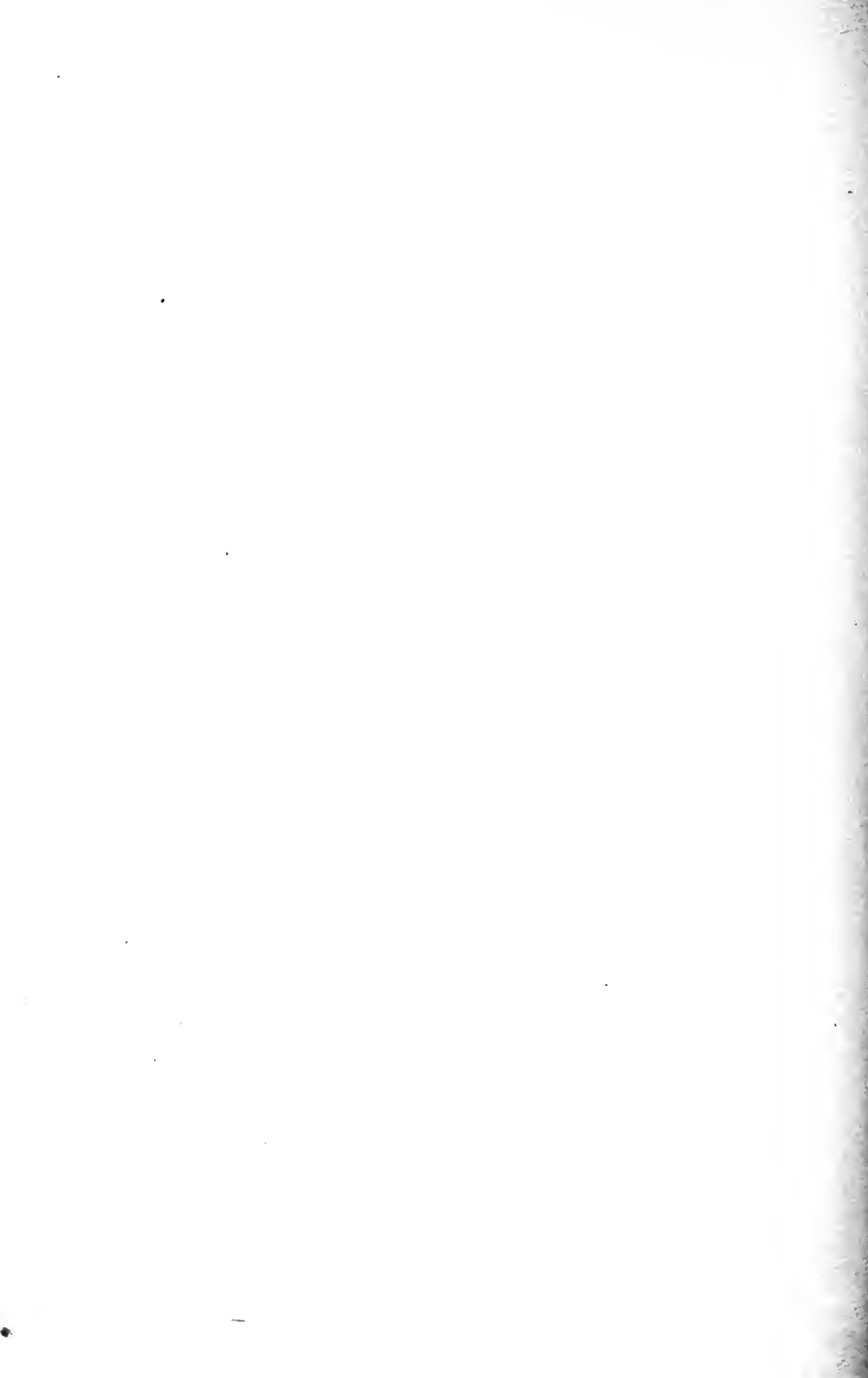
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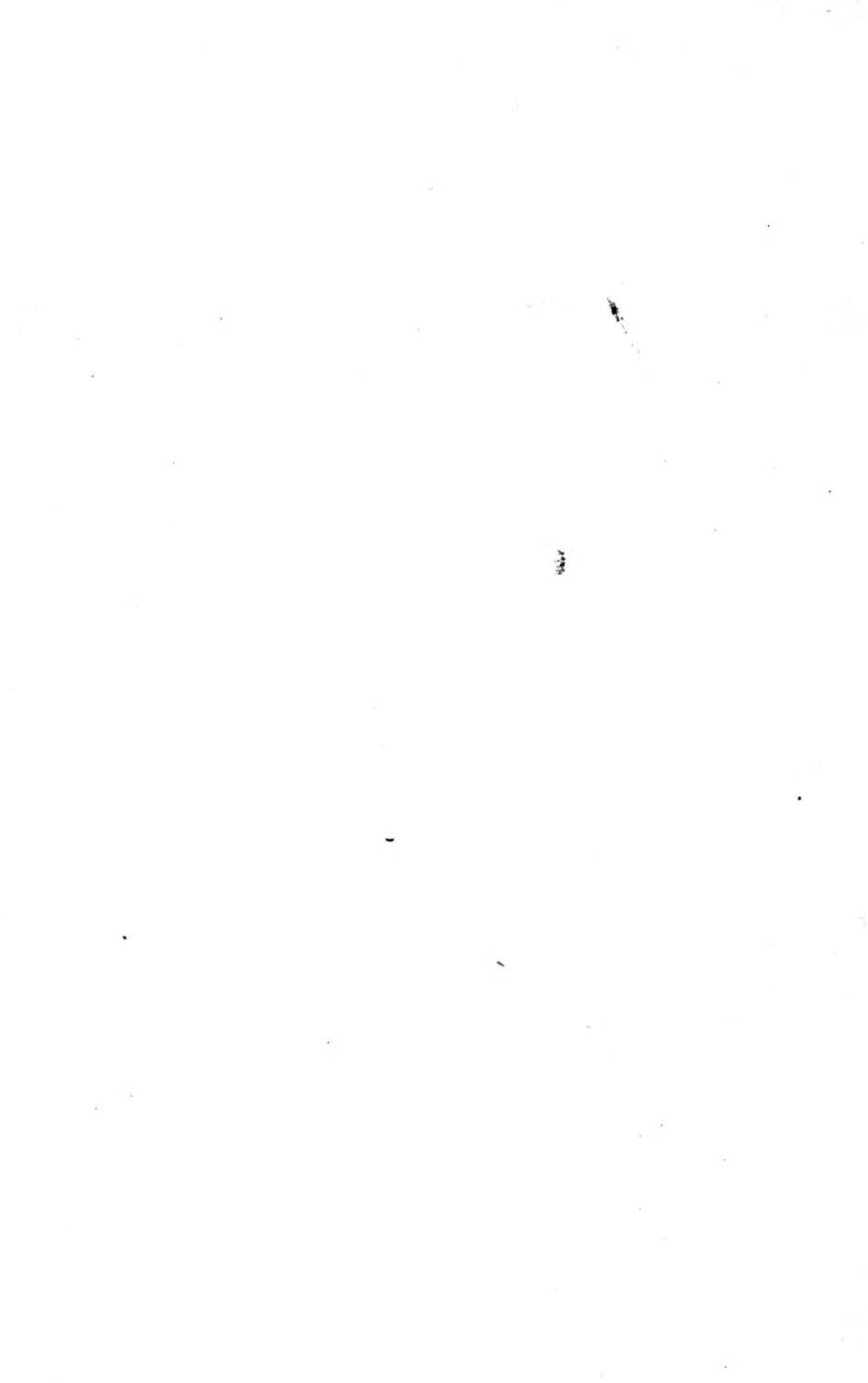
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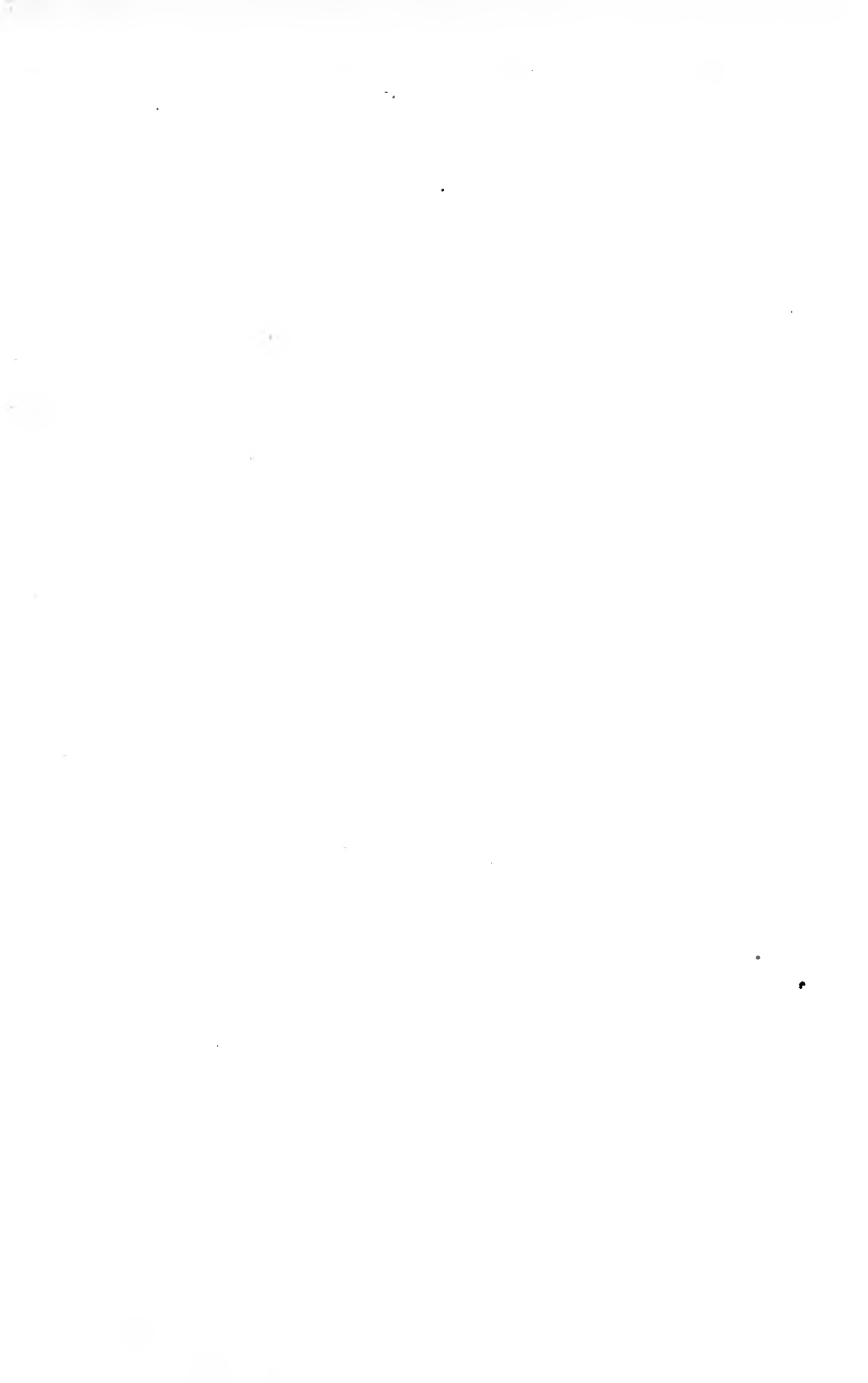
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