lying at New London. Perhaps the most formidable engine of war would be the Stevens floating battery, which is at the present time being put in a state of completion, and is expected to be quite ready for action within forty days' time. As the battery now lies in the yard at Hoboken it appears unwieldy, but ere a fortnight a vast change will be apparent. It has been pronounced by naval connoisseurs one of the most formidable of engines of war. Its keel was laid down in 1840. Since then it has been on the verge of completion thrice, but the changes in naval architecture have been so numerous and important that it has been taken apart to make it conform to these improvements. It is nearly 300 feet in length, is 25 feet beam, and draws 21 feet of water. Its frame is built of the stanchest of live oak. This is covered by teak planking, which in turn is backed with two foot teak slabs. The outside armor consists of five inch chilled iron plates. These are secured to the wood by headless bolts. By this method, the surface on each side of the vessel is smooth, and affords no opportunity for plunging shots to tear off the plates. Its battery will consist of seven guns; four of these are 500 pound rifled Rodmans. The remaining three are 250 pound rifled Parrotts. Her prow is composed of solid iron, backed by oaken logs, and will prove a powerful ram. It is confidently expected that she will be enabled to steam at the rate of twelve knots an hour. Taken altogether, she is a war ship that, if brought into action, will astonish the Spaniards quite as much as did the Monitor the people of the Merrimac.

PREPARATION AND COMPOSITION OF ALLOYS.

The following instructions are extracted from Fesquet's translation of Guettier's metallic alloys, noticed in our last issue:

As generally practiced, the metals to be combined are melted by processes and in apparatus which vary, according to the quantity of alloys to be cast or the nature of the metals under treatment.

The metals easily fusible, such as lead, tin, etc., are melted in a ladle, or in wrought or cast iron kettles.

The more refractory metals are melted in crucibles, whose qualities of solidity and resistance to the fire are the more sought for as the metals have a higher point of fusion, or are more valuable.

For gold, silver, and platinum, we require crucibles of a superior quality, which will not crack, and thus lose in the fire the metals they are intended to receive.

For copper and its alloys, although requiring crucibles as solid and lasting as possible, we look more towards economy, because the work is frequent and regular, and we operate on quantities of less value.

When the mass of metal becomes considerable, whether because many castings are to be made, or because of the heavy weight of the pieces, instead of the crucibles, we operate in reverberatory furnaces, and sometimes in cupolas.

The processes of melting and mixing the metals in a crucible, however simple they appear at first sight, require certain precautions upon which we cannot too strongly insist.

The alloys made in one operation are always very difficult of preparation, when the metals, such as zinc and lead, copper and lead, for instance, possess a sort of "antipathy" in their affinity. It is with much trouble that we obtain, in this way, thoroughly homogeneous castings, presenting the same body and grain of similar alloys, which have already passed through a previous fusion.

In order to arrive at the best possible results, without employing the method by separate operations, it is proper, as a rule, to endeavor to operate according to the following principles:—

1. To charge the crucible, and melt first the least fusible of the component metals.

2. When this metal is in fusion, to heat it up to such a point that it will be enabled, without too great a cooling, to bear the introduction of the other component metals.

3. Once the first charge is in fusion, to introduce the other metals in the order of their difficulty to melt.* Whatever are the proportions of the component metals, and no matter which is the basis of the alloy, it is absolutely necessary that the most refractory metal should be melted first. Its fluidity, indeed, gives the measure of the temperature necessary for finishing the alloy. By charging first a fusible metal, it may volatilize and become oxidized, and the crucible may also break by raising the temperature high enough to receive, without too much cooling, a less fusible metal. At the same time, there will be more waste, and the proportion of the alloy will be sensibly changed.

4. To present at the flame of the furnace the metals which are to be subsequently added, in order to heat them as much as possible, and thus facilitate the change of temperature which takes place when the new metal is added to that or those already melted in the crucible. This practice is especially good when we have to introduce a volatile metal, such as zinc, which, being melted too rapidly, may cause the crucible to break.

5. To stir after the introduction and melting of each component metal; and to cover the crucible, at the same time that the fire is increasing more or less, according to the less or greater fusibility of the metal.

6. To cover the alloys rich in zinc with a layer of charcoal dust. This is not necessary when there is not in the alloy any metal, such as copper or iron, having a high point of fusion; or when the proportion of zinc added does not require a protracted heating, and the alloy may be poured out immediately. With alloys rich in tin, the charcoal dust will cause the scorification* of part of this metal; therefore it is preferable to cover the surface of the molten mass with refractory sand or pulverized sandstone.

7. To stir thoroughly the molten alloy just before it is cast, and, if possible, during the pouring out. The stirring is to be done with a stick of white wood, burning without splitting; and not with an iron rod, which has a tendency to produce dry alloys, and may modify the nature of the compounds by adding some iron to the alloy—a small proportion, it is true, but nevertheless appreciable.

8. To carefully clean the crucible after each operation, in order to maintain the accuracy of the mixture, and facilitate the fusion.

Such are the main conditions for obtaining alloys in one operation. If alloys thus prepared give some trouble in obtaining good results, they are very economical, and present the advantage of keeping, as strictly as is allowed by the fusion, the proportions of the mixture.

Moreover, in practice, it is generally acknowledged that a small proportion of an old alloy, added to a new one, improves it by giving it the homogeneousness which otherwise would be imparted only by a second fusion.

In ternary or quarternary alloys, made of copper, zinc, tin, and lead, it will always be well, in order to obtain more homogeneousness in the final mixture, to alloy beforehand the more fusible metals, such as zinc, tin, and lead; and to combine this first alloy with the copper, under the best conditions possible. In this way the last combination will possess better qualities than an alloy made in one operation.

However, we repeat it, alloys made by the first direct method, although much more simple and economical, do not answer all the wants of the arts, and do not present the same guarantees as those which have been remelted. For instance, runners from bronze or brass castings of a first fusion, when melted again, and when the primitive proportions were good, present a better grain, and a metal without defects, which is more easily worked than another alloy made directly by one operation.

The pieces cast with alloys made by the direct method—we always mean those in which copper is a component part—are possibly less liable to breakage and shrinkage than if made from old metal; but, on the other hand, the surfaces are not so clean, and the grain is not so close and easily worked. Moreover, such alloys are not very fluid, and do not produce sharp casts. These defects are more to be guarded against in the case of statuary and ornamental bronzes than when pieces of machinery are to be produced.

As a rule, the oftener a metal is melted, the more it loses its previous qualities.

* This is a general rule, to be applied in most cases; but there are exceptions. For instance: gold will easily dissolve in melted tin, and platinum in many metals. If platinum were first melted, and zinc, for instance, added, the temperature necessary to obtain the fusion of platinum would be sufficient to volatilize the zinc.—*Trans.*

* The author uses the word "scorification," but we do not think that the term is entirely appropriate. Nevertheless, it is certain that charcoal is not favorable to alloys of tin and copper, and that pure clay crucibles are to be preferred to those of plumbago for such alloys. Metallurgists know that at a certain period of the refining of copper, the metal is carburized and brittle. In order to prevent this carburization, it has been recommended to give a coat of pure clay to the interior of plumbago crucibles.—*Trans.*

THE AMERICAN HISTORICAL RECORD

"The American Historical Record, and Repertory of Notes and Queries, Concerning the History and Antiquities of America and Biography of Americans," is the title of a new publication, edited by Benson J. Lossing, and published by Chase & Town, 142 South Fourth street, Philadelphia, which promises to be interesting and useful. Those with literary and antiquarian tastes will find in it—if the future numbers correspond with this specimen number—much rare information and a medium for the exchange of such items of history as are at present traditional or to be found only in books so rare as to be only accessible to few. The plan of the publication also comprises historical discussions and essays, current historical literature, records of the proceedings of historical societies, engravings, etc. It is a monthly. The subscription price is $3.00 per annum. Mr. Lossing is well known to the public as an author eminently fitted to conduct a magazine of this kind. We make the following extracts pertaining to early American industries:

Button Making.—It is a notable fact in the history of American manufactures, that the first maker of covered buttons, Samuel Williston, is yet living. In early life he was preparing to enter the ministry, when his eyesight so failed that he was compelled to give up study. He kept a country store in which the wooden buttons, then in general use, were sold. His wife covered some of these buttons with cloth. They became popular. Williston and his wife contrived machinery to do the work, the first ever employed in the United States. An immense manufactory grew from this seed, and made half the covered buttons of the world. Williston's factories are still running at East Hampton, Mass., and he is worth several millions of dollars.

The Oldest Daily American Newspaper.—On the 28th of October, 1871, the *North American and United States Gazette* of Philadelphia celebrated the one hundredth anniversary of its birth. It was first established by John Dunlap, in 1771, with the title of *The Pennsylvania Packet and The General Advertiser*, a small folio sheet, published weekly. It was an adherent of the republican cause in America. In September, 1784, Dunlap & Claypoole commenced publishing it daily, and it was the first daily newspaper printed on the American Continent. Its name was soon changed to *The American Daily Advertiser*. Forty years later it was merged into the *North American*. In July, 1747, *The North American* and *The United States Gazette* were consolidated with the present title; and since 1854, Morton McMichael (for a long time a partner in the ownership of *The North American*) became its sole proprietor, and remains so. It has been a deservedly influential publication during its century of existence.

A Relic.—In Pittsfield, Massachusetts, is an anvil which was brought to this country in 1663, by Elweed Pomeroy, who had forged upon it the ponderous horse shoes sed in the reign of the first Stuart, King of England. Like the Egyptian anvil in the British Museum, three thousand years old, the Pittsfield implement, of precisely the same shape, is as sound as when the first blow was struck upon it.

Coal.—Bituminous coal was mined near Richmond, Virginia, so early as the year 1700; and a Richmond farmer used it in making shot and shell during the Revolution of 1775–'83. According to the statements made by Volney L. Maxwell, in a lecture at Wilkesbarre in 1858, anthracite coal was first used by Obadiah Gore, a Connecticut blacksmith in the Wyoming valley, in 1768. Jesse Fell, of Wilkesbarre, was the first to use it for domestic purposes. Philip Ginter, a hunter, discovered the Lehigh coal in 1791. The Schuylkill coal was first sent to Philadelphia in 1812.

Sewage Poison.

It had better be admitted at once, says the *Engineer*, that the specific property, that renders emanations from sewers and cesspools so dangerous to health, is not clearly understood. A gentleman of eminence has lately directed attention to the use of charcoal as an agent effectual for the absorption and destruction of sewer gases; but the question after all is, whether typhoid fever is produced by gaseous products exhaled from organic matter in a state of decomposition, or is attributable to the presence of a specific germ. It is certain that those whose calling brings them into daily contact with decomposing matters of the most offensive kinds are not affected by any special forms of disease; and it is also well ascertained that sewage emanations, possessing little or no offensive smell and not necessarily the result of decomposition, have produced typhoid and other complaints. There is no longer a doubt that cholera poison is a perfectly specific source of disease.

It has been collected from our sewers and experimented upon until its properties and characteristics have been clearly ascertained. It produces choleraic symptoms, of any degree of intensity proportioned to the dose employed and composed of such minute cells that it will pass through the closest filter. The probability is that other diseases are also produced by specific germs borne in the atmosphere; and if so, it will be unsafe to place implicit reliance upon charcoal or any mere deodoriser. Doubtless the gases that are evolved by decomposing sewage matter will, of themselves, seriously affect health; but there is nothing to show that charcoal has any effect in checking the spread of special diseases, or in arresting the passage of germs, of such minute dimensions that they will pass through finest filters and even elude the search of the most powerful microscope. The object of sewer ventilation is not, as is sometimes supposed, merely to purify or destroy foul and stinking air, but it has for its further aim the destruction or dilution of the insidious and probably inodorous poisons that associate with these foul smells. Where access can be had to furnaces and chimney shafts, complete destruction of all sewage products can be accomplished; but in the absence of such means, reliance must be placed on free dilution by discharging the sewer air above the roofs of houses and beyond the lungs of our populations. The experience and conclusions of Dr. Alfred Carpenter cannot, at this time, be too prominently placed before the public for it is only at a juncture like the present that they are likely to receive attention. He says: "Many facts have been brought to my observation as to the power of sewer gas to produce disease; as a factor in the production of typhoid fever its power is now well known. Many other diseases of the system have been directly traced to its influence; thus diarrhœa, dyspepsia in all its forms, palpitation of the heart, various forms of asthma, convulsions, especially in teething infants, and headaches, both persistent and intermittent." These, and a further list of complications, are the inevitable results of exposure to sewer gas whether it reach the system through traps from public drains, or attacks us more directly from soakage under our houses, or through the medium of a contaminated cistern or well.

The Pursuit of Strength.

Those unfortunates who devote their lives to the pursuit of strength, according to *Hall's Journal of Health*, who rise at unearthly hours, and shiver under ice cold shower baths, who never eat as much as they wish or what they wish, who live as mechanically as possible, and conscientiously deprive themselves of about all reasonable enjoyment, are certainly to be pitied. Still their terrible system leaves them alone during the night. If they eat, drink, move, and have their being under its supervision, through the day, at night they can sleep undisturbed. But a new school has arisen in California. Some crack-brained enthusiast has announced that he has prolonged his life for years by sleeping with his finger tips touching his toes. The reason of the advantage of this proceeding is not at first evident, but is easily understood when we read that "the vital electrical currents are thus kept in even circumflow, instead of being thrown off at the extremities and wasted." The discoverer has given the valuable secret gratuitously to the world, actuated solely by a desire to benefit suffering humanity. "Machines, warranted to hold the body easily in this position, can be obtained only of," etc., etc. If the method comes into general use, our posterity will, we fear, be a "stiff-backed generation."—*Chicago Tribune.*