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(Illustrated articles are marked with an asterisk.)

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SCIENTIFIC AMERICAN SUPPLEMENT

No. 549.

For the Week Ending July 10, 1886.

Price 10 cents. For sale by all newsdealers.

THE FASTEST STEAM LAUNCH.

Henrietta is the name of a steam launch just built by the Herreshoff Manufacturing Company, of Bristol, R. I., for Norman L. Munro, of this city. She is elegantly built, principally of mahogany, and a large amount of polished bronze makes her very attractive to the eye. The most astonishing quality, though, is her speed, which is probably greater than ever before attained in a vessel of her size; and we may remark that in all the high speeds attained with other boats, the very best bituminous or semi-bituminous coals are used, that have only 3 to 5 per cent of ash, and to burn the coal fast enough inclosed stokeholds are used, into which air is forced with blowers. But the Henrietta uses anthracite coal of ordinary marketable quality, and the natural draught is increased by a small steam jet in the up-take.

We append dimensions of the boat and record of trial trip, which have been furnished us by her builders:

The Henrietta is the 133d steamer of our build. Her dimensions are: Length on deck, 48 ft.; length on water line, 46 ft. 6 in.; beam, 7 ft. 5 in.; depth, 3 ft. 9 in. She is open nearly two-thirds of her length; has air tight compartments at each end, and four water tight bulkheads. The hull is built of wood, and the planking, decks, etc., are double thickness of mahogany. The keel and entire frame is of white oak, and all fastenings are of copper and bronze.

Engine is of the triple expansion type, of our latest design, and intended for a very high steam pressure. The cylinders are 4 in., 6½ in., and 10 in. diameter, and the stroke of piston is 8 in.

Boiler is the "Herreshoff patent safety," and is of our usual improved type. It has about 9 sq. ft. of grate surface, and the draught is accelerated by a steam jet in the up-take. The fire and engine rooms are not inclosed.

Screw propeller is of bronze, with four blades, and is 28 in. diameter. The boat is almost entirely free from vibrations, even at the highest speed.

The trial for acceptance was made June 14. Six runs were made over a base of one mile (5,280 ft.) in Bristol Harbor. There was a moderate wind abeam, and the sea was quite smooth. A moderately hard red ash anthracite coal was used, that has about 15 per cent of ash.

Run.	Mean steam.	Time.	Speed.	Mean of pairs
1	244 lb.	3 m. 3 sec.	19·67	19·72
2	240 "	3 " 2 "	19·77	
3	244 "	2 " 59½ "	20·05	19·98
4	242 "	3 " ½ "	19·91	
5	244½ "	2 " 59 "	20·11	20·165
6	250 "	2 " 58 "	20·22	

Mean speed, 19·955 miles = 17·3 knots.

Full time occupied, including turns, was between 24 and 25 minutes. There was no heating of bearings whatever, and it was the second time the boat had left the dock.

The Henrietta left Bristol for New York at 4:48 A.M., June 16, in a dense fog, having two persons only on board, the engineer and pilot. She was detained fully one hour by the fog, and was overtaken by the Stiletto, also bound to New York, off Horton's Point, L. I., at 12:15 P.M., just as the fog cleared away. She ran side and side with the Stiletto to Sands Point, and arrived under the Brooklyn Bridge at 6:15 P.M., having had head tide nearly all the way. The actual running speed was over 13 miles per hour; and if allowance be made for fog and adverse tide, her speed was nearly 15 miles per hour.

Consumption of coal from Bristol to New York, 900 pounds. Weight of the boat in running trim, 10,000 pounds. Immersed cross section, 7½ square feet nearly.

THE PNEUMATIC DYNAMITE GUN.

Lieut. Zalinski is still continuing his experiments with the pneumatic dynamite gun illustrated in the SCIENTIFIC AMERICAN of Oct. 31, 1885. The weapon is 60 feet long and has a bore of 8 inches, the projectile force being air under a pressure of 1,000 pounds to the square inch. The trials of the system made during the past fall were sufficiently successful to attract much interest in military and naval circles. The present experiments at Fort Lafayette, New York Harbor, have been witnessed by a number of officers specially appointed by the Secretary of the Navy. The target, consisting of a few sails rigged on a small scow, was placed at a distance of a mile. A number of barrels were anchored around it in a small circle of known radius. Ten blank projectiles were fired at the target. One passed through a sail, and all came sufficiently near the mark to have accomplished their purpose had actual warfare been in progress. Captain Howell, who is well known as an inventor himself, was one of the examining board, and expressed his confidence that these experiments have established the accuracy of the gun, but he was of the opinion that it could be still further improved. In additional experiments with loaded projectiles, one shell went to the bottom without exploding, but another, containing 58½ pounds of nitro-gelatine, burst just beneath the surface, and sent a column of spray into the air to a height of over 100 feet. When the gun was elevated 32 degrees, and the pressure of air at 1,000 pounds, the projectile was carried about two and a half miles.

The gun itself remains substantially the same as before, the present experiments being directed more particularly to the improvement of the projectile. In the latest form, the cylindrical shell is three feet in length, and in diameter the full size of the bore. The wooden tail piece projects several feet back of the cylinder, and is surrounded by spiral flanges of thin metal. In this manner the projectile is given a rotary motion similar to that of a rifle ball; and in consequence, greater accury and increased range have been obtained. The question of our coast defense gives particular interest to experiments with either aerial or submarine torpedoes, for the tendencies of modern warfare point to these as the probable weapons with which future battles are to be fought. It is understood that the board will continue to experiment with the pneumatic gun until thoroughly informed concerning its performance.

Chemistry without Apparatus.

When one is engaged in qualitative chemical analysis, it is necessary to change vessels at almost every reaction, or else be compelled to resort to frequent washing, which, if it be not properly performed, may spoil the results of the subsequent reaction. One of the best means that has been tried of getting over this difficulty consists in the use of the smoked capsules proposed by Mr. Violette. By smoked capsule is meant a small porcelain saucer covered with a layer of lampblack by putting it into the flame of a candle. A drop of water or of a saline solution, carefully deposited in this capsule, assumes therein the form of a globule, which is as limpid as crystal, and which does not adhere to the lampblack. The addition to this globule of another drop of saline solution or a particle of a solid reagent produces therein all the phenomena of coloration, precipitation, and crystallization with perfect clearness. The eye is capable of following in it the least changes (which are rendered still more manifest through the lenticular magnification) without having to look through the glass sides of what are usually used as receptacles.

After the phenomena has been observed, the globule is thrown out through a slight blow on the capsule. The latter will be found clean, without residuum, and perfectly fitted for the examination of another reaction without any mixture with the preceding. The vessel is, so to speak, clean without the necessity of cleaning it, and there need be no fear of any of those contaminations, even slight ones, that sometimes spoil analytical results in the ordinary vessels used.

The capsule, which is only three-quarters of an inch in diameter, is nothing else than one of those small porcelain saucers used for water colors. In order to put it into the flame, it must be grasped with pincers; but the operation may be more easily performed by gluing a thin cork disk to it, and sticking a pin into this for a handle. For smoking one of these capsules properly it is necessary to use precaution. It should be thrust into the upper third of the flame of a candle several times, and be allowed to cool in the intervals. It is necessary to wait until the capsule is cold before depositing the globule in it, for otherwise it would get wet. The carbonaceous coating is at once made wet by acid, alcoholic, and ethereal liquids, and it is only aqueous solutions that assume a globular form upon it.

This mode of operating may be still further simplified by taking advantage of the property that the leaves of the same plants possess of not being wet by water and aqueous saline solutions. Among such leaves those of the nasturtium (*Tropæolum*) have a form that especially adapts them to this use. When one of these is held by its petiole, its upper surface exhibits a depression in which one can easily deposit a globule, and proceed exactly as with the smoked capsule. When the leaf becomes wet, after a few reactions, nothing is easier than to substitute another one for it.—*La Nature.*

The Radiophone.

M. Mercadier has devised a radiophone of a very simple kind. It is in fact simply a microphone with the supports of the carbons fixed to a thin diaphragm or plate of varnished pine. The microphone is connected to a magneto receiver with or without induction coil and in circuit with a battery. In exposing the diaphragm to the action of intense radiation, rendered intermittent by a revolving wheel or screen pierced with holes, the telephone gives out a note corresponding to the oscillations of the radiant energy. Further, a telephone transmitter with its iron diaphragm to the radiation gives out a corresponding note in the receiver. The effects are increased by smoking the diaphragm, or using a powerful source of light, such as the oxyhydrogen or arc light.