Correspondence.

Another Remedy for Ivy Poison.

To the Editor of the Scientific American:

I have noticed a number of brief articles upon the subject of ivy poison and its remedies, in your valuable paper, and am led by them to offer the experience of an amateur botanist with this dreaded vine. During the past ten summers, your humble correspondent has been blistered two or three times each season, with Rhus toxicodendron, and has tried about every remedy known to the physician or to the old ladies, who always have a remedy for every ailment. No remedy which I have tried has been so speedy and effectual as the bruised leaves of nightshade (Solanum nigrum), and cream. This remedy is safe and simple, and should be applied like a poultice to the affected parts.

EDWIN S. LINK.

Kirksville, Mo.

Ivy Poisoning.

To the Editor of the Scientific American:

Referring to the article in your paper of April 7, by Mr. Jessop, who says he has never found a *sure cure* for ivy poisoning, like Mr. J. I was repeatedly poisoned by ivy when a boy, and found no relief till an uncle told my mother to give me a tablespoonful of thoroughwort tea each morning before eating during the month of May, and I never would be poisoned again. She followed his directions, and the result was I never have been poisoned since, although I was exposed to it more or less each summer for a number of years afterward. The above may not be a *sure cure* in all cases, but it is worth trying, as it can do no harm if it does no good.

ALBERT S. TRASK.

St. Paul's School, Concord, N. H., April 9, 1888.

An Ohio Gas Well.

To the Editor of the Scientific American:

Thinking it might be of interest to your readers, I herewith state you something of one of our gas wells here, of which we have quite a number in our county, among them some good ones. The well referred to was closed in 1887, but seems to have been leaking, at least some way or another it caught fire, and the woodwork burned away, leaving it the chance of partially leaking. This happened about three months ago, and it has been burning ever since. Now lately it starts to make a fearful noise. The well is about six miles west of my house, and I can hear it very plainly and distinctly. The sound is very irregular and is like the sound of a good thundering of a coming thunder storm, then stopping for awhile, then at once the roaring, thundering sound starts again. It seems to be subterranean, making the feeling as if the earth was shaking, but only then when the thundering sound is there.

I have been at the well and found a moderate gas flame, seeming to be the gas leaking out between casing and pipe proper, which pipe is closed by two valves. The casing projects about 2 feet out of earth, and pipe about 2 feet out of casing. Now the pipe is leaking at a point about 2 feet above casing, where it has an elbow with a horizontal pipe having the valves, and it seems that the sound is caused by the vapor coming out of pipe, and which seems to be no gas, as very little of it burns, although the fire of the leaking gas from between casing and this pipe burns right under it, and ought certainly to ignite it. I have tried and diverged this egressing gas by holding a piece of long board near orifice, then a little more of it burns.

Has anything of the kind been ever before experienced, and what may be the cause of it? Should like to hear others on this subject, as it is quite new to us.

J. M. KRAMER.

Maria Stein, Mercer County, Ohio, April 2, 1888.

The Boston Hot Water System.

To the Editor of the Scientific American:

In your issue of April 14, under the head of "Hot Water System," you said that the pipes of the new system of heating by hot water, in Boston, are clothed with mineral wool.

We take the liberty of calling your attention to the fact that these pipes (some eight miles in all) are clothed with our patent fire felt covering, which is composed entirely of pure asbestos, with an outer waterproof jacket, which is laced over the covering.

The peculiar feature of this covering of especial interest to mechanical men is the fact that it will stand both heat and moisture, an advantage not secured by the ordinary methods of covering pipes.

THE CHALMERS-SPENCE CO.

New York, April 12, 1888.

STRIKES IN THE UNITED STATES.—Striking was one of the principal occupations of the laborers of the United States in 1887. According to an estimate in *Bradstreet's*, the total number of strikes for the year was 858, involving 340,854 laborers.

Compressed Air Tramcar.

On the lines of the London Street Tramways Company, between King's Cross (Metropolitan) Station and Camden Road, Holloway, several tramcars are to be seen in regular work propelled by compressed air on the Mekarski system. The journey undertaken by these cars is a little less than two miles in length, and is on a rising and falling gradient all the way, there being a length of 100 yards with a gradient of 1 in 27, with a curve of about 50 feet radius at the top of it, while in another part of the line, for a length of nearly three-quarters of a mile, the gradient varies from 1 in 60 to 1 in 40. The rails have been laid for a very considerable time, and are of shallow depth, supported on the old fashioned longitudinal wooden sleepers, so that the track is not nearly so well able to carry a heavy car as if it were laid on the girder rail system. Altogether the route is a very difficult one, and if the air-driven cars are successful in running upon it for a fair length of time, their capacity for complying with the conditions of tramway traffic met with in this country will be more than demonstrated.

The Mekarski cars have been running in the town of Nantes, in France, for some years, but they have had to be very considerably modified to adapt them to the conditions imposed by the board of trade in this country and to the requirements of the tramway companies. The work has been carried out in Sir Frederick Bramwell's office under the superintendence of Mr. H. G. Harris, and amounts to a practical redesigning of the entire arrangement. The distinctive features of the original invention are retained, but the mechanical arrangements have been worked out afresh, and it is upon the suitability and perfection of the mechanical arrangements that the success of a tramway locomotive depends. One of these new cars appeared at the Inventions Exhibition, where it carried many thousands of passengers backward and forward over a short course, without the slightest hitch, and now five of them are going to be submitted to an extended trial under the very difficult conditions we have already alluded to, with a view of affording practical proof of their suitability for competition with horse traction.

The cars are 4 feet 8½ inches in gauge, and each is capable of carrying thirty-eight passengers in addition to the driver and conductor, the general appearance being very similar to that of a horse car, except that the floor is at a somewhat higher level to give space for the machinery underneath. The compressed air is carried in six horizontal cylinders or reservoirs, three at each end of the car, below the floor. Five of these reservoirs are connected together by pipes, and are called the battery, while the sixth is independent, and is called the reserve. These cylinders are filled with compressed air at a pressure of 450 pounds on the square inch. This air, however, does not furnish the entire motive power for driving the car. It is a special feature of the Mekarski system that a store of heat is carried in two "hot pots," one at each end of the car, and is gradually transferred to the air, thus preventing the formation of ice and snow in the cylinders, and to some extent increasing its volume. The hot pots are filled with water from a steam boiler working at a pressure of 80 pounds to the square inch, at the same time that the store of air is received. The heat is transmitted to the air by causing the latter to bubble up through the water on its way to the high pressure cylinder of the engine, and by conducting it, after it has been expanded in this cylinder, through a heater immersed in the water before it passes to the second cylinder. By this arrangement the air is twice heated, first by direct contact with the water, during which it picks up sufficient moisture to lubricate the valves and pistons, and second by passing through heated tubes of considerable surface. Normally, the air from the battery is admitted to the hot pot and so to the engine cylinders, but should a very steep rise be encountered at the end of a long run after the air pressure has fallen, or should a stop be made half way up a hill, then the battery can be shut off, if necessary, and air at the full pressure of 450 pounds be admitted from the reserve reservoir. This reserve is not touched except in emergencies of this kind, and can be relied to pull the car through any possible difficulties that it can encounter. A regulating valve is fixed at the top of each hot pot, a single hand wheel being provided for the two, so that the one out of use cannot be tampered with by the public.

The rotation of the hand wheel forces plunger into or out of a chamber completely filled with liquid. As the plunger enters, the pressure in the chamber is increased and acts upon a brass-faced rubber diaphragm which forms its bottom. A spindle or stalk on this diaphragm is in contact with the valve, which is held up by a spring. When the plunger is moved down, the valve is opened, and *vice versa*. By this means the driver controls the pressure admitted to the engine according to the requirements of the track and the gradients.

A good many pipes are naturally required to effect the distribution of the air.

The high pressure cylinder is 5¼ inches in diameter, and the low pressure cylinder 8 inches in diameter, the stroke of both being 8 inches. They drive on to a crank shaft, which is geared to the driving axle by compound spurwheels of special construction. These wheels have been designed to run without noise and vibration, and they fulfill their object very completely, since it is impossible to hear them even when sitting immediately over them. Each wheel is formed of four steel plates, which were originally clamped together, and had the teeth formed on them in a wheel-cutting machine. The plates were then placed separately in a lathe, and a good deal of the superfluous metal was removed to lighten them, and at the same time the teeth were slightly reduced in width. The plates were then bolted together so as to make a stepped wheel, brown paper being inserted between the surfaces in contact, and the hollow spaces between the plates being filled with hard wood to deaden the sound. To keep the wheel always accurately in pitch in spite of the play of the springs of the car, a novel arrangement of axle box has been introduced. The box is curved, and plays in guides curved to a radius struck from the center of the crank shaft. Thus, however much the car body may rise or fall, the pitch circles of the two wheels always remain in contact.

Elaborate means are provided to control the speed of the car. In addition to the regulator and the reversing lever on each platform, there is a foot brake, and an air brake, which can be applied either by hand or by the automatic action of a centrifugal governor. This governor is driven by a band from the axle, and operates a valve by which air is admitted from the reserve to the brake cylinder. The action of putting on the air brake also automatically cuts off the supply of motive fluid to the engine by admitting the pressure to act upon a piston which operates a valve in the main air pipe. The governor does not open its valve until the speed of the car exceeds ten miles an hour, when it immediately puts on the brake and shuts off the air. As soon as the speed falls the brake comes off, and the engine starts again without attention on the part of the driver. There is also a speed indicator driven by a band.

The frame of the car is strengthened by a truss which rises to the level of the under side of the seat. For moving it in the shed there is provided a hand turning gear consisting of teeth cast on the inside of one of the driving wheels, and engaging with a three-toothed pinion turned by a handle.—*Engineering.*

Jeddah and Mecca.

Many parts of the East are rendered more unhealthy from the want of sanitary arrangements than from heat, locality, and situation. If the authorities in these parts are awakened to the necessity of cleansing the roads and streets, and providing drainage and water, there would be opened to engineers and contractors a large field in carrying out the necessary works. The following example, though a bad case, is probably not an extreme one:

The once important town of Jeddah, on the Red Sea, now chiefly known as the landing place of the pilgrims constantly visiting Mecca—46,000 last year—and at which there was a serious outbreak of cholera in 1864, has at length obtained a water supply, but in other respects its sanitary state is not improved. Jeddah is about forty-five miles from Mecca, has a resident population of about 30,000, continuously augmented by pilgrims, the bulk of whom belong to the poorer classes, the prevailing temperature is a damp heat of 90°, and beyond the immediate suburbs the country, as far as the foot of the hills—ten miles—is a desert. Until recently the scanty supply of water for the inhabitants of the town was derived from a few cisterns and wells in the desert outside. For years attempts were made to have water brought into the town from the adjacent hills, where there existed a plentiful supply in a natural reservoir at a distance to be traversed in four hours. For a long time these attempts failed, owing to the opposition of the proprietors of the cisterns and wells, as they derived a considerable income from the sale of the water, which was sold in ordinary seasons at 1d. per pail or 1·14d. per gallon, and in seasons of drought at much more. With the exception of two slight showers, no rain fell between December, 1886, and January, 1888. Fortunately, the waterworks begun some years previously had been completed, the scheme having at length been carried to a successful issue, and public fountains are erected in various parts of the town for the gratuitous supply of water to the inhabitants. The quality of the water is excellent, and it is hoped that some improvement may be looked for on the general unhealthiness of the town; but before this can take place much more will have to be done. There is no system of drainage. A large cesspool is constructed in the foundations of all houses when being built. This cesspool when full is emptied by the simple method of digging a big hole before the door and transferring the contents thereto. The repetition of this practice has converted Jeddah into a mighty cesspool, which, added to the absence of sanitary precautions generally, excessive heat, and scarcity of water, sufficiently accounts for the great mortality from fever, causing it to be the most unhealthy town on the Red Sea.

Preventing Noise on Railway Bridges.

According to *La Semaine des Constructeurs*, the government administration of the new metropolitan railroad in Berlin has devoted considerable attention to the subject of diminishing the noise of trains passing over the viaducts and bridges, which, of course, form the principal portion of the road. Wherever possible, the viaducts are built of brick or stone, and the sound of light trains running over these is not very annoying; but arches of masonry cannot well be used in crossing crowded streets, and the metallic structures employed in such places rattle and reverberate in a manner which not only upsets the nerves of pedestrians, but by startling horses passing beneath is frequently the cause of accidents. In experimenting to find means for overcoming the trouble, it is found that the form of the bridge does not perceptibly affect the noise from it, a lattice truss, notwithstanding the multiplicity of joints, producing no more sound than a plate girder; but the length is a very important factor, so much so that the noise is considered by the German engineers to be directly proportioned to the span of the bridge. Where the rails rest on wooden cross ties, or on timbers running longitudinally, the sound is less than where they are secured directly to the metal, and it may be still further diminished by placing cushions of felt or rubber under the timbers before bolting them to the bridge construction.

To cover an iron bridge entirely with planking does not appreciably diminish the noise from it unless the planking is covered with gravel, a thin layer of which has a marked deadening effect, while still more improvement is obtained by thickening the layer of gravel about the track so as to bury the cross ties or longitudinal timbers on which the rails rest. Profiting by these suggestions, the Berlin engineers have adopted two different systems for diminishing the noise of trains on their viaducts. One is to bolt to the bridge structure long troughs of sheet iron, about 16 in. wide, so arranged that a rail will come in the center of each. The troughs are then filled with gravel, in the middle of which is buried the longitudinal timber carrying the rail, and the space between the troughs is covered with iron plates on which is spread a thin layer of gravel. The second method, which is found to be more efficient than the other, consists in placing a continuous series of shallow iron troughs, about 5 ft. square, along the line of the tracks. These are filled with gravel, on which the ties and rails are laid.

[In New York it is noticed that a heavy fall of snow renders the elevated railways almost noiseless.]

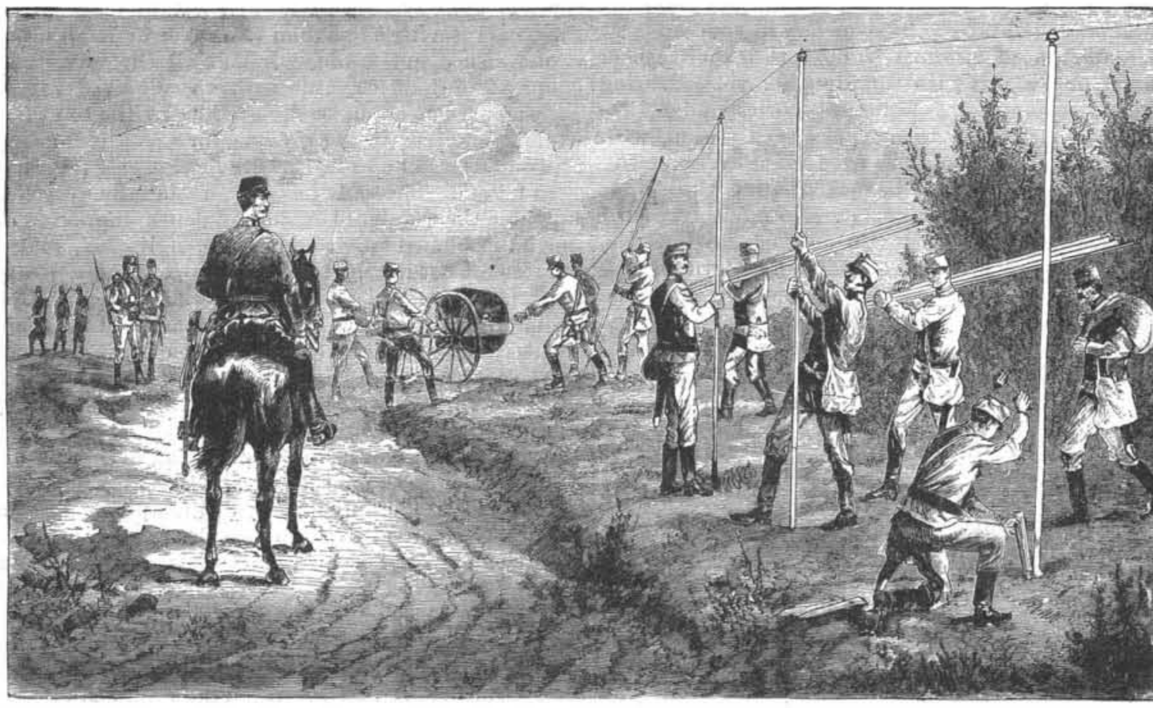
Horse, Steam, or Electricity.

Mr. Ransom, writing on the comparative cost of steam, horse, cable, or electricity, takes a sample road, six miles long, with twenty-four cars, a speed of six miles an hour, and running twenty hours out of twenty-four. This would require forty-eight horses on the lines and 192 in the stables, costing, with harness, initially about $38,400. The initial cost for electrical plant he estimates at $26,500, for cable plant $35,000, and for comparison these figures may be put:

A motor plant of horses costs $38,400; of electricity, $26,500; of cable apparatus, $35,000. With regard to the road, the estimate is for horse road single track per mile, $9,000; electric varies, according to system, from $10,000 to $23,500; cable roads from $30,000 to $110,000; steam, $9,000. If old roads have to be adapted to the new traction, the cost of adaptation is given for a six mile road: For cable, $265,200; for electricity, $70,500; for steam, $40,000. In conclusion, Mr. Ransom says: "In original cost, expense of operating, cost of maintenance, outlay in applying to old roads, steam distances every other mechanical system."

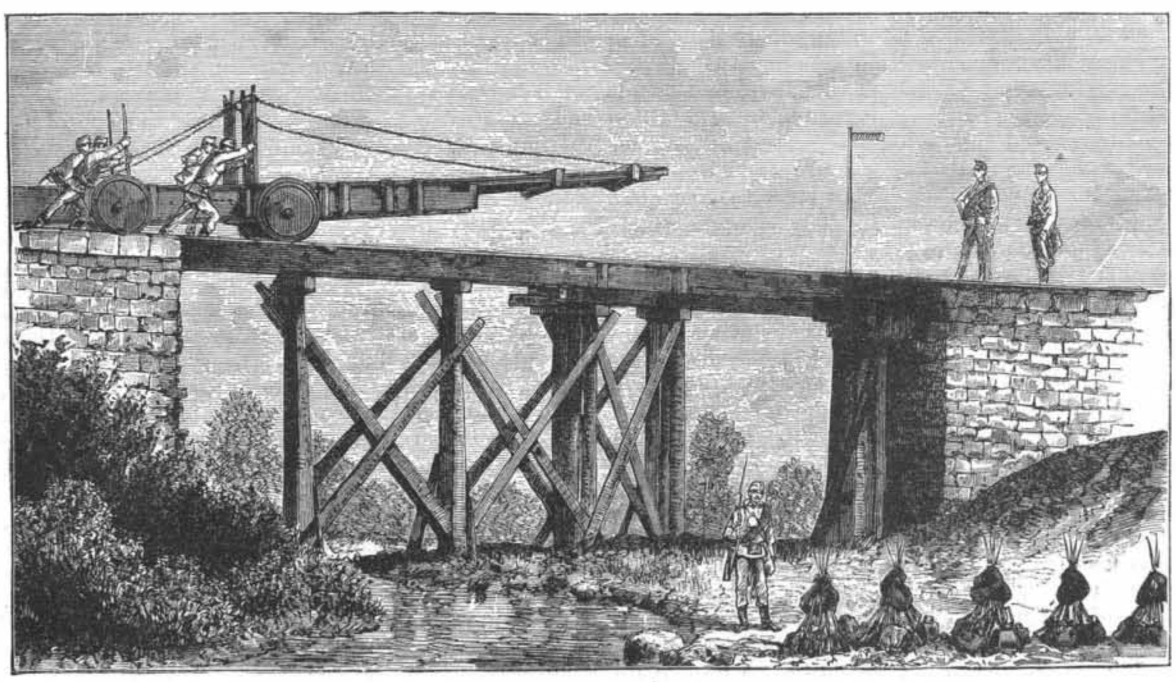
MODERN MILITARY APPLIANCES.

In modern warfare those preparations which facilitate the rapid transportation of the army, the communication of the several sections with one another, and the prompt and satisfactory supply of provisions to the troops, play as important a part as the arming, equipment, and leadership of the army. For years past the Austrian war department has made a point of improving and perfecting the existing military arrangements, and has lately made many innovations in this direction.



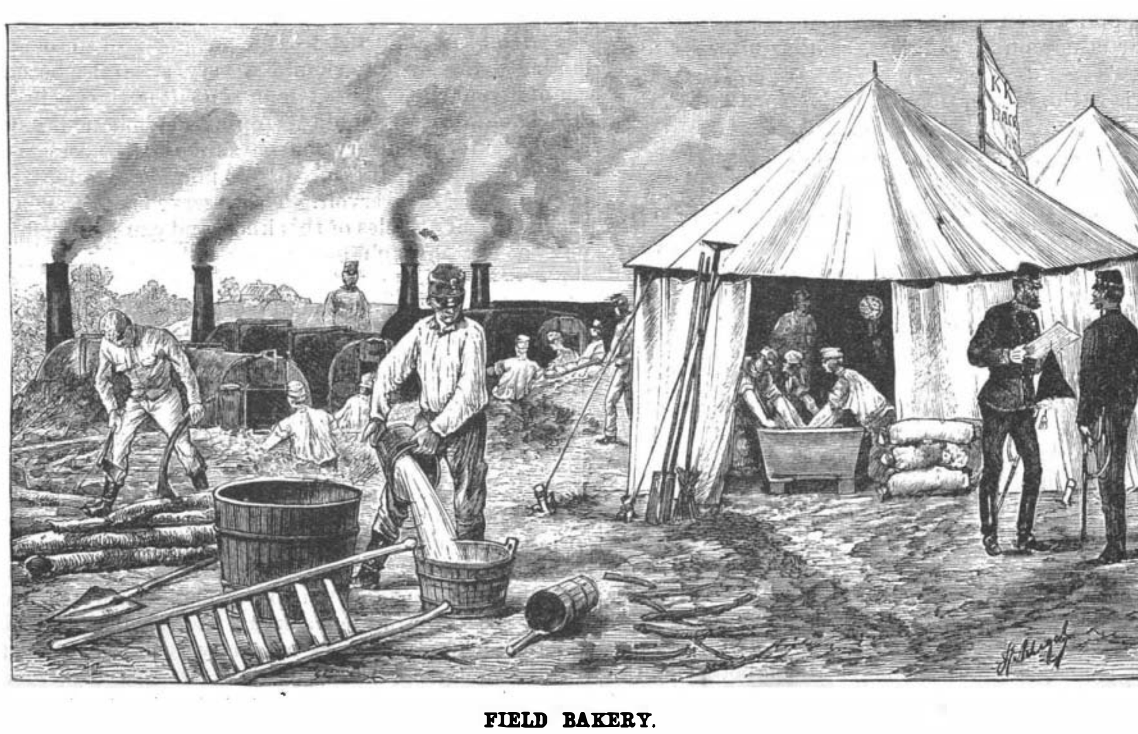
ERECTION OF THE TELEGRAPH BY THE RAILROAD AND TELEGRAPH REGIMENT.

It is very important for the welfare of the troops that they should always be provided with fresh meat and bread. The former is obtained by driving cattle after the army, and the latter by the use of transportable field bakeries. The separable field ovens of the "Payer system," which are used in the Austro-Hungarian army, proved, during the last great maneuvers, to be excellent. The ovens are taken apart, and they, with the other utensils belonging to the field bakeries, are placed on special wagons and carried with the troops so as to be ready in case of need. A field bakery generally consists of three sections of forty-eight ovens, each section being divided into four parts, and each of these parts containing four ovens, which latter are always set up and operated in pairs. It requires four hours to set up the ovens and tents. A field bakery of this kind can deliver 17,928 loaves of bread for nine "heats," each loaf forming two rations.



THE RESTORATION OF A PORTION OF A ROAD BY THE RAILROAD AND TELEGRAPH REGIMENT.

With the very extensive fronts of the large armies of the present day, it is not always possible to communicate by telegraph, specially when two divisions are separated by marshy ground. In such cases the field signaling apparatus can be used to advantage. This is an optical telegraph which consists essentially of a triangular and a hexagonal piece of linen, which can be so arranged in different positions in relation to each other that full dispatches can be transmitted very quickly. As, however, an apparatus of this sort cannot be employed in foggy weather, numerous electric telegraphs must take its place. The construction of the latter (particularly the laying of the cables) is attended to by the railroad and telegraph regiment which has been formed in Austro-Hungary during the past few years. This is a corps similar to the pioneer corps, and is, like the latter, armed with the pioneer sword and also with the extra corps gun; and the uniform is of the same gray with steel-green trimmings, bearing the winged wheel as a special mark. All of the officers of the telegraph regiment, as well as those of the pioneer regiment, are mounted. In placing the telegraph wires they are allowed to run off a drum which is mounted on two-wheeled cart, and then secured to the light, transportable telegraph poles which are supplied with insulators. Furthermore, the construction of short connecting railroads for the transportation of troops, ammunition, and provisions forms a part of the



FIELD BAKERY.

MODERN MILITARY APPLIANCES.