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Improved Projectiles.

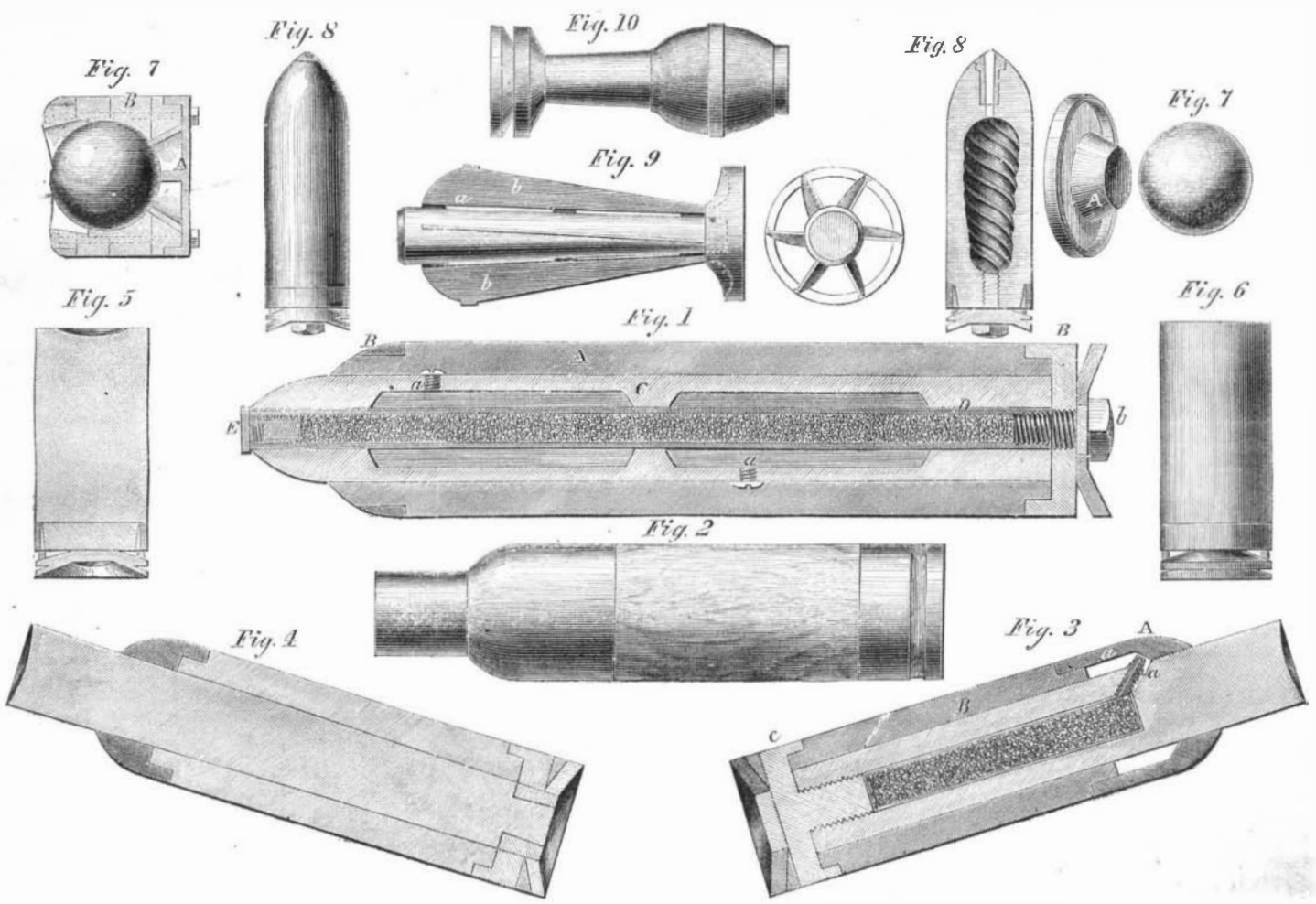
When the first note of the present war overspread the land and aroused our people to the necessity of immediate action, it found them utterly unprepared for the struggle. Betrayed on every side, our fate seemed only a swift and speedy destruction. There was scarcely a rifled gun in the country. There were batteries in abundance of the time-honored smooth-bores; there were stacks and mountains, almost, of the bomb-shells and cannon balls which in former days were so serviceable to the nation, but time had rendered these useless. Against iron-clad ships the eleven-inch guns were scarcely better than a pea-shooter against a rhinoceros; and smooth-bored batteries, in action against the long-range rifled guns supplied to the enemy by the English, were of no use at all. In this emergency, what was to be done? America seemed to be in the same condition with Poland, of whom the poet Campbell says:—

"Dropped from her nerveless grasp the shattered spear,
Closed her bright eyes, and curbed her high career."

Our inventors came to the rescue. Like the serpents' teeth sown by Cadmus, which sprang up armed men, the genius and inventive talent of the nation set to work and soon came forward, each one bearing some deadly weapon, or some improved missile, until at the present time, we fairly bristle with defenses on land and sea. Every town in the land, almost, has its peculiar rifled gun, and shot and shell of the most destructive character can be hurled into the enemy's front, or against his forts, until he gives over the struggle.

The columns of the SCIENTIFIC AMERICAN have contained, from time to time, illustrations and notices of "the grim enginery of war" in the greatest profusion, and the shot and shell herewith illustrated, will convince all intelligent persons that they are of the most formidable kind. These projectiles are those which have obtained a wide celebrity for the inventor, C. W. Stafford. Some of them are very peculiar in shape, and all of them have been proved, by practice, to possess destructive qualities of the highest order. These missiles differ materially from those in ordinary use, and the construction of them exhibits a marked departure from those beaten and well-trodden paths usually traveled by inventors. Although adapted to both smooth and rifled bores, the projectiles have no rifled grooves; they are perfectly cylindrical in shape, being neither hexagonal, nor octagonal, nor of any other form than the one previously mentioned, yet they have, when fired from the gun, as rapid and certain a rotation about their axis as any rifled projectile. Let us refer to our plate for a description of the individual shot there illustrated.

Fig. 1 is a representation of an incendiary shell, intended for dislodging an enemy from cover, or for burning his towns, ships, barricades, or other defense where he may be hidden. The long wooden case, A, is confined between two metallic caps, B; the shell,



THE CELEBRATED STAFFORD PROJECTILES.

C, is cast on the wrought-iron tube, D, and is cored out at regular intervals for the admission of an unextinguishable liquid; this is supplied through the holes, *a*, now filled by the small screws. The explosive charge is contained in the inner tube, and is fired by a time fuse, E, at the end. The base of the shell is occupied by the metallic plate secured to it by the bolt, *b*. The recess between the base of the shot and the metallic plate is wound with twine, or any fibrous substance, well lubricated, and the plate itself, at the time of the discharge, is forced into the rifle grooves of the piece, the shell remaining upon the lands; rotary motion is thus imparted, and the missile goes forth upon its errand of destruction. Wherever it lodges it is sure to burst, creating havoc and death. Fig. 2 is an elevation of one of these shells with a steel punch head on it.

Figs. 3 and 4 are what are called *sub-caliber* shot and

shell. The object is to impart a high velocity to a small exposed area of projectile, and this is accomplished in the following manner. The shell (Fig. 3) is a steel cylinder, bored out for the reception of the bursting charge; at the head of the shot the cast-iron case, A, is attached, and connected with the wooden body, B, by the metallic plate C, and leather heretofore mentioned. The nipple cone, *a*, is screwed into the body of the steel bolt, and explodes at the time of impact with the target; this bursting charge is composed of gun cotton and fulminating mercury. This shell has been driven through five and six inches of iron, backed with 18 inches of oak, exploding between the two substances and tearing them into fragments!

Figs. 5 and 6 are heavy cylindrical steel projectiles of great solidity and strength, and have been fired from the Dahlgren gun with the most destructive results.

The sub-caliber shot (Fig. 7) and shell (Fig. 8) are intended for the fifteen-inch smooth-bore and the Parrott rifle. The spherical shot has a bronze base, A, which is accurately turned off in the lathe, and bored out to a given diameter, the shot being a ten-inch. The wooden casing is then fitted on, and fastened to the bottom by bolts, and the space, *a*, then existing at the head of the shot, filled with plaster-of-paris; the openings in the base are treated in a similar manner. At the right hand of the engraving the plano-conoidal bottom is seen, as also the missile which accompanies it. The theory is that, when this shot is fired from the gun, the atmospheric resistance that it meets with, as well, also, the shock of the discharge, loosens the bolts, and forces the wooden packing backward, while the shot continues in its flight, propelled by the whole effective force of the gases set free behind it in the weapon. The shell (Fig. 8) has its interior corrugated, and from this peculiarity is rendered much more destructive to human life, as it bursts—it is so stated—into a greater number of pieces.

Another sub-caliber shot for the new naval guns (fifteen-inch) is represented in Fig. 9. This is a single bolt of steel supplied with a composition casting, *a*, shown in dark lines on the body. The metallic base is affixed to the bolt, and the wings or vanes, *b*, also of metal, are contained by spiral grooves in the composition bushing. The interstices are then filled with Babbit metal. Rotation around its axis is insured, it is asserted, by the action of the vanes or wings upon the air; and penetration is effected by the enormous advantage given by employing the force of the fifty-pound charge on a bolt of small diameter.

Fig. 10 is an improved metallic case for the same kind of shot, and consists of a hollow iron globe, A, riveted to the body of the projectile, the small band around it is turned off concentric with the base, thereby accurately centering the bolt with the diameter of the gun. It is asserted by the inventor that this sub-caliber bolt is able to penetrate 12 and 13 inches of iron when fired from the fifteen-inch gun!

These shot and shell possess extraordinary powers of penetration and endurance, as was shown by the target in Wall street last summer; this was composed of iron 6 inches thick, backed with oak, and was completely riddled at long range. Large quantities of these missiles are now being furnished to the Government; and all the iron-clad vessels, we believe, are to be supplied with them. The patents on these inventions, in this country and Europe, were procured through the Scientific American Patent Agency. For further information address C. W. Stafford, care of C. P. Dixon, Esq., 48 Pine street, New York.

Maxims on Onion Culture.

Moisture at the base of the bulb for any length of time is most injurious to the onion; on the other hand, a dry heat at the surface is very beneficial, as it is the sun heat alone which renders the Spanish onions so superior to the English in flavor and beauty of the bulbs. The hotter the season or the climate, the sweeter is the flavor of onions; and the colder the season or the climate, the more pungent.

The hoe should never be used among onions. In does mischief, and if an onion is once loosened its the soil it never makes much growth afterwards. So, too, the bulbs should never be earthed up; they should stand wholly above ground, and have good depth of soil to root in.

Sea-sand, salt and soot are good top-dressings for an onion bed—to be put on at least a week before sowing. Soot and guano, three parts of the first to one part of the second, is a good top-dressing for the seed bed when the seed is sown late, as it gives the young plant a good start to make up for lost time. Salad onions to be sown every three weeks, from the end of March to the end of August.

If young onions suddenly turn yellow and drop over on the ground, it is pretty certain they are attacked by *Anthomyia ceparum*. The grub which does this mischief is white, slimy, cylindrical, and from a quarter to half an inch long; it eats into the heart of the onion and destroys its life. As the fly inserts its eggs close to the ground, within the leaf sheaths of the plant, any noxious dressing not injurious to the plant may be used to keep the fly at a distance. Gas-house lime sprinkled between the rows, or thinly over the whole of the seed-bed, will sometimes serve the purpose, and at other times fail. When charcoal is used liberally as a top-dressing, it is very rarely the plants suffer from this pest. Another enemy is the grub of *Eumerus æneus*, the brassy onion fly. This grub is brownish and bristly; it is only in a wet season this is to be feared—drought is death to them. Gas-house lime is the preventive of this also. Deep trenching and a clean state of the ground will be the best preventives of the vermin that destroy the onion crop.

Weather Hints for Farmers.

The following are extracts from Admiral Fitzroy's "Manual of Practical Meteorology." They were intended for the climate of England, but are also of interest here, as telling the signs of the weather:—

"Whether clear or cloudy, a rosy sky at sunset presages fine weather; a sickly-looking, greenish hue, wind and rain; a dark (or Indian) red, rain; a red sky in the morning, bad weather or much wind (perhaps rain); a gray sky in the morning, fine weather; a high dawn, wind; a low dawn, fair weather.

"Soft-looking or delicate clouds foretell fine weather, with moderate or light breezes; hard-edged oily-looking clouds, wind. A dark, gloomy blue sky is windy, but a bright blue sky indicates fine weather.

"Small inky-looking clouds foretell rain; light scud clouds driving across heavy masses show wind and rain; but if alone, may indicate wind only.

"High upper clouds crossing the sun, moon, or stars, in a direction different from that of the lower clouds, or the wind then felt below, foretell a change of wind toward their direction.

"After fine clear weather, the first signs in the sky of a coming change are usually light streaks, curls, wisps, or mottled patches of white distant clouds, which increase, and are followed by a murky vapor that grows into cloudiness. This appearance, more or less oily or watery, as wind or rain will prevail, is an infallible sign.

"Usually, the higher and more distant such clouds seem to be, the more gradual, but general, the coming change of weather will prove.

"Light, delicate, quiet tints or colors, with soft undefined forms of clouds, indicate and accompany fine weather; but unusual or gaudy hues, with hard, definitely-outlined clouds, foretell rain and probably strong wind.

"Misty clouds forming, or hanging on hights, show wind and rain coming if they remain, increase, or descend. If they rise or disperse the weather will improve or become fine.

"When sea-birds fly out early, moderate wind and fair weather may be expected. When they hang about the land, or over it, sometimes flying inland, expect a strong wind with stormy weather. As many creatures besides birds are affected by the approach of rain or wind, such indications should not be slighted by an observer who wishes to foresee weather, or compare its variations.

"There are other signs of a coming change in the weather known less generally than may be desirable, and therefore worth notice; such as, when birds of long flight—rooks, swallows, or others—hang about home, and fly up and down or low, rain or wind may be expected. Also when animals seek sheltered places, instead of spreading over their usual ranges—when pigs carry straw to their styes—when smoke from chimneys does not ascend readily (or straight upwards during calm)—an unfavorable change is probable.

"Dew is an indication of fine weather, so is fog. Neither of these two formations occur under an overcast sky, or when there is much wind. One sees fog occasionally rolling away, as it were, by wind, but seldom or never formed while it is blowing.

"Remarkable clearness of atmosphere near the horizon—distant objects, such as hills, unusually visible or raised by refraction—and what is called a good 'hearing day' may be mentioned among signs of wet, if not wind, to be expected.

"More than usual twinkling of the stars, indistinctness or apparent multiplication of the moon's horns, haloes, 'wind-dogs,' and the rainbow, are more or less significant of increasing wind, if not approaching rain, with or without wind."

Cost of Fences---Improvements Wanted.

The following interesting extracts are from a communication of Charles R. Smith to the *Country Gentleman*:—

"At the New York Fair, facts were presented as to the amount and cost of fencing, which will astonish every man who has not given that subject much thought. $144,000,000 for the fences of a single State! and this is the cost of construction only, the value of the land they cover not being included in the estimate. Notwithstanding their immense cost, they are a century behind the improvements of the ago. Evidently there is no one thing in which our farmers so sadly err as in building fences. They build temporary fences, which require constant watching and frequent repairs; they build wide wall fences, and cover up from 50 to 60 feet of land to the rod, without thinking that by so doing they materially lessen the size of their fields—they build the rail zig-zag, and are profoundly unconscious that it requires four times as much lumber as a straight board fence, and that it puts three-fourths of a rod of land through its entire course, beyond the reach of the plow and mowing machine! A mile of straight board fence can be built with 13,000 feet of lumber. One mile of zig-zag rail fence will require 52,000 feet, making a difference of 39,000 feet. Taking the estimates of Hon. T. C. Peters, as to the amount of fencing in New York, and allowing one-half of them to be straight board fences, and the other zig-zag rail fences, if we reckon the extra quantity of lumber required for the latter at $4 per thousand, and the land at $40 per acre, the crooked fences will cost $49,000,000 the most! Can New York afford to throw away this value of land and lumber? Can the West, so scantily supplied with fencing materials, afford it?

"In my opinion, for a permanent fence, the whole system of putting posts of wood in the ground, to be thrown out by frost in three or four years, or to decay in eight or ten, is wrong; and I believe that the time will come when farmers will as soon build their houses and barns in this way, as their fences, and when zig-zag in fencing will be considered just as much a mark of wisdom as zig-zag in walking. Substitute straight, upright durable fences for the crooked, leaning, short-lived ones so common all over the country, and what a change would be made in the appearance and value of our farms, and what a saving would be made in materials, time, money and labor! We want fences that are easily and cheaply made; that are straight and cover but little land; that are adapted to our river lands and roadsides, where snow-drifts are troublesome in winter, and that will last in every part, without cost of repairs, at least 50 years.

The New Copper Paint.—J. Nickles, the Paris correspondent of *Silliman's Journal*, states that M. Audry, who has been so successful in electro-plating with copper the cast-iron monumental fountains in the *Place de la Concorde*, makes his new copper paint from the porous copper deposited by the galvanic battery, mixed with a varnish. The solvent of his varnish is the light and refined petroleum, or what we call benzine. The copper is very pure and is easily pulverized, then it is mixed with the benzine varnish, and applied either to iron, brass, plaster, or wood. When this copper is mixed with oils, it acquires a green antique hue.

Railroad Engineers.

There exists in this country a race of men whose life is a perfect paradox. They pass their existence in a whirl of the wildest excitement and danger, which is, at the same time, to them, but wearisome monotony. They have homes and firesides, and wives and children, yet they are ever wandering to and fro, dashing along by cities, villages, quiet country fields and dark forests, as if they had no resting place. Seen daily by thousands of their fellow beings, they are personally known to but very few. Though holding responsibilities, the very contemplation of which is fearful, they are scarcely thought of by even those who place themselves within their power. Until the present season of war there were none in this country who had the lives of others so utterly in their power. Day by day, though they never see or speak to the procession of travelers which follows unresistingly in their wake, they yet have that procession completely in their power. With the spirit in "Manfred," they can almost say :—"Our hands contain the hearts of men, our footsteps are their grave!" The anomalous beings are they who "run" the railroad trains—the engineers, conductors and brakemen. They have been too long looked upon as the rougher kind of humanity, have been the subjects of severe condemnation and reproach upon the occurrence of every disaster; while their skill, bravery, and presence of mind have scarcely ever found a chronicle. Yet if the records of their noble deeds were all gathered and presented in their true light, it would be found that those rough, weather-worn men are entitled to as high a place and as lofty a fame as has been allotted to any other class who cope with disaster.

Gigantic Vegetables in California.

Cabbages weighing 15 pounds are wonders in the New York market; in San Francisco they are common. Whole fields of cabbage heads weighing 20 pounds each have been grown; and hard, solid heads, with no loose leaves, weighing 53 pounds each, are on record. One cabbage, which did not make a head, grew to be 7 feet wide, throwing out leaves 3½ feet long on each side. In many cases the cabbage has been converted into a perennial, evergreen, tree-like plant, by preventing it from ever going to seed. Several of these are growing in the State, with stalks from 2 to 6 feet high, and a foliage that grows through winter and summer. In 1857, one squash vine on the ranch of James Simmons, in Yuba county, produced 130 squashes, weighing in all 2,604 pounds. In the same year J. Q. A. Ballou, at San Jose, grew 2 squashes weighing 210 and 204 pounds respectively. The largest California onion weighed 47 ounces avoirdupois, and measured 22 inches in circumference. The largest red beet weighed 118 pounds, was 5 feet long and a foot in diameter. It was three years old. The first year it grew to weigh 48 pounds, and because of its large size was reserved for seed; but it disappointed its owner, and, instead of producing seed the next year, merely kept on growing, and reached the size of 86 pounds, and the following year got to 118. Such beets can be grown in abundance. A beet of 20 pounds is a wonder in New York; in California it is too common to attract more than a glance. Beets are frequently 3 feet long, so that it requires no little trouble to dig them out. —*California Farmer.*

Interesting to Boiler-makers.

According to the experiments made by Professor Fairbairn, the law of resistance for cylindrical tubes is this: A tube having the same strength of material, and being of the same diameter, will resist double the pressure to one of double the length; or the collapsing pressure, other things being the same, varies inversely as their lengths, and inversely as their diameters. Experiments made with elliptical tubes showed that in every construction where tubes have to sustain a uniform external pressure, the cylindrical is the only form to be relied upon, and that any departure from the true circle is attended with danger. The experiments also tend to confirm the conclusions heretofore arrived at, namely, that the strength of riveted joints of malleable iron plates are nearly as the numbers, one hundred for the plate, seventy for double-riveted joints, and fifty for single-riveted joints.

Kerosene Lamp-chimneys.

Mrs. Mary Kyle Dallas thus comments (in the *New York Weekly*) upon the domestic bliss which has attended the introduction of kerosene-oil lamps into her family :—

"Who, in the name of everything smashable, invented them? Did the old gentleman in black, with suspicious feet, visit this earth in the guise of an oil merchant, and bestow upon miserable mortals those abominable long-necked chimneys? Or did he only prompt the fiendish thought which gave rise to them by evil whispers in the left ear of the misguided inventor? One would think so, for, of themselves, kerosene lamp-chimneys are sufficient to fill the lunatic asylums with wretched housekeepers and drive young couples, trying to keep house on nothing, to commit suicide. *You* could tell all about them, could you not, Mrs. Saveall? who—dear little economical soul that you are—finding the gas a heavy item, resolved, once upon a time, to save your spouse's pocket by using kerosene oil. Accordingly, you purchased several lamps at auction for a mere nothing, bought three gallons of oil from a good-natured cousin in the trade, at wholesale price, and then said to your husband: 'Now, love, we'll have no more of that dreadful gas bill.' Saveall, of course, was pleased; but during the course of the evening you made the discovery that there was an odor which was far from delightful, somewhere or other. After Mr. Saveall had rummaged the house, inspected the cellar, and rapped at the surbase for dead rats, you mustered up courage to suggest, faintly, that you were 'afraid it was the oil.' Of course it was; no doubt of that, but you can agree that you will get used to it after a while, if you are not suffocated at first. 'Besides,' says Mr. Saveall, 'no doubt the lamp is wrong, somehow; let me see. Oh, yes, I'll screw it a little tighter, and I'm sure the smell will cease to be perceived!' Accordingly, Mr. Saveall gives the required screw to the lamp top, and as he does so, dash, crash, smash, goes the chimney in a thousand pieces over the hearth!

"'Phew!' whistles Saveall, 'how very singular;' and you echo the remark. Fortunately, you have another lamp, and after many astonishing accidents, such as getting the wick all out at the top, or screwing it all down into the oil, or trying to light the brass tube, and dropping the match through the aperture, at the risk of an explosion, your second lamp is fixed to suit you. It will smell badly, but you are so glad to get the light by this time, that you don't notice it. 'It is strange you should have been so careless as to break that chimney!' you say in a pettish tone, to your 'lord and master,' as you reach a glass of water from the table; now I could use one a year and never crack it, my dear.' But even as you speak, whiz, fiz, goes the second chimney into more minute particles than the first! You are inclined to think the days of witchcraft have returned, until you discover that the secret of the explosion is the drop of cold water which, trinkling down the side of the goblet, fell upon the heated glass.

"'Use it a year, could you, Kitty?' says Mr. Saveall with a provoking laugh, as you pick up the pieces, and you begin to feel indignant, when squalls from the nursery call you thither in alarm. Bobby, in his night-gown, is standing on a chair near the bureau, looking guilty; and Sammy explains from his crib that 'Buzzer Bob wath thquirtin water at me from the wath bathin and thmathed the lamp,' which Bob denies, vowing that he never touched the chimney, and guesses Sam 'fired something at it.' Whereupon Mr. Saveall delivers an oration on the expansion of glass by heat, while you chastise Bobby, and run a bit of glass through your slipper into your foot. You have still one chimney left, and as you retire, you place this last treasure upon the lamp you intend to burn all night. 'Turn it down a little, my dear,' you say to Mr. Saveall, as you cuddle up the baby; and Saveall does it with a flourish, thereby putting it out altogether. 'No matter about lighting it again,' you say, 'you'd be sure to break it in the dark,' and in a very cross mood you address yourself to sleep.

"About midnight, baby bethinks himself of the colic, as an interesting means of passing the time, and cries, and squeals, and kicks as only a baby can. Catnip tea must be had, and sleep. Mr. Saveall arises to light the lamp. Sooner said than done. He cannot get that chimney off. He tugs and pokes. 'How do you do it, love?' 'To the right—I mean to the left—somehow or other; I know you screw it round!' is your lucid answer. 'Please hurry!' 'I should think it was nailed on,' mutters Saveall. 'Ah, now I have it—no—ah this is it.' Smash!—it is all over with that last chimney. You groan; Saveall says something naughty, and tries to pretend he only coughed, and baby's voice [redacted] octave higher. 'Perhaps it will burn without the [redacted]' says Saveall. Ah! I thought so—there!' [redacted] even as he speaks, the unshielded flame pops up and goes off with a blue explosion which makes you shriek in terror, and might be dangerous but for a sudden *douche* of cold water. So, despairing of your kerosene-oil lamp, you light the gas and use it ever after; consigning the new purchase to oblivion, and compassionating your unhappy neighbors who, having no gas, must continue the ruinous smashing process indefinitely."

The Seasons of California.

Nowhere in all the earth are the phenomena of day and night ushered in with such splendor as in this valley that lies so closely on the confines of the occidental sea. Nowhere does the beautiful sun—manifest type of God—so drape himself in bannered clouds, so grandly fit to be the couch of all magnificence, as he does in this, our Palestine. A poet and a dreamer would say that when the sun so clothed himself in such array of billowy beauty, it was a grand prayer and a benediction, a terrestrial adoration swelling from nature's heart to nature's God. May the sunset of Time be as gorgeously painted and as auspicious of hope! The seasons of California are varied and lovely. In this valley, during the warm days of summer, our eyes rest on the snow-capped hills that surround us at the North, while the ocean breezes from the South fan us unto pleasantness. During our warmest months night comes to our relief, cold and exhilarating. Then we are favored by the delightful season of autumn. Could more be asked on earth, so far as weather is concerned, than has been presented the past few weeks? The husbandman has been enabled to harvest his golden crops, while the miner has been allowed to delve in the sands of the rivers for hidden treasures, unmolested by early rains. Soon we will reach the season of winter, when the heavens will commence their weeping, interspersed by clear skies and bright sunshine. We pass through the season of rain and of sunshine, to be conducted into the season of spring, when the lilies will spring from the mountain side, the floods be withdrawn, and the plain covered with flowers. Verily, we dwell in pleasant places, and while peace is by our firesides, we are furnished with plenty, and should consider ourselves the most happy and prosperous people on the face of the earth.—*Marysville Appeal.*

An Exhumed City.

A most singular discovery has been made on the French coast, near the mouth of the Garonne. A town has been discovered buried in the sand, and a church has already been extracted from it. Its original plan shows it to have been built near the close of the Roman Empire, but changes made in it had given it the appearance of an edifice of mixed style, in which Gothic architecture has usurped the place of the Roman. The original paintings, its admirable sculptured choir and Roman capitals are adorned with profuse ornaments, which are attracting a number of visitors. This temple is all that remains of those cities described by Pliny and Strabo; the Gulf of Gascony abounds in ruins of those ancient cities. It has been 1,500 years since Novigamus, the old capitol of Medoc, which was a very celebrated city when the Romans were masters of Gaul, was buried under the ocean; of all that tract of territory the Roche du Cordonon alone is visible. The remains of Roman roads, the site of Jupiter's temple, the vestiges of the Spanish Moors and the roads to Eleanor de Guyenne have been rescued from the sands in the neighborhood of the long-buried city of Soulac. Nowhere has the erosion of the ocean been greater than on the coast of Gascony.

LUNCHEON, says Thackeray, is base ingratitude to breakfast and premeditated insult to dinner.

The Ericsson Batteries in Action.

Some very interesting details of the late performances of the new iron-clads are here appended, quoted from the letter of a correspondent of an Albany paper. The writer relates one extraordinary result of firing the heavy guns, which seems, to say the least, singular. Why firing a heavy gun over a ship's quarter should boiler foam is not very clear :—

"On Sunday morning we went to it again; the *Moniauk* got her position, and we all hammered away for three hours; several guns were dismounted; the enemy were again and again swept from them; but they supplied their places and kept up an unremitting fire. The rents made in the loose sand, of which the fort was constructed, were repaired; the enemy fighting with the greatest determination and pluck. We were obliged to give it up as a bad job. The *Montauk* was struck forty times in this affair by rifle bolts and eight 10-inch solid shot, but came out with no material injury! My nice little cabin was knocked into a cocked hat.

"The interesting part of this adventure is the performance of the *Montauk*—she being one of the new class of *Monitors*, and this being the first time any of them have been subjected to the severe test of actual service. You will be interested, I know, in hearing of the powers of iron. She is a great curiosity. The shot struck her in every part necessary to fully prove her invulnerability. On her flat deck, protected by 1-inch plates, over 8 inches of oak, and beams 12 by 12 inches, 23 inches apart, she received five or six shots; they made furrows, but glanced, doing no injury; her side armor (5 inches) was struck repeatedly, making dents about 1 inch deep, covering a segment of one-fourth the circumference of the shot, which were smashed by the impact.

"Upon her turret (11 inches) similar dents were made, but not so deep; the same effect was produced upon the pilot-house on top of the turret (6-inch iron). No visible effect whatever is discernible inside, except in the pilot-house, where seven of the bolt heads, which there secure the plating, were thrown violently through and inside by the impact. The people there were obliged to take refuge outside under the lea of the turret. In no place was there the least sign of penetration. The enormous 15-inch gun, weighing with its carriage 45,000 pounds, was handled with ease. No trouble or annoyance was experienced from the concussion or smoke either from the impact of shot outside or from the discharge of the gun.

"When a shot struck the turret it sounded like the cracking of a nut upon an anvil. Many difficulties were experienced, but all admit of a remedy; but it is a marvel how such complicated machinery worked upon its first trial. The turret, weighing 150 tuns, is, as you know, keyed up from below, and its weight supported upon a shaft; after continued firing it sagged somewhat and considerable trouble was encountered in keying up, so that it would revolve easily. The blast from the guns came back through the eye-holes in the pilot-house so that effects of practice could not be observed. The big gun fills up its port-hole so that it could not be sighted, except by the '11-inch' alongside of it, which is rough gunnery.

"Firing over the stern and quarter caused the boilers to foam; they must be secured also more firmly; down 'below' glass suffered and the wicks of lamps disappeared at each discharge. Some means must be devised for handling the enormous projectiles, weighing upwards of 400 pounds.

"On the whole these novel crafts are a success—so far as fighting qualities are concerned; but I would rather go into ten actions than to make a passage at sea in one of them. It is God's providence that enables them to 'march' upon the ocean. If they live through one gale they never will survive another. In smooth water they seem to be perfect, but our people must not expect too much of these vessels.

"I would guarantee to hold a sand battery like that at Genesis Point againt a dozen of them; two of them would demolish Fort Sumter or any square casemated stone or brick fort in two hours; but sand forts are a different thing, particularly where the guns are isolated and far apart, protected by high, thick earthen 'traverses.' The shell bury in the sand and throw it about promiscuously; but, unless you hit the gun itself, no great damage is done, beyond occasionally killing a gun's crew whose place can be be supplied if its defenders are in earnest."

ANCIENT AND MODERN WEAPONS OF WAR.

It has been aptly remarked that there is nothing new under the sun. No sooner does some special exigency call for destructive instruments of war, or for machines calculated to expedite more peaceful pursuits, than, undaunted by difficulties, the inventors spring forth fully equipped for all emergencies, each bearing some novel machine to accomplish the end in view. When iron-clad ships were suggested, the proposition was first derided by the universal Yankee nation, then barely tolerated, and finally adopted with the utmost enthusiasm. Rams were advocated, discussed, *pro* and *con*, as to their merits, until they too were considered indispensable, and were also put in hand. Long centuries before the *Merrimac* bore down upon the helpless *Cumberland*, and smashed in her sides with her iron beak, the Romans and Greeks had armed the prows of their vessels

Fig. 1

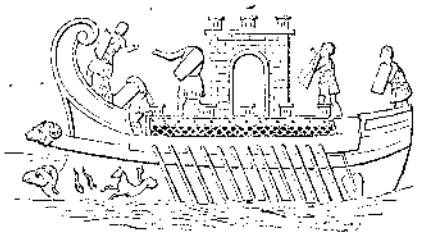
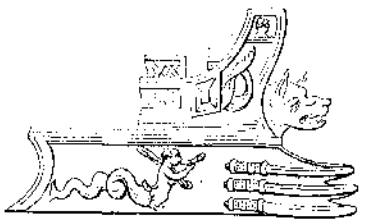


Fig. 2



with short arms, which, propelled by the lusty arms of a hundred or more slaves (who were condemned to the galleys or triremes, as punishment for their crimes), ran in to the ships of their enemies with great speed and force, and sent them to the bottom. These "ships" of war were only used on rare occasions, as they were heavy and hard to manage. Their thickness of hull was as great as that of an ordinary steamboat of modern times. We append two views of the different sorts of rams and vessels to which they were attached. The first is a vessel propelled with fifty oars, twenty on a side; she was in use in the year 700 B.C., and is supposed to have been invented by a Corinthian called Ameinocles. The position of the rams, and the literal representation of the animal's head in one of them, shows that the ancients had a realizing sense of the force which the patriarchs of the flock were capable of exerting.

Other rams were afterwards adopted of which an illustration is also given. The tower seen amidships of the ram is a structure intended as a shelter for the "chivalry" of the period, the headless individuals on deck are supposed to have lost their caputs by the skill of some sharp-shooter. They are apparently not at all incommoded but continue their orders without removing from the scene. The prow was generally ornamented with some enigmatical figures, either painted or inlaid; and it was not uncommon to add a representation of a human eye upon each side of the bow. Just below the prow, and projecting a little above the keel, was the *rostrum* or beak, which consisted of wood, armed with sharp pointed iron, or the head of a ram. The use of this attachment is obvious. These rams are said to be the invention of Piseus of Tyre; at first they were set above water, and were plainly visible, but afterwards it was deemed more politic to place them below the surface, and then the moral and physical effect produced upon an adversary was much augmented. The ram was also used independently, in land assaults on fortified cities, and was mounted for this purpose on a beam; worked by gangs of huge Greeks, they smote the walls such sturdy blows that the blocks of stone soon tumbled in. The assailants then stormed the breach as in modern warfare.

So also with the iron-clad turrets and towers now in use, their origin is very ancient. Diodorus (B.C. 405) mentions this kind of defence as being used by Dyonisus, at the siege of Motya. These towers were built of huge timbers, and were armed on their fighting sides with heavy iron, to protect them from the assaults of the enemy, they were also covered with raw hides and blankets, moistened with a solution of alum, to prevent them from being fired by the enemy. When about to go into action, the towers were pushed close to the walls of the besieged city, and the warriors inside then did their best with the limited means they possessed. Battering rams were brought to bear upon the masonry, and firebrands were also thrown within the walls, while the assailed in their turn employed similar means for beating off their opponents. These towers were considered very formidable machines. At the siege of Rhodes, Demetrius Poliorcetes employed an iron-clad turret called a "helepolis." Its form was pyramidal, and the three sides exposed were covered with iron plates. Towers of this description were used to destroy the walls of Jerusalem when it was taken by the Romans.

Still another device, lately resuscitated, belongs to the ancients—that of the shield to cover infantry in the field moving to attack other infantry or walled cities. The ancient shield was a very crude affair, but it sufficed as a protection against the weapons of the period. It was called a *testudo* or tortoise, from its resemblance to the shell of that reptile, and seems to have been very useful.

The foregoing are only some of the ancient weapons of offense and defense that were employed centuries ago. Fashions change; the world moves, it is said; and yet we come round, in cycles of time, to adopt those methods which the barbarians of old invented. Aided by the discoveries of science, we so improve upon their crude ideas, that we shall shortly reduce the art of war to a fruitless struggle—one wherein neither side can obtain a decided advantage. This is the present tendency of things, and in the words of the poet, it is "a consummation most devoutly to be wished."

Birds' Sense of Danger.

The power of judging of actual danger, and the free and easy boldness which results from it, are by no means uncommon. Many birds seem to have a most correct notion of a gun's range, and, while scrupulously careful to keep beyond it, confine their care to this caution, though the most obvious resource would be to fly right away out of sight and hearing which they do not choose to do. And they sometimes appear to make even an ostentatious use of their power, fairly putting their wit and cleverness in antogonism to that of man, for the benefit of their fellows. I lately read an account, by a naturalist in Brazil, of an expedition he made to one of the islands of the Amazon to shoot spoon-bills, ibises, and other of the magnificent grallatorial birds, which were most abundant there. His design was completely baffled, however, by a wretched little sand-piper that preceded him, continually uttering his tell-tale cry, which aroused all the birds within hearing. Throughout the day did this individual continue its self-imposed duty of sentinel of others, effectually preventing the approach of the fowler to the game, and yet managing to keep out of the range of his gun.—*Gosse's Romance of Natural History.*

ORIGIN OF THE TERM "HUMBUG."—This now common expression is a corruption of the word "Hamburgh," and originated in the following manner :—During a period when war prevailed on the Continent, so many false reports and lying bulletins were fabricated at Hamburgh, that at length, when any one would signify his disbelief of a statement, he would say: "You had that from Hamburgh;" and thus "That is Hamburgh," or humbug, became a common expression of incredulity.