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NEW YORK, SATURDAY, JULY 6, 1861.

THE BEGINNING.

During the seventeen years we have been publishing the SCIENTIFIC AMERICAN, we have presented no volume to our readers with more satisfaction than the one which closed with the last number. The variety and richness of its contents are greater than those of any of its predecessors. Among the more prominent of these are :—A complete course of Faraday's lectures, profusely illustrated ; an illustrated history of the steam engine from the earliest times, with biographical sketches of the inventors who have made the principal improvements in its various parts ; a series of original articles on the nature of wealth, and the process of its production ; and a current history of the war, carefully prepared each week from the latest and most authentic accounts, together with illustrations of the latest improvements in war implements.

These are in addition to our usual record of discoveries in science, and our illustrations of new inventions in the mechanic arts in Europe, as well as in this country. The unusually valuable character of the latter were especially noticed in our last issue. Among the illustrations of inventions transferred to our columns from foreign journals will be found an engraving of the first practical air engine, invented by Robert Stirling, of Scotland, and a cut of Lenoir's gas engine, which is attracting so much attention in France. This volume also contains an engraving of the apparatus employed in the important experiments on turbine water wheels at Philadelphia, and an illustration of the experiments which demonstrated the frailness of the Armstrong gun.

It would be useless to specify in detail all the prominent features in the history of the past year, as it stands related to the progress of the arts and sciences.

These wonders teach, in a very impressive manner, the uncertainty of the future. What new devices of inventive genius, or what new marvels of scientific discovery the next six months may bring forth, it is impossible for the boldest intellect to imagine.

It shall be our constant and unceasing aim to keep our readers fully advised of all that shall occur during the ensuing year. The mind is almost bewildered in view of the stupendous scenes that are before us. The nation is rocking upon its very foundation, and the ingenuity and wisdom of our people will be taxed to the utmost to devise means to carry the country over the breakers. Mechanical ingenuity will play a conspicuous part in all these grand movements, and in these columns only can the public curiosity be gratified with a full view of all that takes place in this department.

To enable us to meet the reasonable expectations of our readers, we must be supported by their generous subscriptions, and we promise them, in return, a compensation ten-fold in value. The SCIENTIFIC AMERICAN is, beyond doubt, the cheapest paper of the kind ever published, and we wish to say to our readers distinctly, that but for the professional business of this office we could not afford to give them an illustrated journal of this character, in these times, for two dollars a year. We urge our friends to remember this fact, and to use their exertions in extending its circulation.

An Enfield rifle ball makes two hundred revolutions per second, after leaving the barrel.

EXPERIMENTS WITH McCARTY'S CENTRIFUGAL GUN.

An *intense* crowd of persons assembled at the foot of Thirty-second street, North River, this city, on the afternoon of the 19th inst., to witness experiments with Mr. R. McCarty's centrifugal gun. A few persons were permitted to examine it in the building before it was taken out for operation, but the interior was not exposed. Its external appearance is almost like that of a narrow fan-blower mounted upon a long low carriage. The bullet case is placed in front, and consists of a vertical circular box secured on a shaft. In size it is three feet in diameter and about three inches broad. A tube or bullet barrel 24 inches long is placed tangentially at the top of the case and serves as a guide for the discharge of the bullets. At the center, on one side, is placed a small copper hopper into which the bullets are fed from the tubes, containing twelve iron balls, each 1¼ inches in diameter, and weighing four ounces. On the other side of the axle of the case is a small pulley over which a belt passes from a fly-wheel pulley near the back end of the carriage. The belt pulley receives a very high velocity from the driver shaft, the speed being communicated through cog gearing. The driver shaft is operated by a large crank lever at each side, and two reciprocating brakes capable of permitting ten men to work the machine. The power is accumulated by rotating the centrifugal bullet case for some moments before the balls are discharged.

A large target of common inch plank was placed in front of the gun at a distance of about 130 paces, and after getting up a high velocity on the machine, by the men working at the brakes, a stream of about sixty bullets was discharged in a few seconds. A number of the bullets struck the ground ricochetting in front of the target ; several passed over the target, and a number smashed through it and went about 40 or 60 yards beyond. This was done three times in succession. The tube of the centrifugal case was elevated to about 40°, and several bullets were discharged more slowly and with greater range than before, but as they went into the river, we were unable to judge of the distance.

A number of army and navy officers were present, and the experiments were conducted with more promptness and dispatch than is usual in such cases, Inventors and owners of new inventions, who make public exhibitions, very frequently do injury to themselves, and impose upon those whom they invite as witnesses, by not having all things arranged to commence operations at the hour appointed. A few weeks since we went to see a series of experiments in gunnery, and were kept waiting three full hours after the time appointed before the trial commenced.

Mr. McCarty was the first inventor who patented a centrifugal gun in America (and in Europe also, we believe). This was in 1838. There can be no question about its ability to discharge a stream of bullets without powder, by manual labor alone. Placed in a situation to defend a narrow pass, or a breech in a fort, against a storming party, it could throw a steady stream of bullets against the foe. It is capable of being operated by steam as well as manual power. A very large gun, upon this principle, is now in the course of construction by the inventor, which we examined in the workshop ; it is intended to be driven by a steam engine.

JAMES' RIFLED CANNON.---IN WHAT IT CONSISTS.

We are frequently asked in what consists the peculiarity of James' rifled cannon, and we publish this reply to the question for the benefit of all who are interested in the subject. There is no such ordnance as James' rifled cannon, and it is a misnomer to so call it. James' invention consists in the projectile only, which, like all those of its class—projectiles with expanding rings of soft metal—is adapted to any rifled cannon, but especially to those with numerous shallow grooves. The six-pounder used by Gen. James in his recent exhibition, was rifled with 14 grooves, about a sixteenth of an inch in depth, the lands being of the same width as the grooves. They commence at the breech, parallel with the axis of the gun, and deviate to a constantly increasing spiral, which terminates at the muzzle in a twist of one turn in nine feet. This makes an excellent rifled cannon, though it is the opinion of some artillerists that in guns of this size the twist may be increased with advantage to one turn in five feet at the muzzle. This gives the shot some 16,000 to 20,000 rotations per minute. The Whitworth gun recently on exhibition in this city had a twist of one turn in three feet, which would give the shot some 30,000 rotations on its axis per minute, allowing the initial velocity to be 1500 feet per second.

STEEL CLAD STEAM CHARIOTS OF WAR.

In ancient times, armies went forth to battle clad in steel. The horses of cavalry, as well as the men, were covered with coats of mail, and the infantry had steel caps and coats, and even their limbs were encased in metal. The Assyrians and Gauls had also chariots of war, beside horsemen and footmen, in their armies. Each chariot was generally drawn by four fleet horses covered with mail, and harnessed abreast. Huge scythes, projected horizontally from each chariot, which, beside a driver, contained several warriors who were expert at throwing the javelin and drawing the bow. It is rather remarkable that, with improvements in destructive agents of warfare, such as gunpowder, artillery and muskets, steel armor gradually went out of use. The supposition is quite natural that, instead of abandoning mail armor with the general introduction of firearms, it would be the very thing to modify, in a great measure, the advantages of firearms, still leaving the victory to the strong man, instead of the skilled, but perhaps light, marksman.

Of course, coats of mail are not proof against artillery, but they are against lead bullets ; and perhaps they may yet be reinstated in their former position. Modern military tactics are mostly based upon rapid movements, which most persons believe cannot be effected with heavy armor-clad soldiers. But it is a fact that the tactics of the great Cæsar, as they relate to rapidity of movement, have never been surpassed ; indeed, they were the model of Napoleon, who, in exhorting his army upon one occasion, told them they had not yet rivaled the legions of the great Roman. Cæsar's soldiers were clad in cuirasses ; they also carried heavy iron shields.

The navies of Europe are now being remodeled upon the old principle of clothing soldiers in mail, and for similar reasons we would not be surprised if steel coats would again come into use in armies.

An entirely new feature may also be yet introduced into warfare in the character of steel clad steam chariots. Each should consist of a light but strong road locomotive, covered with steel plates, and mounting a pivot rifled cannon on a shielded platform. The locomotive which was fired upon by the masked battery at Vienna, Va., last week, would have been able to dislodge the enemy had it carried an 18-pounder, and been protected with a steel shield an inch thick. Steam locomotive batteries require special adaptations to secure new results, but there are inventors who can supply all the details.

Mail clad towers may also be drawn or pushed up by steam engines close to batteries and forts. From these, soldiers may be able to send down showers of iron hail upon an enemy. The Power which has the most money to pay for such destructive agents, and which, at the same time, commands the best mechanical genius to invent and construct the mechanism, will be irresistible.

OWNERS WANTED FOR MODELS.—The following models have been recently received at this office, without the names of the inventors or owners being attached, and without any letters accompanying them to indicate who they are from, or for what purpose they have been sent:

One tin model of a plow.
One coil of pipe, from Boston.
One full-sized cooking stove.

The owners of the above articles will please to forward us their names, and state what they desire done with them.

TO OUR EXCHANGES.—To the press generally we owe our warmest thanks for friendly notices. We have not sent them, as usual, our annual prospectus ; we trust, however, that they will extend to the SCIENTIFIC AMERICAN their usual salutations. The paper will be continued to all such journals as thus indicate a desire to receive it *without an exchange.*