MARINE STEAM RAM.

A correspondent (W. J. P.) of the Philadelphia *U. S. Gazette*, claims the marine steam battering ram, lately built in France and England, as an American invention. He says:—"Although in consequence of the slowness with which our government machinery moves, as well as the unbroken peace we have enjoyed at our eastern seaboard for so many years, the other great naval powers have been the first to put the idea of a steam ram to a practical test, yet the truth is that this is an American invention, and the various British officers and men of science who are contesting for the honor of its first suggestion are but copyists or re-inventors.

"In the spring and summer of 1855, Charles Ellett, Jr., the well-known American civil engineer, then in Europe, addressed a series of letters to the Navy Department of the United States, urging upon our government the adoption of the steam ram as the cheapest and most efficient means of defending our coasts and harbors from an invading foe. Mr. Ellett's plan was simply to convert an ordinary steamer into a *floating battering-ram*, and enable her to fight, not with her guns, but with her momentum. This change of tactics would place any good commercial steamer in a position to sink, without firing a gun, any ship of war that now floats. He proposed to strengthen the steamer throughout in the most substantial manner, so that she might be run, head on, into the enemy, and burst in his ribs, or drive a hole into his hull below water line.

"In a subsequent communication to the Navy Department, dated August, 1855, Mr Ellett urged many convincing arguments in favor of his proposition, and cited all the cases of collision at sea, that had been reported in the European papers, since his previous letter, to prove the advantage which a vessel gained from being the one to give rather than to receive the shock.

"To the surprise of Mr. Ellett, with whom the idea of applying steam in the manner described was entirely original, the reply of the Secretary of the Navy informed him that a similar suggestion had been proposed to the Department more than 20 years before, and had been renewed many times since by various officers of the navy.

"To Commodore Barron, of the United States Navy, must be awarded the honor of having made, as early as 1832, the first suggestion of a means of attack and defense upon the sea, which is destined to effect as great a revolution in naval warfare as steam has in transportation, both on sea and land."

The old commodore was one of the most prolific inventors our country has produced.

In the London *Engineer*, of July 15, Mr. J. Grantham claims the invention of the "Steam Ram" for Admiral Sir Isaac Coffin, of the British Navy. He states that he heard the admiral and the great James Watt discuss the subject in 1824, and that such vessels were proposed to the British government in that year. Watt was consulted about making the engines sufficiently strong to resist the collision, and the vessel was to have an iron prow and also be cased with this metal. It seems to us that the merit of the invention belongs to either Coffin or Barron—both naval officers of fame, and Americans; but the one was in the service of his country, the other, and the older, in that of England.

TESTING CAR-WHEELS AND RAILS.

The proper system of testing any article—machine or whatever it may be—is to make it undergo such operations as those for which it is designed to be employed. In submitting rails or car-wheels to the common method of hydraulic pressure, or blows from a trip hammer to test their strength, it would be all very well if they were designed to stand repeated blows, or continual pressure, but such experiments are of little value in testing their adaptibility for rolling motion and the action of trains, Mr. C. T. Liernur, C. E., of Mobile, proposes a plan for testing samples of rails and car wheels, which appears very feasible, and is thus described in the *Railroad Journal*, he says:—

"The proper system of testing anything, consists in submitting the article to a course of trials, exactly similar in its results to actual usage.

"For this purpose I lay a circular track, composed of three, four, or more rails, making a circle of from 20 to 30 feet in diameter. On this track I place a car supported by four, six, eight or more wheels, all the axles of which point towards the center—said car to revolve with, and to be attached to, a perpendicular shaft placed in the center of this circular tract. The wheels to be of the size, pattern, and make, as those to be used upon the road for which the rails are to be tested, and the car to be loaded with a weight per wheel equal to the greatest load they will have to sustain upon the road. The vertical shaft to be well braced and strongly attached to the car, so that when a rotary motion is given to the former, this motion will be participated in by the latter—a pulley being placed at the top or bottom of the shaft, for the purpose of revolving it by means of a stationary steam engine. The speed of travel of the wheels to be the same as the average speed required upon the road. The *modus operandi* of the test of rails with this apparatus will be as follows:

"Assuming the average traffic of the line to demand the going and returning of eight daily trains upon the road (or four each way), of 15 eight-wheel cars, then each rail would be ridden over by 480 wheels daily. My testing car being supported by, say, eight wheels, in that case 60 revolutions would be equal to one day's use of the rail. Supposing the circular track to measure 60 feet on its circumference, and the average speed of the trains on the road in question to be 20 miles per hour, or say, 1,800 feet per minute, then it would be necessary to give the revolving car 30 revolutions per minute, to subject the rails to a trial of usage with the same speed. At this rate (60 revolutions of the car being equal to one day's use of the rails) the effect of the wear due to that time will be produced in two minutes. If two minutes are equal to one day's use, then one hour will be equal to that of 30 days, and 12 hours and 10 minutes to that of 365 days, or one year. Or in other words, experimenting during one day, of 12 hours and 10 minutes, will show the effects of a whole year's use of the rail when laid on the road. A rail which begins to laminate in six days, four hours, and six minutes of testing, is sure to do the same in six years, four months, and three days of usage. To obtain the effect of the hammering, crushing and tearing due to the wheels, one or two of the rails should be so bent as to form depressions in the surface of the track, and also be not exactly true in its circular alignment, in order to cause a zig-zag or sideway traction. Thus all the different peculiarities of a railroad can be imitated, and the duration and corresponding value of rails and wheels be determined with great accuracy, because in the trial they are exposed to all the various strains and other elements tending to its destruction in the same combination as they would be when laid upon the road, and were subjected to its regular traffic.

"The contested superiority between pear and square headed, thick and thin headed rails, hollow and solid rails, heavy and light rails, the merit of all kinds of splices, chairs, keys, and bolt-fastenings, and between the great variety of car-wheels will thus soon be determined."

ALL MEN ARE CHEMISTS.

There is no man in the community who has not a considerable portion of that knowledge which constitutes the science of chemistry. Chemistry ascertains the properties of simple substances. Of the sixty-two simple substances at present known, forty-seven are metals. Every man who knows that iron is harder than lead, or that gold is heavier than copper, knows so much chemistry. Lavoisier, who was guilliotined in the French revolution in 1794, was the first who supplied weights systematically to chemistry—the first who began to find out *how much* heavier one substance is than another.

The metals which are the most common—the ones with which the chemist has most to deal—are of course the very ones the properties of which are most widely known. If a man, with the knowledge he already has of the common metals, iron, copper, silver, gold, lead, tin, zinc, mercury, antimony, and arsenic, will learn the properties of four other substances, he will know more than half of all that is embraced in the science of chemistry. These four elementary substances make up almost the whole of our bodies, and of the bodies of all animals, as well as of all trees and plants; they compose the air and the water. We burn them for fuel and for light, we eat them, and drink them, and wear them. They are the most common substances in nature. Their names are oxygen, hydrogen, nitrogen, and carbon.

A COLUMN OF INTERESTING VARIETIES.

Warfare in the days of Cæsar, was no mere child's play. In nine years he had conquered 300 tribes, 800 cities, slain a million of men, and taken a million prisoners. After he had become master of the world, he entertained the whole Roman populace, at 23,000 tables, furnished with every luxury. He made an artificial lake, for the purpose of showing the assemblage a sample of naval warfare..... Australia is of almost exactly the same extent as the United States, including the territories.....When Lavoisier, who has been called the father of modern chemistry, was arrested, by order of the Committee of Public Safety, during the "reign of terror" of the French Revolution, he asked for a fortnight's lifetime to finish some experiments. The reply was, "The Republic does not need them;" and his head was cut off by the guillotine. He was accused of fraud in his office of Farmer-general.....Plumbago and charcoal are composed of the same substance, carbon; but, while charcoal is very combustible, plumbago is used for making retorts to resist an intense heat.....Observations on the comets, especially on the last brilliant one, which appeared a year ago, show that there are properties of matter, at all events of some matter, which are not at all understood.....The great mass of almost all rocks consists of metallic ores, more than half of them being composed of oxygen and some metal.. ...9013 lbs. of water consist of 1000 lbs. of hydrogen and 8013 lbs. of oxygen.....The stars, sun and moon apparently roll around the heavens once in 24 hours; the pivots being the north and south poles of the heavens; the north pole is very near the north star.....Astronomy is the oldest of the sciences; it was first studied by shepherds, while watching their flocks at night.....It is said that turbine water-wheels have been constructed which, from actual measurement, yield more than 90 per cent. of the power, a result which has never been equalled by any breast-wheel..... Some of the comets, while at the greatest distance from the sun, do not move as fast as a man can walk.....In this latitude, men, with their houses and farms, are carried along by the rotary motion of the earth, just about as fast as a cannon ball moves, while the revolution of the earth around the sun carries us all with a velocity more than sixty times that of a cannon ball.....Pure clay is the ore of the new metal aluminium.....The Aurora Borealis is one of the things about which hardly anything is known; the recent display caused, as usual, perturbations in the magnetic needle, and in the workings of the telegraphs. .....Some of the latest inventions in the steam-engine, made by our most profound philosophical mechanicians, are efforts to utilize one form of it which was known before the Christian era.....The recent balloon ascensions seem to confirm the probability of there being a current of air at the height of 10,000 feet, blowing constantly from the west towards the east; the top of Mount Washington reaches into the lower edge of this current, and generally feels its effects.....Arago, the great French astronomer, expressed a regret that the observatory of Paris contained no telescope equal to the magnificent refractors of Washington and Cambridge, in the United States.....The largest steam-engine afloat, is the one on the *Metropolis*, which plies between New York and Fall River, Mass.; it is larger even than those upon any of our steamships.....If a model of the universe were constructed on a scale of 10,000,000 miles to an inch, (so that the sun should become a shot .08 of an inch in diameter, and the earth's orbit be 19 inches in diameter,) the nearest fixed stars would still be 30 miles distant.....Comparative anatomy illustrates forcibly the uniformity of the works of nature. We were walking on the shore of Staten Island with a gentleman who had paid some attention to this science, and observing a little bone on the beach, we asked him if he could tell to what animal it belonged. He looked at it without picking it up, and replied, "Yes, that is the inside lower bone of the right fore-leg of a dog." Agassiz made a drawing of a fish from a single scale, and afterwards, when the fish was found, the drawing proved to be a very good likeness..... Cypresses are known to be 800 or 900 years old. They rise 120 feet, and are from 25 to 40 feet round. Strabo speaks of one in Persia 2,500 years old.....At different times, quite a number of new stars have appeared in the sky, and, after blazing a while with great brightness, have ceased to be visible.....An animal which does not reach across the wire of a pin appears, under a microscope of high power, more than an inch and-a-half in length.

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