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NEW SERIES

Remarkable Locomotive Boiler Explosion.

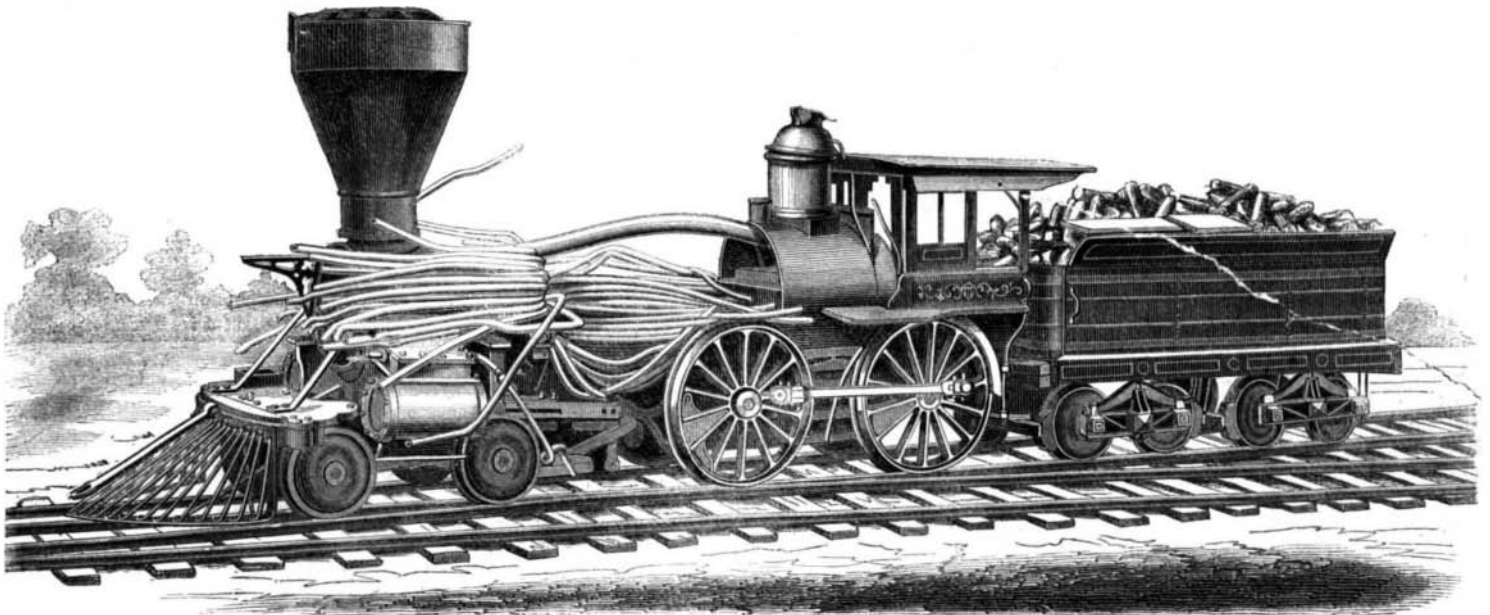
The accompanying illustration of an exploded locomotive boiler has been prepared by us from a photograph sent by our correspondent whose graphic account is given in the annexed letter.

MESSENGERS. EDITORS:—Inclosed with this letter I send you a photograph of a locomotive which exploded her boiler on the 14th of July last. She was one of the Cleveland and Toledo Railroad Company's heavy freight engines, and had but a short time before been thoroughly repaired and smaller driving wheels put

presented in the annexed engraving is such that it conveys the idea that no mysterious agent was the cause of the accident, but simply an overpressure of steam. As there are still many persons who believe that explosions in boilers sometimes occur by the water being decomposed and resolved into its elementary gases—oxygen and hydrogen—by the plates of the metal becoming red-hot, we have now testimony of the highest scientific value against this hypothesis. This testimony has been published in a recent number of the London *Chemical News*, from which we make

the introduction of an apparatus for superheating steam on board the Woolwich steamboats. In this apparatus the steam was carried in iron pipes immediately through the furnace, and in contact with the incandescent fuel. Professor Faraday, after having examined the apparatus at work, says:—

“I am of opinion that all is safe: as respects the decomposition of the steam by the heated iron of the tube and the separation of hydrogen no new danger is incurred. Under extreme circumstances the hydrogen which could be evolved would be very small



EXPLODED LOCOMOTIVE BOILER.

under. No cause has been assigned for the accident. She had just started from this station and had not gone 80 rods from the Company's round house when she exploded. She appears to have given way on the top of her boiler first as she did not go off the track and the rails were bent down almost square when the explosion took place. Every one who saw the engine said that she was the most complete wreck they ever saw. All that was left of her that could be used were the cylinders, frame and driving wheels, and they were badly injured.

The most singular part of the accident is, no one was injured by the terrible explosion, although there was another engine attached to the one that exploded, assisting it up the grade. The engineer—Mr. Levi Kingsbury—says the first thing he knew was that himself and the fireman were on one side of the track trying to find out what had happened. The engine and train ran about 20 rods after the explosion. She was a Rogers, Paterson, engine and about six years old. Some of the engineers will have it that it was on account of changing her name, which was done a short time previous, and it is a singular fact that the names of five locomotives have been changed on this road and every one of them had some serious accident happen almost immediately after. Three were blown up and two ran off of the track killing some person every time excepting on the late occasion. The photograph is a curiosity and will be prized.

W. S. HADLEY.

Norwalk, Huron Co., Ohio, Sept. 28, 1862.

The appearance of the exploded locomotive repre-

sented in the following extracts and commend them for their scientific importance to every person who has anything to do with steam boilers:—

The unsatisfactory results generally obtained by those who have sought to decompose water by heat on a large scale, with the view of applying its elementary gases separately, does not appear to have prevented the occasional adoption of the hypothesis that, in certain cases, all the steam contained within a boiler is decomposed, and its hydrogen (by some means not easily explained) exploded with great violence. That steam, passed over pure metallic iron heated to redness, is decomposed, is perfectly true, although the iron must retain all the oxygen separated in the operation. With oxidized iron, however, the process of decomposition cannot be continued. This is, we believe, a chemical fact of which there can be no dispute. To decompose 1 pound of water (or steam, which is chemically the same substance) 14.2 ounces of oxygen must be fixed by the iron, and only 1.8 ounces of hydrogen will be set free. This large proportion of oxygen, absorbed by only a few square feet of over-heated surfaces, would soon form an oxide of iron of sufficient thickness to arrest all further decomposition, and all the hydrogen up to that time disengaged would not amount, perhaps, to 1 pound in weight. By itself or mixed with steam, hydrogen cannot be exploded nor even ignited. It will extinguish flame as effectually as would water.

Upon this subject we may refer to a report made by Professor Faraday in May, 1859, to the Board of Trade, upon the liability to accident consequent upon

in quantity—would not exert greater expansive force than the steam—would not with steam form an explosive mixture—would not be able to burn with explosion, and probably not at all if it, with the steam, escaped through an aperture into the air or even into the fireplace. Supposing the tubes were frequently heated overmuch a slow oxidation of the iron might continue to go on within; this would be accompanied by a more rapid oxidation of the exterior iron surface, and the two causes would combine to the gradual injury of the tube. But that would be an effect coming under the cognizance of the engineer, and would require repair in the ordinary manner. I do not consider even this action likely to occur in any serious degree. I examined a tube which had been used many months, which did not show the effect, and no harm or danger to the public could happen from such a cause.”

Professor Taylor, of Guy's Hospital, reported in part as follows:—

“It is true that steam passed over pure metallic iron heated to redness (1000°) is so decomposed that the oxygen is fixed by the iron while hydrogen gas is liberated. This chemical action, however, is of a very limited kind. The surface of the iron is rapidly covered with a fixed and impermeable layer of the magnetic oxide of iron, and thenceforth the chemical action is completely arrested. If the interior of an iron pipe has been already oxidized, by passing through it, while in a heated state, a current of air, there will be no decomposition of steam during its passage through it. If the interior of an iron

pipe were not thus previously oxidized it would speedily become so by the oxygen derived from the air, which is always mixed with steam. Hence, chemically speaking, under no circumstances, in my opinion, would any danger attend the process of superheating steam as it is conducted under this patent. It is proper, also, to state that hydrogen is not explosive but simply combustible, and, assuming that it was liberated as a result of the decomposition of superheated steam, its property of combustibility would not be manifested in the midst of the enormous quantity of aqueous vapor liberated with it and condensed around it. There could be no explosion inasmuch as hydrogen, unless previously mixed with oxygen, does not explode, and oxygen is not liberated but actually fixed by the iron in this process. It is a demonstrable fact that the vapor and gas evolved under the form of superheated steam tend to extinguish flame and to prevent combustion from any other cause."

Professor Brande, in a report made by him to the patentees of the same apparatus, observes:—

"In reference to the question which you have submitted to me respecting the possible or probable evolution of hydrogen gas, and consequent risk of explosion in the processes, and by means of the apparatus which you employ for the production of superheated steam. I am of opinion that there can be no danger from such effect—that the temperature to which the iron pipes connected with your boiler are raised, and the extent of the iron surface over which the steam passes, are insufficient for its decomposition; and that, if the temperature of the pipes were even raised considerably beyond that which you employ, or would be able to attain, a superficial layer of oxide of iron would line the interior of the heated pipes, and so prevent any continuous decomposition of water. Effectually to decompose steam, by passing it over iron, it is necessary that a very extended surface of the metal (as in the form of thin plates or iron turnings) should be used, and that the temperature should be continuously maintained at a bright red heat, namely, at a temperature considerably above 1,000° Fah. I have read Dr. Taylor's report, and entirely agree with the inferences he has drawn as to the absence of danger from the evolution of hydrogen gas in practically carrying out your process for the production and application of superheated steam."

The practical conclusions upon this subject are the following:—First, decomposition cannot possibly occur, to any considerable extent, under any circumstances arising in the working of ordinary steam boilers. Second, if it did occur the hydrogen thus liberated would have no access to oxygen, without which it could neither inflame nor explode. Third, even if oxygen were present the presence of steam would prevent ignition. Fourth, if oxygen were present, and no steam existed in the boiler, the hydrogen would only inflame and burn silently as fast as it was produced, the heat for ignition being supposed to come from a red-hot plate. Under these accumulated impossibilities of violent explosive action, the explanation of boiler explosions by the decomposition of steam is without any support whatever.

IMPROVEMENTS IN THE ART OF HOUSEKEEPING.—It is sometimes said that there are less improvements in the art of housekeeping than any other. It is quite clear that there are not enough of them, and those which are made are not generally adopted. Let us refer now to what we regard as an improvement in the little art of shelling beans. The old method was making use of the thumb and fingers; then the use of a needle to prepare the pod to open readily. Now, the method is to pour upon the pods a quantity of scalding water and the beans slip very easily from the pod. By pouring scalding water on apples, the skin may be easily slipped off, and much labor saved.

TAXATION IN DIXIE.—The new revenue bill before the rebel Congress provides for the levying on the 1st of January next, a tax of one-fifth the value of the products of the land for the preceding year; one-fifth the value of the increase of horses, asses, cattle, sheep and swine; one-fifth the products made in feeding the same; and one-fifth the yearly income of each person. The rebels will pay dearly for their whistle.

NOTES ON NAVAL AND MILITARY AFFAIRS.

AFFAIRS IN NEW ORLEANS.

General Butler has so far succeeded in restoring order in New Orleans that he has reopened the courts and reestablished civil law. He is receiving many volunteers too for the Union army.

AFFAIRS IN NORTH CAROLINA.

The Hon. C. H. Foster is running as the Administration candidate for the United States Congress. He is addressing Union war meetings in the eastern counties of the State in favor of filling up the North Carolina regiments, and it is said that he is meeting with good success.

The Unionists in Camden county have petitioned President Lincoln for permission to drive all the rebel families out of the county. If granted, they promise two loyal regiments for the Union, half of which are already raised—one of cavalry and one of infantry.

It is stated that Gov. Vance, who was recently elected by the party least hostile to the North, has called a council of the leading men of the State to take President Lincoln's proclamation into consideration.

AFFAIRS ON THE POTOMAC.

On the 4th of October, President Lincoln reviewed the army of General McClellan, which is situated in the neighborhood of Harper's Ferry, very near the scene of the great battle of Antietam, or Sharpsburg. It is said that the President rode more than 40 miles, passing by at least 12 divisions, each composed of 3 brigades, a brigade being formed of 4 regiments. This would make an army of 144,000, were all the regiments full, but many of the old regiments are terribly thinned. Besides these are other corps of McClellan's army on the south side of the Potomac. General Sigel is slowly pushing his reconnoissances southwest along the railroad route, over which General Pope was driven by the advance of Generals Lee and Jackson.

General McClellan has issued the following order with reference to the President's emancipation proclamation. As long as these sentiments prevail among our soldiers as well as our citizens, the overthrow of our beneficent institutions by military power—so persistently prophesied by mocking foreigners—can never take place:—

HEADQUARTERS, ARMY OF THE POTOMAC,
CAMP NEAR SHARPSBURG, Md., Oct. 7, 1862.
The attention of the officers and soldiers of the Army of the Potomac is called to General Order No. 139, War Department, Sept. 24, 1862, publishing to the army the President's proclamation of Sept. 22.

A proclamation of such grave moment to the nation, officially communicated to the army, affords to the general commanding an opportunity of defining specifically to the officers and soldiers under his command the relation borne by all persons in the military service of the United States toward the civil authorities of the government. The constitution confides to the civil authorities, legislative, judicial and executive, the power and duty of making, expounding and executing the Federal laws. Armed forces are raised and supported simply to sustain the civil authorities, and are to be held in strict subordination thereto in all respects. This fundamental rule of our political system is essential to the security of our republican institutions, and should be thoroughly understood and observed by every soldier. The principle upon which, and the objects for which, armies shall be employed in suppressing the rebellion, must be determined and declared by the civil authorities, and the chief Executive, who is charged with the administration of the national affairs, is the proper and only source through which the views and orders of the Government can be made known to the armies of the nation.

Discussion by officers and soldiers concerning public measures determined upon and declared by the Government, when carried at all beyond the ordinary temperate and respectful expression of opinion, tend greatly to impair and destroy the discipline and efficiency of troops by substituting the spirit of political faction for that firm, steady and earnest support of the authority of the Government which is the highest duty of the American soldier. The remedy for political errors, if any are committed, is to be found only in the action of the people at the polls. In thus calling the attention of this army to the true relation between the soldiers and the Government, the general commanding merely adverts to an evil against which it has been thought advisable during our whole history to guard the armies of the republic, and in so doing he will not be considered by any right-minded person as casting any reflection upon that loyalty and good conduct which has been so fully illustrated upon so many battle fields. In carrying out all measures of public policy this army will, of course, be guided by the same rules of mercy and Christianity that have ever controlled its conduct toward the defenceless.

AFFAIRS IN KENTUCKY.

The attention of the country is now directed to the great operations in Kentucky. On the 1st of October, General Buell's army started from Louisville to the south, in the direction of Bardstown. On the 4th,

the rebels at Frankfort, the capital of the State, which is 65 miles by railroad nearly due east from Louisville, went through the farce of inaugurating Richard Howes as Governor of Kentucky, and the next day they abandoned the place; probably fearing that General Buell would get in their rear.

REBEL ATTACK ON CORINTH.

After the battle of Iuka it seems that General Rosecrans retired with his forces behind the entrenchments of Corinth, where he was assailed on Saturday, the 4th of October, by the main rebel army. General Grant's headquarters are at Jackson, some 60 miles north of Corinth, and from that point he has forwarded the three following despatches:—

GRANT'S HEADQUARTERS, JACKSON, Tenn., Oct. 5—8 A. M.
To Major General H. W. Halleck, General-in-Chief, United States Army:—

Yesterday the rebels, under Price, Van Dorn and Lovell, were repulsed from their attack on Corinth with great slaughter. The enemy are in full retreat, leaving their dead and wounded on the field. Rosecrans telegraphs that the loss is serious on our side, particularly in officers, but bears no comparison with that of the enemy. General Hackleman fell while gallantly leading his brigade. General Oglesby is dangerously wounded. General McPherson, with his command, reached Corinth yesterday. General Rosecrans pursued the retreating enemy this morning, and should they attempt to move toward Bolivar, will follow to that place. General Hurlbut is at the Hatchie river with five or six thousand men, and is no doubt with the pursuing column. From seven hundred to a thousand prisoners, besides the wounded, are left in our hands.
U. S. GRANT, Major General Commanding.

GRANT'S HEADQUARTERS, JACKSON, Tenn., Oct. 5, 1862
To Major General H. W. Halleck, General-in-Chief, United States Army:—

General Ord, who followed General Hurlbut, met the enemy to-day on the south side of the Hatchie, as I understand from a despatch, and drove them across the stream and got possession of the heights with our troops. General Ord took two batteries and about two hundred prisoners. A large portion of General Rosecrans's forces were at Chevala.

At this distance everything looks most favorable, and I cannot see how the enemy are to escape without losing everything but their small arms. I have strained everything to take into the fight an adequate force, and to get them to the right place.

U. S. GRANT, Major General Commanding.

Chevala is ten miles to the northwest of Corinth on the railroad to Memphis on the Mississippi.

HEADQUARTERS OF GENERAL GRANT,
JACKSON, Tenn., Oct. 6—12:20 P. M.
To Major-General Halleck, General-in-Chief:—

Generals Ord and Hurlbut, came upon the enemy yesterday, and General Hurlbut having driven in small bodies of the rebels the day before, after seven hours' hard fighting drove the enemy five miles back across the Hatchie toward Corinth, capturing two batteries, about three hundred prisoners, and many small arms. I immediately apprised General Rosecrans of these facts, and directed him to urge on the good work. The following despatch has just been received from him:—

CHEVALLA, Oct. 6, 1862.
To Major-General Grant:—
The enemy are totally routed, throwing everything away. We are following sharply.

W. S. ROSECRANS, Major General.
Under previous instructions General Hurlbut is also following. General McPherson is in the lead of General Rosecrans's column. The rebel General Martin is said to be killed.

U. S. GRANT, Major General Commanding.

Engraving by Electricity.

Some will have noticed the machine in class VII. for engraving the cylinders, of copper brass, employed in the printing of woven fabrics and paper hangings. Its distinctive feature is in the application of voltaic electricity in communicating certain necessary movements to important and delicate portions of the apparatus. The cylinder to be engraved is first coated on its outer surface with a thin film of varnish, sufficiently resistant to the continuous action of the strongest acids. The requisite number of copies of the original design are then traced or scratched simultaneously by a series of diamond points, which are arranged on the machine parallel, with the axis of the cylinder. Each diamond point is in correspondence with a small temporary magnet; and the entire series is so arranged *en rapport* with the original design, which had been previously etched on a metal cylinder fitted in with a non-conducting substance (this cylinder being made to revolve in contact with a tracing point), that when the electric current passes, intermittent currents are established, whereby the diamonds are withdrawn from their work at the proper intervals. The metallic surface is thereby exposed in certain parts; and a bath of nitric or other acid being afterward used to etch or deepen the engraved portion, the operation is completed. By means of this apparatus, engravings may be enlarged or diminished to any necessary extent from the same original.—*London Builder.*