

by the fires in the galley, and cabin stove, which draws the air towards the extreme ends of the vessel. It is necessary, for this reason, that an uninterrupted communication should be maintained between the openings at the termination of the horizontal tubes, and the general air of the ship. The stove in the cabin should have an open fire, with a good-sized smoke-funnel from it into the open air.

The smoke-flue from the warming apparatus, which has been described as taken off from the bottom of the stove, is made the means of affording additional heat to the open space between decks. A vertical smoke-flue of about one foot diameter is carried up from the bottom of the cockle to the under side of the upper or "spar" deck. This communicates with an horizontal smoke-tube, of a flattened oval form, and put together, like the caliducts, with two thicknesses of plates, and an intervening air-space. The oval tube is suspended from the beams of the upper deck, and extends the whole length from the main to the fore hatchways. Besides its use in warming the ship, this pipe serves a useful purpose in drying the clothing of the men in wet weather. The smoke-pipe terminates in the ventilating funnel near the fore hatchway.

The ship being thus filled with an abundant supply of fresh warmed air, the vitiated air is extracted: firstly, by means of the large open fire in the cooking galley; and secondly, by a ventilating chimney, or funnel, which surrounds the smoke-pipe from the galley and cockle; and is carried up to a considerable height, and terminating with a cowl, acting in the ordinary mode, by its mouth being averted from the wind.

In this apparatus, the cockle itself, with the whole of the caliducts, and hot-hair tubes, are fixtures, but the smoke-