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Contents:

(Illustrated articles are marked with an asterisk.)

NAVAL ARCHITECTURE AND ENGINEERING.

A cotemporary remarks that "the loss of the British iron-clad *Captain* is an event that cannot fail to exert an important influence on naval architecture in the future," and there is no doubt of the truth of the remark. Within the last ten years there has been something almost constantly turning up or going down, to modify naval architecture.

This is not to be wondered at. The transition from wood to iron, as the material for the construction of war vessels, could scarcely have been accomplished without some failures and disasters. To suppose that it could, would be to suppose engineers incapable of error, iron incapable of penetration by shot, and the power of invention to devise means of attack, to be inferior to the same talent in devising means of defense.

There have, therefore, naturally been many mistakes made, as well as modifications necessitated by the continued improvement in the methods and instruments of attack.

The *Captain* seems to have been one of these mistakes. Her enormous weight of armor appears to have rendered her unfit to endure heavy weather. The query now arises whether such enormous weight of metal can be made by any modification of model compatible with good sea-going qualities in a ship. We do not believe any one is yet prepared to give a satisfactory answer to this question. There is no end of theorizing, and plenty of men will be found to take the affirmative, as well as the negative side in the debate, but experience with heavy iron-clad vessels has been such as to rather emphatically point to the negative as the ultimate decision of engineers. The advances secured in the weight and penetrating power of artillery seem to necessitate even as great or greater weight than that of the *Captain* in order to withstand the now well-nigh irresistible force of projectiles.

One serious difficulty in practical experiments with such vessels, is the enormous expense attending them. The *Captain* must have cost the British Government nearly or quite as much as a fleet of wooden war vessels. It is impossible, therefore, that in the race for naval supremacy such rapid progress can be made as some seem to expect. Some of the blunders committed, however, seem certainly too gross for the present state of knowledge on this subject.

For instance the French naval squadron, especially designed for service in the Baltic, has been found to draw too much water for that service, and has been withdrawn from it.

The Prussians have employed well known means to render difficult the navigation of the shallow waters on the south Baltic coast. The usual lights have been extinguished, and false lights substituted, and the inlets and entrances to rivers filled with torpedoes, and protected by light-draft gunboats which can run where the French ships are totally unable to follow them. Think of ships drawing from twenty to thirty feet of water sent upon such a service.

Of all the blunders committed by the French in the initiation and conduct of the present war, scarcely anything can exceed this. France has expended vast sums in experiment and in construction to produce a formidable navy that is at most worthless to her in her present crisis.

England made a similar blunder in the Crimean war. She also sent to the Baltic a fleet of heavy-draft vessels, which proved of no use, yet with this lesson of history so recently learned and written, France has followed the example of England with the same results. How long is it to be before naval constructors will learn that only light-draft vessels are fit for such service.

But then here comes in the difficulty. To make formidable iron-clads of light-draft seems almost an impossible problem.

A NEW ARTIFICIAL LIGHT.

One of the arguments employed in our works on chemistry to prove that the atmosphere is a chemical mixture and not a true compound is derived from an experiment upon the solubility of air in water. Roscoe says, in his admirable treatise:

"When air is shaken up with a small quantity of water, some of the air is dissolved by the water; this dissolved air is easily expelled again from the water by boiling, and on analysis this expelled air is found to consist of oxygen and nitrogen in the relative proportions of 1 and 1·87. Had the air been a chemical compound, it would be impossible to decompose it by simply shaking it up with water; the compound would then have dissolved as a whole, and, on examination of the air expelled by boiling, it would have been found to consist of oxygen and nitrogen in the same proportions as in the original air, viz., as 1 to 4. This experiment shows, therefore, that the air is only a mixture, a larger proportion of the oxygen being dissolved than corresponds to that contained in the atmosphere, owing to this gas being *more soluble in water than nitrogen*."

It is somewhat remarkable that no practical application of this experiment has been attempted until recently. The principle above enunciated is now applied to the manufacture of oxygen from the air. By compressing atmospheric air into receivers filled with water, more than the usual quantity of oxygen will be dissolved, and the dissolved air can be forced into a second and third receiver, becoming each time more and more rich in oxygen, until an atmosphere is finally obtained that consists of 90 per cent of that gas. Some use for the nitrogen may be invented, but at present it is of little value. It is probable that this method will eventually prove the cheapest for the manufacture of oxygen. Experiments have established the fact that an atmosphere containing 50 per cent of oxygen yields results nearly equal to what can be obtained from pure oxygen. Thus far the chief investigations have been made in this direction of furnishing a new and cheap artificial light. As soon as we can feed an air to our lamps containing 30 or 40 per cent more than the usual proportion of oxygen contained in the atmosphere, the brilliancy of the light will be greatly increased and it will afford a much healthier light than is now given by our gas. A lamp has been invented in Cologne, called the Phillips Carbo-oxygen lamp where the oil is some cheap hydrocarbon, the wick of non-combustible material, probably asbestos, and oxygen is supplied from a reservoir by a peculiarly constructed apparatus. The flame is made to assume the form of a star, and any heating of the wick holder is prevented by the manner in which the oxygen jet is permitted to feed it. It is said that the lamp needs no special attention beyond that of filling it with the patented hydrocarbon liquid. The wick requires no trimming, and explosions are impossible, as the oxygen does not in any way mix with the gases that might be produced by the heat of the combustion. The light of a lamp consuming five and a half cubic feet of gas per hour is equal to 90 or 100 candles, or ten times that of an ordinary gas jet. In diffusive power it would, however, probably not equal a less brilliant light. For lighthouses, fog signals, and photographic purposes, and for studies for the microscope, such a lamp would be of great value. The usefulness of this method of obtaining oxygen would not be confined to the production of light. There are other important applications for that gas, and the moment that we can obtain it cheaply it will enter into metallurgical operations, into compound blow-pipes, into laboratory and pharmaceutical uses, and, in fact, be applied in a thousand ways. It is possible that we may find some other liquid than water that has great solvent power for oxygen with none for nitrogen. The receivers once filled with such a liquid need not be filled a second time, but an indefinite quantity of air could be absorbed and expelled from the same apparatus, and it is possible that this operation could be carried on by clock-work or some other mechanical means. We are manifestly on the eve of the discovery of an easy and cheap method for the manufacture of oxygen for artificial light and other purposes, and the source of the gas appears likely to be the atmosphere.

AFFAIRS IN PARIS.

In consequence of the hostilities at Paris, the office of the Scientific American Patent Agency has been temporarily removed to Fécamp, Seine-Inférieure, No. 22 Rue des Cordieries. Fécamp is not likely to be bombarded by the Prussians, and may be conveniently reached by our clients via Bordeaux or Marseilles.

A Paris correspondent of the New York *Tribune*, who lately went to call on some of his friends, says: "I found everyone engaged in measuring the distance from the hostile batteries to his particular house. One friend I found seated in a cellar, with a quantity of mattresses over it to make it bomb-proof. He emerged from his subterraneous "Patmos" to talk to me and after ordering his servant to pile on a few more mattresses, retreated again. Anything so dull as existence it is difficult to imagine."

Communication between Paris and the interior of France is now maintained by means of balloons and carrier pigeons M. Durnorf, the aeronaut, lately carried a large mail from the beleaguered city. He left the Place St. Pierre, Montmartre, Paris, at eight o'clock in the morning. A strong east wind was blowing. He rose three thousand yards, and with a telescope saw the Prussians pointing cannon at him. The infantry also tried their rifles, but he was out of range. He descended near Evreup, and thence by rail to Tours.

The roar of cannon is now continuous at Paris, as the contending armies are constantly at work, harassing and destroying each other.

The French, judging from their own accounts, have devised an ingenious system of night attacks, by which they deprive the Prussians of rest, and frequently obtain important advantages over them by capturing prisoners. In these attacks the French use the electric light to blind the eyes of the enemy. Preparations have been made to light the city with petroleum if it becomes necessary to cut off all the gas.

THE SIEGE OF PARIS.

As London is the chief European center of commerce, Paris is the center of fashion and gaiety for the entire world. In time of peace its hotels are always crowded with people of every country and race, who bring to it and leave with it vast sums of money annually. The first Napoleon having in view the brilliant future of this modern Babylon, ravished every city which fell into his hands for works of art to decorate the streets, parks, and palaces of the French capital; thereby rendering it, in connection with its more modern improvements, undoubtedly the most attractive and splendid city the world has ever seen in any age.

One shudders at the probable condition of this beautiful city and its inhabitants at the present moment. The Palace of the Tuileries, the Palace of the Luxembourg, the Grand Hotel, and other public buildings are turned into hospitals and lazar houses, as shown by the yellow flags displayed upon them, and the city is crowded with probably fifteen hundred thousand non-combatants. The long list of disasters to the French arms has been crowned with news of the fall of Strasbourg which must strike to the hearts of the Parisians like the final death-blow to all hope of success for their cause. Their parks are dismantled, their beautiful groves destroyed, and their rich bronzes melted down as material for artillery. They are cut off from external intercourse with the world, and can only get such news of external affairs as the Prussians permit to pass their lines. They are consequently well posted as to their disasters, but anything calculated to raise hope could only, if it existed, reach them by devious and doubtful means. To crown all, it is reported that riots rage in the streets, and that firing can be both seen and heard from a distance between unknown factions, which must, whatever their character, add to the confusion and dismay of the populace.

It is hard for those who have not visited and sojourned in Paris to form any adequate idea of her former beauty, and what must be the aspect she now presents in her distress. Even though familiar with her splendid hotels, theaters, and churches, her boulevards, parks, and gardens, our imagination finds it impossible to picture the reality of the death and misery which now fill them all with cries of desolation and despair; and though we have felt that this war originated entirely with the French, and was begun on the most flimsy and insufficient pretext, we cannot withhold a sentiment of keenest pity and sorrow for the helpless misery of the—with all their faults—most refined, cultivated, and pleasant people the world has ever produced, nor help regretting the too probable fate of this unrivaled city.

THE CHEAP PRODUCTION OF POTASH.

In Vol. XXII., page 399, SCIENTIFIC AMERICAN, we gave the various methods employed for obtaining potash from feldspar, published in foreign journals, but failed to do credit to a distinguished American scientist who was one of the first to propose a practicable method for the resolution of minerals containing this alkali. The subject is of sufficient importance to recur to it once more.

At the meeting of the American Association for the Advancement of Science, held in New Haven in August, 1850, Professor Henry Wurtz, read a paper on green sand, which was afterwards published in *Silliman's Journal*, Vol. X., page 329, from which we quote the following:

"The pulverized and ignited marl (green sand) was mixed with a sufficient quantity of chloride of calcium to form upon the fusion of the latter a pasty mass. The decomposition of the green sand takes place in this case, at a low temperature, and is so complete that I have founded upon this circumstance a method of decomposing minerals in the process of analysis, which I have had the honor of presenting to the Association before. The mass, after fusion, falls to pieces in water, yielding to this solvent, in most cases, all the potash which was contained in the green sand employed in the form of chloride of potassium."

In the previous communication alluded to above, the process is given of fusing feldspar, hornblende, scapolite, etc., with chloride of calcium and chloride of barium. Subsequently to Professor Wurtz's valuable paper, to wit, in 1853, Prof. J. Lawrence Smith published in *Silliman's Journal* a process for "determining alkalies in minerals," which was essentially the one proposed by Dr. Wurtz, with the slight modification of the substitution for chloride of calcium of an equivalent mixture of carbonate of lime and sal ammoniac convertible by heat into carbonate of ammonia which passes off, and chloride of calcium which remains and accomplishes the decomposition. Professor Wurtz has found that his original plan, while less complex, is preferable on many accounts