

BOTANIZING UPON A COIN.

Who has not remarked those small blackish masses which, as a consequence of too long a circulation, form incrustations (Fig. 1) upon the surface of coins, in the depressions between the images and letters? These have been studied by Mr. Reinsch, of Erlangen, whose investigations have embraced the coins—copper, silver, and gold—of all the states of Europe, and who has everywhere found micro-organisms—algæ and bacteria.

Upon scraping off with a needle the incrustation that had formed in the depressions of coins, and then placing it in distilled water and examining it under a magnification of from 200 to 300 diameters, Mr. Reinsch has detected the presence of the following bodies: fragments of textile fibers (Fig. 2, c), numerous granules of starch (Fig. 2, d), especially that of wheat, globules of fat, and a few unicellular algæ, etc. But, upon increasing the magnification, there are seen, amid all such detritus, bacteria in active motion (Fig. 2, b). Sometimes it is the rod-shaped sorts (oscillaroid bacteria), having an oscillatory motion (*Vibrio*, Fig. 3, d), or a spiral one (*Spirillum*), and sometimes the globular forms (micrococoid bacteria). Sometimes all these forms are collected upon one and the same piece of money; but in most cases one form or another is met with isolatedly.

The globular bacteria are most frequent; the *Spirilla* (Fig. 3, c') are much more rarely met with. As for *Bacilli*, these are almost always found upon copper, gold, and silver coins, under the form of from 4 to 12 jointed rods about 0.0055 or 0.0077 mm. in diameter. The terminal joints of these rods are swollen into a globular form. All these bacteria cease motion as soon as a drop of iodine or glycerine is introduced into the preparation. As for algæ (Fig. 2, a), the two species oftenest met with on coins are a very small *Chroococcus* (of the family *Phytocromaceæ*) and a unicellular species (Fig. 3, b') that approaches the *Palmellæ*. The *Chroococci* are hardly 0.00095 mm. in diameter, and are found collected, in 4s, 8s, and 12s, in spherical colonies that form small masses 0.02 mm. in diameter (Fig. 3, a'). The second form of alga (the one that approaches the *Palmellæ*) is much larger, and consists of thick-walled cells having dark colored contents. In form they are related to the *Pleurococci*. Their diameter is from 0.009 to 0.01 mm., and the thickness of their walls is about a tenth of these figures. Several of these cells are found in segmentation, but not, however, so regularly as the typical *Pleurococcus*. The algæ are met with only upon old coins; the new pieces contain bacteria merely. Aside from algæ and bacteria, the incrustations upon coins contain undeveloped hypbæ, and spores of fungi analogous to those found in mould.

The fact ascertained by Mr. Reinsch is of great importance as regards public hygiene. We all know to what a degree the bacteria are propagators of contagious diseases, and certainly they could not choose a better vehicle for their dissemination than cash—that "object of circulation" *par excellence*. It would perhaps be prudent in times of epidemic to wash in a boiling alkaline solution such coins as have become coated by too long a circulation.—*Science et Nature*.

In connection with this subject, we present the following article, contributed by the editor of the *Hungarian Journal of Botany* to the September number of the *Bulletin of the Torrey Botanical Club*, of this city:

THE MICROVEGETATION OF BANK NOTES.

The recent researches of Paul Reinsch in Erlangen have revealed the occurrence, on the surfaces of the coins of many nations, of different bacteria and two minute algæ (*Chroococcus monetarum* and *Pleurococcus monetarum*, P. Reinsch), living in a thin incrustation of organic detritus composed especially of starch grains, fibers, etc., deposited upon their surfaces during the course of long circulation. This thin incrustation renders the coins very suitable for this microvegetation, but the same phenomenon is exhibited by paper money, and, indeed, by notes of clean and, to the naked eye, unaltered surface.

I have scraped off some of these minute incrustations with hollowed out scalpels and needles, and divided them into fragments in distilled water that had been boiled shortly before, and, upon examining them with lenses of high power (R. T. Beck's one-tenth inch), have seen the various schizomycetes distinctly.

I can now proceed to give a brief account of the results I have obtained from the investigation of the paper money. I have investigated the Hungarian bank and state notes, re-

cent and old (from the years 1848-49), also Russian ruble notes, and have found bacteria upon all of them, even upon the cleanest.

On the surface of all the paper money is always to be found the special bacterium of putrefaction, viz., *Bacterium termo*, Dujardin.

In the thin incrustations on the paper money I ascertained



Fig. 1.—Coin with incrustations at a b c. Fig. 2.—A portion of the mass magnified × 200-250: a, algæ; b, bacteria; c, fibers of cotton; d, starch grains. Fig. 3.—The same more highly magnified: a', algæ (*chroococcus*); b', unicellular algæ; c', *Bacillus*; d', *Vibrio*; e', *Spirillum*.

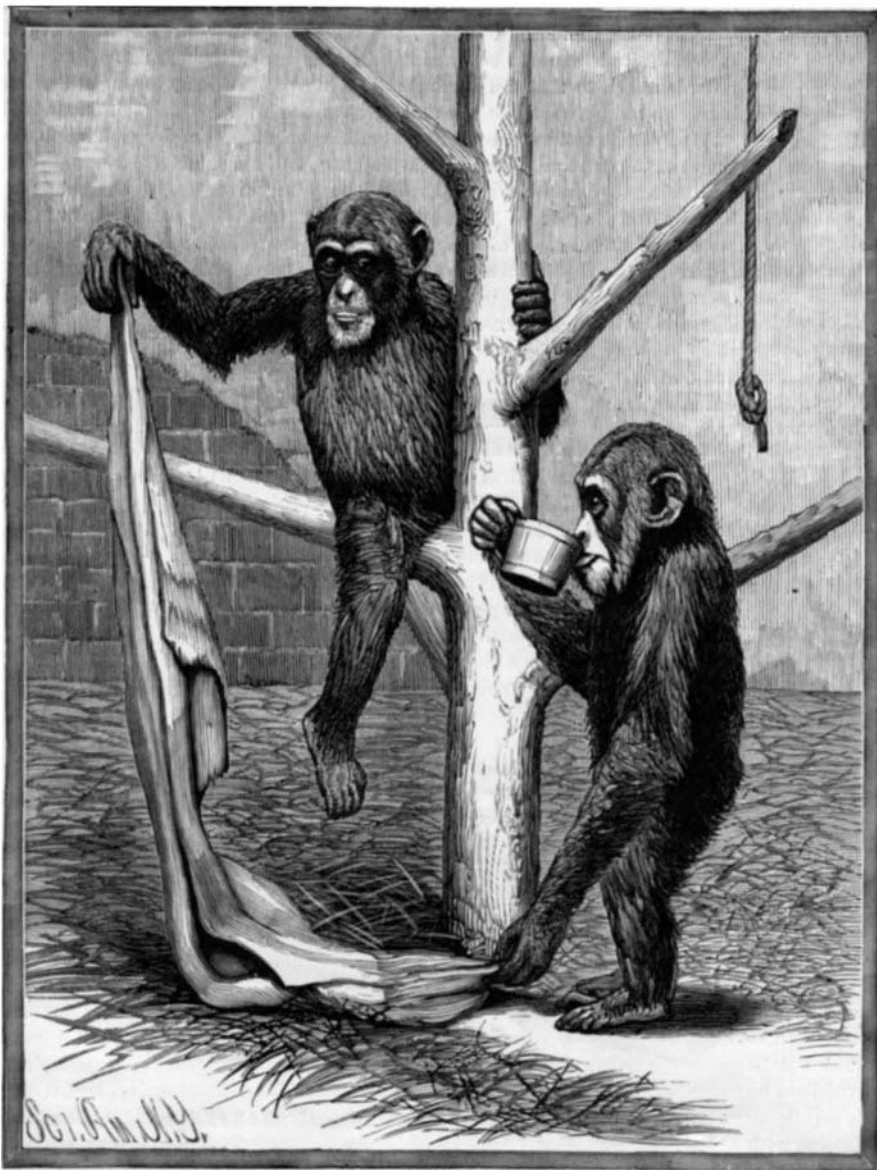
the occurrence of starch grains (especially those of wheat), linen and cotton fibers, and animal hairs, and, in this deposit upon the forint state notes, the blastomycete *Saccharomyces cerevisiæ* in full vegetation.

Various *Micrococci*, *Leptotriches* (many with club shaped, swollen ends), and *Bacilli* are also the most frequent plants in the deposit of the paper money.

The two new species of algæ described by Paul Reinsch are very rare on paper money. The green *Pleurococcus* cells have been observed in some cases on 1 and 5 forint state notes, and the bluish-green minute *Chroococcus* on the border of the 5 forint state notes.

The vegetation of the paper money is, according to my researches, composed of the following minute plants:

1. *Micrococcus* (various forms); 2. *Bacterium termo*; 3.



YOUNG CHIMPANZEES.

Bacillus (various forms); 4. *Leptothrix* (species?); 5. *Saccharomyces cerevisiæ*; 6. *Chroococcus monetarum*; 7. *Pleurococcus monetarum*. From a hygienic point of view an investigation of the commonest household objects, and especially of books etc., used by students, may not be superfluous.

Valerian for Superficial Wounds.

At a recent meeting of the Societe de Biologie, M. Arragon brought forward a new method of dressing wounds, by which, he declared, their healing was hastened and the pain was made to disappear at once. The method consisted in the application of compresses wet with a decoction of thirty parts of valerian root in one thousand parts of water. Of fifty patients treated in this way, with only two had benefit failed to result, whether the wounds were lacerated or contused, but it is expressly stated that the treatment is of no avail in deep wounds. In one instance, warm injections of the decoction were used for otitis media. The anodyne effect is attributed to the action of the valerianic acid on the terminal nerves, and an antiseptic influence also is credited to the remedy.

Gas Tight India Rubber Tubing.

An elastic rubber tubing perfectly gas tight and free from smell has been urgently needed for many years; in fact, the impossibility of making satisfactory gas connection for gas apparatus which requires to be movable has rendered the use of gas as a fuel in many cases a most objectionable nuisance. A tubing by Mr. Fletcher, of Warrington, Eng., is made of two layers of rubber, with pure soft tin foil vulcanized between. It is said to be perfectly and permanently gas tight under any pressure, and free from smell after long continued use, while it retains the flexibility and elasticity of an ordinary rubber tube.

YOUNG CHIMPANZEES.

The chimpanzee is generally admitted to be the highest species of the apes, because its anatomy compares more favorably with that of man than any other of the monkey family. The adult measures nearly five feet in height. Its body is covered with long blackish-brown hair, which is thick upon the back, but scant upon the fore part of the body; at the sides of the head the hair is very long, and hangs down in the form of whiskers; the eyes are rather small; the lips are thick, and admit of great protrusion. The hands and feet are nearly naked, and the hairs of the forearm are directed toward the elbow.

The chimpanzee is a native of the Guinea region of West Africa. It has only been within the last few years that living specimens have been exhibited in this country. Our Zoological Gardens, Philadelphia, have now two interesting individuals of this species. Although they are comparatively young, perhaps not older than six years, yet they have an extremely antiquated appearance. I heard a countryman say to a bystander that he "guessed they were 70 years old, easy." One of them has such a great fondness for an old blanket, that he carries or drags it with him wherever he goes. Even if he desires to climb to the extreme top of his cage, the blanket must go along, although it greatly retards his progress. He knows its use, but does not always use it judiciously. Thus, on an oppressively hot day in July, I have seen him reclining for twenty minutes or more, entirely enveloped in the blanket, with the exception of his face, looking at the spectators with a comical and pouting expression. I saw one, when teased and disappointed by its keeper, throw itself upon the floor, and roll and scream vehemently, very like a naughty child in a tantrum. A board shelf was placed across their cage for them to climb upon. This they soon found could be used as a spring board, and nothing seems to give them more pleasure than, when there is a good audience, to steal gently to the center of the board, grasp it tightly with all fours, and spring violently up and down, causing the board with themselves to vibrate rapidly, and producing at the same time a loud, jarring noise. They then seem to greatly enjoy the startled and amused looks of the spectators. Perhaps one of their most human actions is languidly to recline, and holding a straw in one hand, listlessly to chew at its tip, while the eyes are rolled vacantly around. It may be that they are then building "castles in Spain." A lady observing a chimpanzee thus engaged, said he was thinking of liberty and his sunny home. But I do not for a moment suppose he was dreaming of and longing for his native home—the luxuriant and balmy forests beside the calm-gliming Gambia—but rather saying to himself, "Isn't it most time for that bossy and consequential cousin of mine to bring me my boiled rice and milk?" C. FEW SEISS.

The Length of the Meter.

The result of the latest investigations by Prof. William A. Rogers, gives the length of the meter as 39.37027 inches.

Concrete vs. Brick Floors.

The designer of a certain warehouse in Germany, unable to find definite data of the resistance of such floors, resolved to make trials for his own information, and incidentally for that of his professional brethren. The warehouse was of immense size, covering nearly an acre of ground, and was intended for the storage, among other things, of heavy pieces of metal, the handling of which often involved considerable shocks to the floors. The whole building was fire-proof, part of the flooring being of brick arches in cement, between iron beams, and part of concrete slabs supported in the same way. Five trial floor arches were built, each 44 inches in span, of which the first consisted of concrete, made with one part Portland cement to five parts of gravel, while the second was of hard bricks in Portland cement mixed with three parts of sand, and was covered with a coat of asphalt three-quarters of an inch thick; the third was of softer brick, in mortar containing one-half as much lime as cement, and four parts sand; the fourth was of the same brick, in equal parts of lime and cement, and five parts sand; and the fifth was of the same brick, in cement alone, mixed with four parts sand. These last floors were finished with a coat of cement, three-quarters of an inch thick or more.

Fifty-four days after their completion, each floor was loaded with pig iron to the amount of 200 pounds to the square foot. This weight had no effect, and two days later the concrete arch was tested by letting fall upon it an iron ball of 60 pounds weight. This, dropped from a height of five feet, did no harm, and another ball, of 135 pounds weight, was let fall from the same height. The first blow produced no effect, but by dropping the ball repeatedly on the same spot a crack was started at the fourth blow, and the eighth broke a hole entirely through the floor, the opening being 4 inches in diameter at the top and 24 inches at the under side.

Thirty days later the same test was applied to another part of the floor, and a hole of the same size and shape was broken through at the ninth blow of the ball. The thickness of the concrete in the middle of the span was 4 inches. Trials were made of the brick floors in the same way. The first, of hard brick in strong cement mortar, stood forty-eight blows of the heavy ball before it was pierced; the second, of softer brick, with lime added to the mortar, gave way at the tenth blow; the third, at the seventh blow; and the last, of soft brick in sandy cement mortar, without lime, at the tenth. In all these cases the hole broken through was much larger at the intrados than at the extrados. A new floor was then built of soft brick, in mortar made with two parts lime to three of cement and ten of sand, and covered with a layer of concrete, of equal parts of cement and sand, 2 inches thick. After this had set, the floor required seventy-one blows of the 135 pound weight to break it through. This protective effect of the thick layer of concrete over bricks is very curious, but aside from this, the result of the tests was decidedly in favor of the brick arching.—*American Architect.*

Exemption of a Physician's Property from Debt.

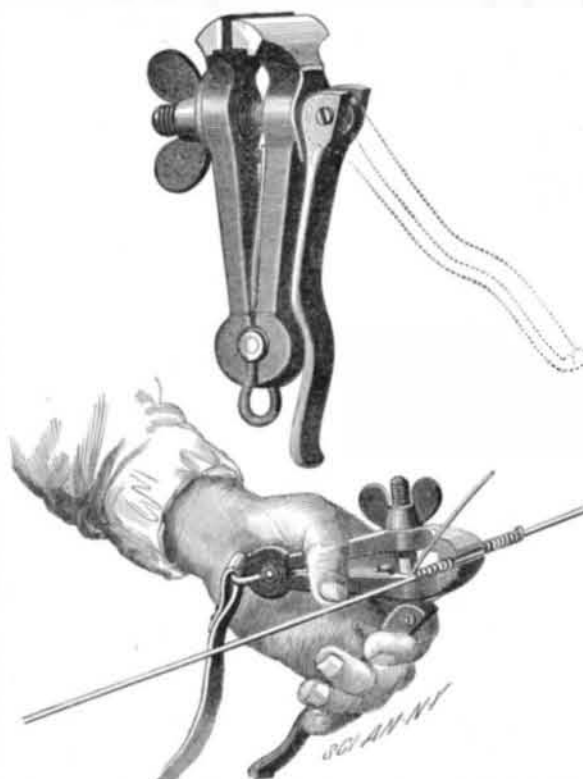
A New Hampshire physician was unfortunate enough to fall into debt and have judgments entered against him. The creditors naturally tried to obtain payment by issuing execution, and among the articles levied on by the sheriff were the physician's wagon and harness. The New Hampshire law says that such articles as are "tools of a person's occupation" cannot be seized and sold under an execution. The physician maintained that his wagon and harness came under this designation, and tried to recover them from the sheriff. The court, in deciding the question, which is an important one, does not settle the particular case, but refers it to a jury. The legal principles involved are of interest, and we quote from the decision as follows:

"The court cannot say, as a matter of law, that a wagon or a harness is a tool of a physician's calling, and so exempt to all physicians; nor can they say that it is not such a tool. The most that can be said, as a matter of law, is that it may be a tool of his profession if, in the particular case, it is reasonably necessary for him to use it as a tool. If it should appear that his practice was confined to his office, or that he was a physician or surgeon in a hospital, attending to no cases outside of the institution, or that he was a surgeon on shipboard, or that he went on foot or horseback, or on the cars, to visit his patients, a wagon and harness would not be exempt under our statute, because they would be of no use to him as tools in his practice. They might be of use to him in other respects, as in going to church, or in carrying his children to school, or in visiting friends, or as a means of recreation and pleasure; but these uses are manifestly not within the legitimate scope of the technical duty of a physician. Not coming within the strict definition of the term tools, and not being reasonably necessary as tools for him in his practice of his profession, they would not be tools within the meaning of the statute, and so would not be exempt as such. But if it should be found that the physician claiming the exemption could not practice his profession with reasonable success without a team with which to visit his patients; that he was located in a country town, for example, where it was necessary for him to ride a large part of the time in order to accomplish anything professionally, a wagon and harness might properly be found to be reasonably necessary for him as tools of his occupation. But the finding would be one of fact, so far as the reasonableness of the use is concerned; and it could not be said that these articles are exempt to every physician, or to physicians generally,

but only to the debtor in the particular case. If there is any doubt whether an article claimed to be exempt from attachment is a tool under the statute, the question should be submitted to the jury whether its use as a tool by the debtor in his business is reasonably necessary. If it is, it is exempt; otherwise, it is not exempt."

IMPROVED VISE.

The object of an invention recently patented by Mr. William M. Whiting, of Elizabeth, N. J., is to construct a vise for grasping and securely holding articles of various sizes in such a manner that the pressure exerted by the pivoted jaws may be increased at will by a device acting independently of the screw and nut usually employed for forcing them together. The jaws of the vise are of the usual form. A screw threaded bolt extends through holes in the jaws, and at one end is pivoted to a cam lever, which also serves as a head for the bolt and prevents it from passing through the hole. A nut turns upon the thread of the bolt projecting

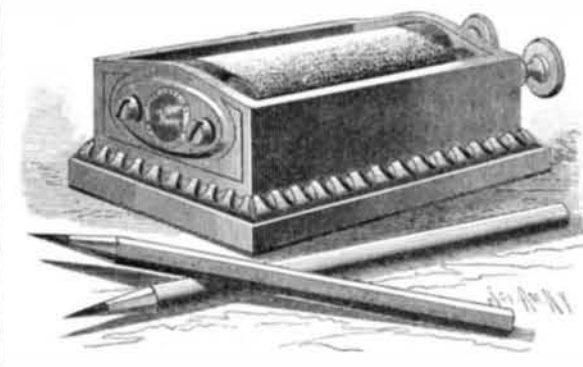
**WHITING'S IMPROVED VISE.**

from the opposite side of the vise. By means of this nut the jaws may be forced together, but where a greater pressure is desired than can be obtained in this way, the cam lever is raised so that the narrowest portion of its eccentric is interposed between the jaw and pivot of the lever.

After the jaws have been brought sufficiently together by the nut, the final pressure for grasping the object is obtained by forcing the lever downward, when it may be conveniently held by grasping it in the hand, together with the lower portion of the vise. This vise is designed with especial reference to the requirements of telegraph line men, and is of great value in working upon several articles of the same size, for in such case it can be set, by means of the screw, so as to allow the object to be readily placed between the jaws, after which the grasping pressure may be instantly secured by a single movement of the cam lever.

COMBINED PAPER WEIGHT AND PENCIL SHARPENER.

A small article which artists and draughtsmen will find particularly useful has been recently brought out by Messrs. Keuffel & Esser, of 127 Fulton Street, New York city. In a cast metal coverless box are journaled, longitudinally, two rollers, the axes of which are extended through the case at one end and provided with buttons by means of which they may be turned. Each roller is formed with a longitudinal slot just wide enough to admit the edge of a piece of fine sand or emery paper, which is of such a length

**COMBINED PAPER WEIGHT AND PENCIL SHARPENER.**

as to admit of its being wound several times around the rollers. The paper passes over a bar placed across the top of the box parallel to and between the rollers, and thus presents a wide surface upon which the pencil may be conveniently sharpened. When the exposed part of the paper becomes worn, a clean portion may be brought up by simply turning one of the rollers. All the dirt is collected at the bottom of the box. The device also forms a very handy paper weight.

DECISIONS RELATING TO PATENTS.**United States Circuit Court.—Northern District of Illinois.**

THE BROWN MANUFACTURING COMPANY vs. DEERE & CO. Blodgett, J.:

The first claim of letters patent No. 190,816, granted to William P. Brown, May 15, 1877, for an improvement in couplings for cultivators, examined, sustained, and the defendant held to infringe.

The phrase in the claim "against or with the weight of the rear cultivators or plows" should not be read, as defendant contends, "against and with the weight," etc. There is no uncertainty or ambiguity in this claim. The claim is comprehensive enough to cover both the arm, M (by which a spring power is applied), and the arm, M' (by which the draught power can be applied), for the purposes to which the inventor proposed to apply them.

The objection that the specification describes and the claim covers a useless form or construction, as well as a useful one, is of no avail where the infringer uses the latter. The well known maxim applies, "*Utile per inutile non vitiatur*"—that which is serviceable is not to be rendered invalid by that which is useless.

Transferring the point of applying the lifting force of a spring from a point behind the forward end of the beam to an arm on the coupling, to which the beam is pivoted, held to involve patentable invention.

The fact that not only the defendants in this case, but other large manufacturers of cultivators, have at once adopted substantially the same auxiliary lifting devices shown in complainant's patent is evidence of the popular acceptance of this as a practical solution of many of the difficulties which had been encountered in the attempt to use the older devices, and is such a change and improvement as required more than mere mechanical skill, and brings this device fairly within the domain of the patent laws.

The fact that these older devices—Stover of 1870 and Brown of 1872—which it is now claimed were susceptible of being modified by mere mechanical skill into a machine in its operation and effect like that shown by the complainant's patent, rested without any such modification until the present patent was promulgated, held to be quite conclusive proof that it required something more than mechanical skill to produce what is shown in this patent.

United States Circuit Court.—Southern District of New York.

HOLMES ELECTRIC PROTECTIVE COMPANY vs. METROPOLITAN BURGLAR ALARM COMPANY.

Wheeler, J.:

Patent No. 120,874, granted to Edwin Holmes and Henry C. Roome, November 14, 1871, construed to be for an electrical covering fitting the outside of safes, as distinguished from an electrical protection applied to houses and other buildings and to rooms. The patent sustained, and a preliminary injunction granted.

The provision of the statutes that a United States patent for an invention previously patented abroad shall be so limited as to expire at the same time with the foreign patent seems to mean that the term of the patent here shall be as long as the remainder of the term for which the patent was granted there, without reference to incidents occurring after the grant. It refers to fixing the term, not to keeping the foreign patent in force.

Rifle Caliber Machine Guns.

Lieut. Sleeman, in an article in the *N. A. Review* for October upon the development of machine guns, says:

The use of rifle caliber machine guns offers to a general the simplest and most effective means whereby to intensify rifle fire at any point of his position, without causing the offensive or defensive power of any other part to be weakened for this purpose.

Rapid firing single barreled shell guns possess some exceedingly important features for the military service, whether used in the field, as mountain guns, or for the armament of fortifications and earthworks. The properties that most strongly recommend these guns for service in the field are rapid fire, little or no recoil of gun carriage, mobility, simplicity of mechanism and manipulation, and, lastly, the use of made-up or self-contained cartridges. It is difficult to conceive of more suitable guns for light horse artillery. Take, for instance, a battery of six rapid firing three-pounder shell guns, each capable of discharging eight projectiles in half a minute, with deliberate aim between each shot. A battery of this nature could in this short period of time deliver forty-eight projectiles, equivalent to 144 pounds of metal, and if common shells were used, with 1,440 splinters, or for shrapnel shells, with 2,016 lead bullets. Such a rain of bursting shells would create terrible confusion, and have a most demoralizing and destructive effect, if thrown among a body of troops, while if directed against earthworks or houses, the continuous fire of shell after shell would soon produce considerable damage. The comparative lightness of these weapons would permit of their being provided with an effective shield protection without reducing to any serious extent their property of mobility; besides, the additional weight of this shield would permit of a larger powder charge being used, with a corresponding increase in initial velocity, accuracy, and power. Three-pounder guns have been referred to, but six-pounders are also adapted for field service, by allowing them to recoil and automatically return to their original positions without causing their carriages to run back.