

municating fire by felt and sheet iron. The hull is coppered. The boilers are on deck and has water bottoms. Has a poop cabin. Date of trial, December 22d, 1858.

C. H. H.

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*Particulars of the Steamer Arizona.*

Built by Harlan & Hollingsworth, Wilmington, Delaware. Intended service, New Orleans to Brazos.

**HULL.**—

Length on deck,	.	.	.	201 feet	6 inches.
Length on deck at load line,	.	.	.	200 "	
Breadth of beam,	.	.	.	34 "	
Depth of hold,	.	.	.	10 "	
" to spar deck,	.	.	.	17 "	6 "
Length of engine space,	.	.	.	75 "	
Draft forward, light,	.	.	.	4 "	6 "
" load,	.	.	.	7 "	
Draft aft, light,	.	.	.	5 "	2 "
" load,	.	.	.	8 "	2 "
Tonnage,	{ Hull,		632.		
	{ Engine room and bunkers,		236.		
Area of immersed section at load draft,				228 sq. feet.	
Speed in knots,	{ with tide,	.	14½.		
	{ against tide,	.	10.		
Masts, 2.—Rig—Schooner.					

**ENGINES.**—Vertical beam—condensing.

Diameter of cylinder,	.	.	.	44 inches.
Length of stroke,	.	.	.	11 feet.
Cut-off,	.	.	.	5 " 6 "
Maximum revolutions,	.	.	17½.	
Weight of engines,	.	.	360,000 lbs.	

**BOILER.**—One—Return flued.

Length of boiler,	.	.	.	24 feet.
Breadth "	.	.	.	15 " 6 inches.
Height " exclusive of steam chests,	.	.	.	7 " 7 "
Weight " with water,	.	.	130,000 lbs.	
Number of furnaces,	.	.	4.	
Breadth "	.	.	.	3 " 5 "
Length of grate bars,	.	.	.	6 " 2 "
Number of flues,	{ above 8.			
	{ below 8.			
Internal diameter of flues,	{ above 1 ft. 5½ ins.			
	{ below 2 ft. by 1-6 ins.			
Length of flues,	{ above 14 ft. 2 ins.			
	{ below 15 ft. 6 ins.			
Heating surface,	.	.	.	1880 sq. ft.
Diameter of smoke pipe,	.	.	.	5 " 3½ "
Height "	.	.	.	33 " 8 "
Load on safety valve per square inch,	.	.	30 lbs.	
Consumption of coal per hour,	.	.	¾ ton.	

**PADDLE WHEELS.**—

Diameter overboards,	.	.	.	30 feet.
Length of blades,	.	.	.	6 " 6 inches.
Depth of blades,	.	.	.	22 "
Number "	.	.	21.	

*Remarks.*—Frame | 3½ ins. × 1 in.—18 ins. apart; 12 strakes of

plates from keel to gunwale,  $\frac{3}{8}$  to  $\frac{1}{2}$  inch thick; four bulkheads. Diameter of rivets  $\frac{5}{8}$  and  $\frac{3}{4}$ . Distance apart, 2 inches; single riveted. Depth of keel, 5 ins. Dimensions of ditto U  $\frac{1}{2}$  inch plate. One independent steam, fire, and bilge pump. Flanch iron clamped around the gunwale 24 ins. in width by  $\frac{1}{2}$  inch thick, with knees to each frame. Keelsons, 12; fore and aft, 20 inches high. Date of trial Jan. 1859.

C. H. H.

*The Drinking Waters of the Metropolis.\** By EDWIN LANKESTER, M.D., F.R.S., M.R.I.

[Abridged from a paper read at the Royal Institution.]

The water used in London for drinking purposes is obtained from both rivers and springs. The Thames and the New River, and partially other rivers, supply the river water. The spring water is of two kinds. First, from surface wells, obtained by digging through the gravel which covers the London clay in the western parts of the metropolis, and into the clay itself. Secondly, from deep wells, which generally pass through the London clay and penetrate the chalk below. The surface wells receive the soakage of the water which falls over London, and the water is contaminated by the contents of cesspools, drains, and sewers. The deep wells receive their supply of water from the chalk which forms the sides of the great "London Basin." All these waters contain more or less of the following mineral constituents:—

1. *Carbonate of Lime*, of which 3 to 17 grains are contained in the gallon. The carbonate of lime is the most common source of the *hardness* of the waters of London. It may be got rid of by Clark's process, which consists in adding lime to the water. This process would greatly improve the Thames water. This plan is carried out most successfully on a large scale at Plumstead. It was recommended by the government Commissioners, on account of its "health, comfort, and economy."

2. *Sulphate of Lime*, in the proportion of from 1 to 15 grains in the gallon. It decomposes in contact with organic matters, and produces sulphureted hydrogen. Very small quantities of organic matter serve to produce this effect.

3. *Chloride of Sodium* exists in Thames water, from 1 to 4 grains in the gallon; in deep wells, from 10 to 17 grains; and in surface wells, from 20 to 40 grains. In the Thames it may be the produce of the tide; in the deep wells it is washed out of the chalk; but in the surface wells, where it is most abundant, it is derived from the animal and vegetable refuse of the houses through which it percolates. The analyses of above one hundred of these wells showed that they were all equally open to suspicion on this point.

4. *Phosphates and Silica* exist in all the London waters in small quantities.

5. *Ammonia* also has been detected in small quantities in the Thames;

\* From the London Mechanics' Magazine, July, 1858.