

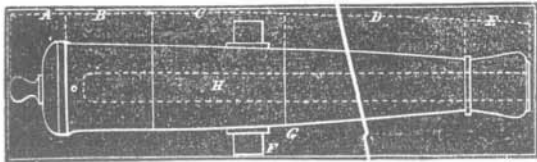
ORDNANCE AND GUNNERY.

D. Van Nostrand, No. 192 Broadway, has just published a new edition of Capt. Benton's work on ordnance. It is entitled "A Course of Instruction in Ordnance and Gunnery; Compiled for the use of the Cadets of the United States Military Academy, by Capt. J. G. Benton, Ordnance Department, late Instructor of Ordnance and Science of Gunnery, Military Academy, West Point, Principal Assistant to the Chief of Ordnance, U. S. A." It is a comprehensive and elaborate treatise on the subject, under the following heads: "Gunpowder," "Projectiles," "Cannon," "Artillery Carriages," "Machines and Implements," "Small Arms," "Pyrotechny," "Science of Gunnery," "Loading, Pointing and Discharging Firearms," "Different Kinds of Fires," "Effects of Projectiles," "Employment of Artillery," "Tables of Multipliers," "Tables of Fire," "Appendix," "Index." We make the following extracts:—

NAMES OF THE SEVERAL PARTS OF A CANNON.

This nomenclature refers more particularly to guns of the old pattern, large numbers of which will probably remain in service for some time to come. The most recent models are characterized by an entire absence of moldings and ornaments, and the elements, in both cases, are curved instead of right lines. The modifications which it is necessary to make to suit the present nomenclature to the new system, will readily suggest themselves to the mind of the pupil.

The names applied to the several parts of a cannon are illustrated in this cut. A is the cascable; B, first reinforce; C, second reinforce; D, chase; E, swell of the muzzle; F, trunnions; G, rimbases; H, bore.



The cascable is that part of the gun in the rear of the base of the breech; it is composed generally of the following parts: the knob, the neck, the fillet

The base of the breech is a frustum of a cone, or a spherical segment, in rear of the breech.

The base ring is a projecting band of metal adjoining the base of the breech, and connected with the body of the gun by a concave molding. It serves as a point of support for the breech sight, and rests upon the head of the elevating screw. The ring is omitted in guns of recent model.

The breech is the mass of solid metal behind the bottom of the bore, extending to the rear of the base ring.

The reinforce is the thickest part of the body of the piece, in front of the base ring. If there be more than one reinforce, that which is next to the base ring is called the first reinforce; the other, the second reinforce.

The chase is the conical part of the piece in front of the reinforce.

The astragal and fillets in field guns, and the chase ring in other pieces, are the moldings at the front end of the chase.

The neck is the smallest part of the piece, in front of the astragal or chase ring.

The swell of the muzzle is the largest part of the piece in front of the neck. It is terminated by the muzzle moldings, which, in field and siege guns, consist of the lip and fillet. In sea-coast guns, and heavy howitzer and columbiads, there is no fillet. In field and siege howitzers, and in mortars, a muzzle band takes the place of the swell of the muzzle.

The face of the piece is the terminating plane perpendicular to the axis of the bore.

The trunnions are cylinders, the axes of which are in a plane perpendicular to the axis of the bore, both axes being in the same plane.

The rimbases are short cylinders, uniting the trunnions with the body of the gun. The ends of the rimbases, or the shoulders of the trunnions, are planes perpendicular to the axis of the trunnions.

The bore of the piece includes all that part bored out, viz.: the cylinder, the chamber (if there be one), and the conical or spherical surface connecting them.

The muzzle or mouth of the bore is chamfered, in order to prevent abrasion and facilitate loading.

The lockpiece is a block of metal at the outer open-

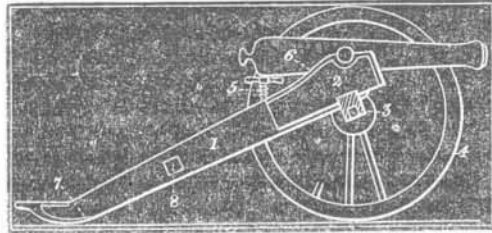
ing of the vent for the attachment of the lock. As friction tubes are now used for firing cannon in the land service, this part is omitted.

The natural line of sight is a line drawn, in a vertical plane through the axis of the piece, from the highest point of the base ring to the highest point of the swell of the muzzle, or to the top of the sight, if there be one.

The natural angle of sight is the angle which the natural line of sight makes with the axis of the piece.

GUN CARRIAGES.

Artillery carriages, like the cannon which they support, are classified into field, mountain, prairie, siege and sea-coast carriages. The sea-coast carriages not being required for the transportation of their pieces, differ materially from the others in their construction. The principal parts of all other artillery carriages are, as shown by the following figure, the stock, 1, the



cheeks, 2, the axle tree, 3, the wheels, 4, and the elevating screw, 5.

CAISSONS.

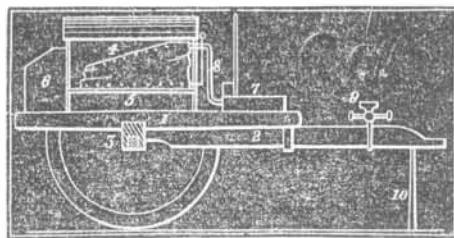
The caisson is used to transport ammunition; and in light field batteries there is one caisson to each piece, in heavy batteries there are two. The ammunition is contained in three chests—two mounted on the body and one on the limber. The number of rounds for each chest varies with the caliber of the piece, as follows, viz.:—

6-pounder gun and 3-inch rifle gun.....	50
12-pounder gun.....	32
12-pounder howitzer.....	39
24-pounder howitzer.....	23
32-pounder howitzer.....	15

The whole number of rounds for each piece may be ascertained by multiplying the above numbers by four.

TRAVELING FORGE.

The traveling forge is a complete blacksmith's establishment, which accompanies the battery for the purposes of making repairs and shoeing horses. It consists of a body, upon which is constructed the bellows house, &c., and the limber, which supports the stock in transportation. The body (see the following figure) is composed of two rails, 1, a stock, 2, and an axletree, 3. The bellows house is divided into the bellows room, 4, and the iron room, 5. Attached to the back of the house is the coal box, 6, and in front



of it is the fireplace, 7. From the upper and front part of the bellows, an air pipe, 8, proceeds in a downward direction to the airbox, which is placed behind the fireplace. The vise, 9, is permanently attached to the stock, and the anvil, when in use, is supported on a stone or log of wood, and when transported is carried on the hearth of the fireplace. The remaining tools are carried in the limber chest. When in working order, the point of the stock is supported by a prop.

CHARGE.

**Maximum Charge.**—By increasing the charge of powder of a firearm the greater and (in consequence of the wedging of the unburned grains among each other) the more difficult will be the mass to be set in motion; the space between the front of the charge and the muzzle will be diminished, and a large number of grains will be thrown out unconsumed. It is evident, therefore, that the effect of a charge of powder on a projectile should not increase with the size of the charge, and experiment shows that beyond a certain point an increase of charge is actually accompanied

with a loss of velocity. The charge corresponding to this point is called the maximum charge.

The following are the results of experiments made in France on a 36-pounder gun, of 16 calibers in length:—

Charge, lbs.....	36,	42,	49,	56,	70,	77.
Initial velocity, feet.....	1,320,	1,170,	950,	493,	454,	191.

It will, therefore, be seen that an excess of charge is almost as injurious to the velocity of a projectile, as an excess of length of bore.

**Effects on Recoil.**—Trials made at Turin show that the recoil, and consequently the strain on the gun and carriage, increase in a more rapid ratio than the charges, viz.: 14 lbs. of powder gave a recoil of 70 inches; 15 lbs., 72 inches; 16 lbs., 74 inches; 18 lbs., 100 inches.

**Effects of Length of Bore on Maximum Charge.**—All experience proves that the longer a piece is, in terms of its caliber, the greater will be the maximum charge in proportion to the weight of the projectile. For heavy cannon, 19 to 20 calibers long, the maximum charge may be stated to be one-half the weight of the projectile; and for light cannon of the same length, one-half to two-thirds of this weight—the increase of range for charges above one-half the weight of the projectile being very small.

**Most Suitable Charge.**—A charge of one-fourth the weight of the projectile, and a bore of 18 calibers, is the most favorable combination that can be made in smooth-bored cannon, to obtain the greatest range with the least strain to the carriage.

In the early days of artillery, when dust instead of grained powder was used in cannon, the weight of the charge was equal to that of the projectile; after the introduction of grained powder it was reduced to two-thirds, and in 1740 to one-half this weight.

[The work from which these extracts are compiled embraces 550 pages of reading matter, and is profusely illustrated. The typography is faultless, and the paper and binding superb, reflecting much credit upon the publisher.—Eds.]

Increase of Insects.

John H. Klippart, in a communication to the *Ohio Farmer*, speaking of the increase of insects, says:—

It is a well-known fact in natural history that there is such a thing as alternate generations; and it is an equally well-known fact to entomologists that there are viviparous and oviparous generations of the same insect during the same year. May not the first generation of the army worm be oviparous, and the succeeding generation be viviparous, as in the following case of aphides? All the aphides, it has been well ascertained, which appear in the spring, are exclusively females, no males being found till the autumn; and these females are endowed with a fecundity almost incredible. M. Latreille says that one female during the summer months will produce about 25 a day, and M. Reaumur calculates that one aphid may be the progenitor of 5,904,900,000 descendants. It is not necessary for the young female aphides produced during the summer to pair with a male, which, indeed, would be impossible, as no males were then to be found; yet these females go on producing, each their 25 a day of living young ones, all of which become in a short time as fertile as their parent. The following calculation of the fecundity of a species of aphides, from Prof. Owen's lectures on "Comparative Anatomy," will afford some explanation of the extraordinary number in which these creatures sometimes occur; the *aphis lanigera* produces each year ten viviparous broods, and one which is oviparous, and each generation averages 100 individuals.

Generation.	Aphids produced.
1st.....	1
2d.....	100
3d.....	10,000
4th.....	1,000,000
5th.....	100,000,000
6th.....	10,000,000,000
7th.....	1,000,000,000,000
8th.....	100,000,000,000,000
9th.....	10,000,000,000,000,000
10th.....	1,000,000,000,000,000,000

This fearful table, representing the fecundity of one species of insects, affords a most useful lesson at this season of the year. Now is the period to labor with most success in their destruction. Every insect observed upon the stem or leaf of a plant should be brushed off and destroyed.

The Suez canal approaches completion; 22,000 workmen are employed on the work.