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## THE NEW CUNARD STEAMERS.

The two new additions to the Cunard fleet of steamers, plying between New York and Liverpool, the Campania and the Lucania, are now distinguished as the largest and finest vessels of their kind in the world. The Lucania has just completed her first round voyage and made a great record for speed. Daily runs of 460, 490, 498, 516, and 533 nautical miles per day were made. The Campania has even reached 548 nautical miles in a day.

The Campania and Lucania are as nearly as possible twins. They are each 600 feet in length between perpendiculars. Length over all, 620 feet; breadth, 65 feet 3 inches; depth to upper deck, 43 feet; gross tonnage, 12,500 tons.

They are each fitted with two sets of the most powerful triple expansion engines that have yet been constructed, each set capable, it is believed, of indicating from 14,000 to 15,000 horse power. These engines are fitted in two separate engine rooms, there being a dividing center line bulkhead between them, fitted with watertight doors for the necessary purposes of communication. Each set of engines has five inverted cylinders—two high pressure, one intermediate pressure, and two low pressure cylinders, the two high pressure being placed tandem wise above the low pressure ones. These are arranged to work on three cranks, set at an angle of 120 degrees. The high pressure cylinders are each fitted with piston valve, the intermediate and low pressure with double piston valves, all of which are worked by the usual double eccentrics and link motion valve gear. Steam from the two high pressure cylinders exhausts into the intermediate one, which in turn exhausts into the two low pressure cylinders, which have relieved slide valves, expansion taking place in three stages.

Steam for the main engines is generated in twelve large double-ended boilers, each having eight corrugated furnaces. The boilers are arranged in two groups of six, each group self-contained in water-tight compartments, and having a common funnel of the unprecedented diameter of 21 feet. The two funnels, it may be added, are from their lowest section 120 feet high, or about the height of the Eddystone Lighthouse. There is also a large single-ended boiler for supplying steam for the electric light, refrigerating and other auxiliary machinery. In addition, a small single-ended boiler is fitted on the lower deck for supplying steam to the distilling condensers, heating pipes, etc. An elaborate system of piping is fitted throughout the ship, and connected to the various auxiliary pumps for filling and emptying the ballast tanks, pumping out bilges, pumping water on deck in case of fire, and other purposes.

The interior fittings of the vessels are most luxurious. Four hundred and sixty saloon passengers, 180 second cabin and 540 steerage passengers can be accommodated. An attempt has been made to bring the surroundings up to the level, in point of comfort, of the first class hotel. No expense has been spared to give the portion of the vessel devoted to the saloon passengers the utmost elegance. High prices are charged for passage on these flying palaces of the ocean; nor is this to be wondered at, as the running expenses are enormous. Each ship burns about 500 tons of coal per day, in ninety-six furnaces, and to keep them a-going requires a small army of stokers.

## MUSHROOM POISONING.

Within the last few weeks several very serious cases of mushroom poisoning have been chronicled by the daily press. In the literature of the subject of mushrooms there may be found a most vivid description of the agonies endured by one who was nearly killed by mushroom poisoning. There is every reason to believe that the sufferings of some (if not all) of the unfortunate victims referred to were very great, independent of the fatal results. It is a very common practice to distinguish between mushrooms and toadstools, the latter name indicating presumably any kind of fungus of the mushroom shape, other than the ordinary edible one. Another popular practice is to assume the validity of some simple test, independent of eating it, to determine the edibility of a fungus. Both these ideas are quite wrong. No distinction between mushroom and toadstool is admissible, and the mushroom gatherer of this vicinity confining his harvest to the field mushroom, or *Agaricus campestris*, often passes over other mushrooms which are perfectly edible but of whose innocuousness he has no assurance.

The mushrooms proper are classified largely by the nature of the under surface of the head. In the *Agaricus* division this part is filled by radial plates, familiar to us all in the ordinary mushroom. In other divisions this part has a different structure. The number of varieties is very great and the number of edible varieties is also far greater than usually supposed. The assumption that there is a universal and simple test other than eating for mushrooms is an error. One of our leading chemists, a great lover of mushrooms, adopted the following test for mushrooms: To determine whether an untried fungus was edible he

would cook and eat a piece the size of a silver dime; if this produced no effect, he would prepare and eat a piece as large as a silver dollar; if this produced no effect, he would consider that fungus a safe one. The fact of the case is that the only way to know whether a fungus is edible or not is to distinguish it by its appearance; in other words, to know it when seen.

One of the troubles incident to the determination of the edible species is that in the *Agaricus* division, characterized by the radial plates formed in the under surface of the head, some of the most poisonous species fall.

Hence this identification by the radial plates in itself is of practically no value and might lead to dangerous results. One system of testing consists in ascertaining if the suspected fungus will discolor a silver spoon; this test is absolutely without value. It is also probable that any chemical test which may be devised for determining the presence of the poisonous alkaloid will yield in simplicity and in directness to the simple identification of the species found.

In different parts of the world different mushrooms are selected for eating, varying greatly in flavor and other qualities. Here the field mushroom seems most in demand, as only a few expertsever go outside of the one individual species. The moral of the whole matter is that in gathering mushrooms care should be taken and absolutely no doubt should be allowed to exist as to the identity of the species collected. Experience not only proves the danger incident to mushroom gathering, but it also shows the perfect ease with which the proper fungus can be identified even by children.

## HEALTH RULES IN SIX WORDS.

Strict temperance.

Correct diet.

Systematic exercise.

## AUTOMATIC SAFETY APPLIANCES RECENTLY INTRODUCED ON A NEW YORK RAILROAD.

I note with interest what you say in the current number of the SCIENTIFIC AMERICAN about railroad signals, having given much attention to the subject and written a great deal upon it. It seems to me that the very features which you demand in a perfect system are now working in one recently put in by one of the most conservative and best managed railroads in the country, where it crosses the Western New York & Pennsylvania in the outskirts of Buffalo. I lately examined this, in company with the chief engineers of two roads, and my two companions were loud in their praises of it. The transmitting power is compressed air at about fifteen pounds pressure, and the mechanism in the hands of the towerman is a single lever, requiring a force of ten pounds to throw it. When this lever is upright, the distance semaphores at 1,000 feet and the home ones at 500 are at danger in all four directions, and a double-jointed shoe is raised six inches in the center of the track opposite the home semaphore. If the engineer passes the home semaphore when at danger this shoe strikes a lever hinged to the forward truck frame of the locomotive, which in turn opens a cock in the air pipe, setting the brakes on the train. A hundred feet inside the home signal is a derailing point, which the locomotive would take if, by any failure of the air brakes, it reached that place. By throwing the lever in the tower to the right, the air brake shoe and semaphores fell and the derailing point closed on one line, but on the other remained as they were. The train on the open line advanced a few feet beyond the home signal, when the tread of the wheels pressed down a detector bar on the outside of the rail, which through pneumatic pressure locked the mechanism in the tower, so that while the signalman could bring his lever back to the upright position, thus setting the danger signals behind the train to prevent a rear end collision, he could move it no further, and it was absolutely impossible to open the other road to a train until after the one to which the crossing had been given had been cleared.

The air is conveyed in pipes, and there is a small cylinder, with plunger and piston, at each point where its force is to be exerted. The strong feature of this system is that when one road is closed the other is absolutely and effectually closed mechanically, and beyond the efforts of an excited or careless towerman to open it. The system is applicable to the approach of drawbridges and to the "blocking" of roads, in the latter case the train mechanically raising the danger signal behind it, which would be mechanically released only when the train had left the block; also to the working of switches. The interlocking feature appears to be positive.

S. D. LEE.

Rochester, N. Y.

For what is the greatest amount of lumber used? Nine people out of ten will say for houses and buildings. It is doubtful if 35 per cent of the lumber output goes into buildings. The railroads, farmers, and miscellaneous purposes take about 40 per cent, and the other 20 per cent goes into boxes. The estimate is made, says the *Southern Lumberman*, on the judgment of some of the oldest and best informed lumbermen in the country.