sumed thoroughly, for the simple reason that it is easier to do so than to punch it through the bars when half burned. I have lately put in two boilers, making double the capacity of the one formerly used, and find a saving in fuel, as well as a great saving of labor for the engineer. Again, as to the economy of using steam expansively. When we had only one boiler we could manage to run by careful firing with the cut off at half stroke, but could not make steam enough to run at the same speed, using the steam at full stroke. We have lately increased our piston speed fifty per cent., and reduced the amount of steam in same proportion, and are, so far satisfied with the result. As to oiling the cylinder, we find that when the engine lags, from low steam, an application of oil through the steam chest is equal to several pounds pressure by the gage; but as to which is the cheapest—oil or fuel—we have never 'ciphered out.'" J. L. H.

Cincinnati, Ohio, April 4th, 1864.

[Our correspondent's views are correct and to the point. It is a very common error to make boilers too small for their duty; we always advise 15 feet of heating surface to the horse power, and in many cases even 20 is better than the quantity usually given, which is ten. It is cheaper in every respect to have ten horse-power surplus in the boiler than just enough to keep the engine running. Coal will not burn when it is continually raked up, "poked," "sliced," &c., and it is only by slowly roasting away upon the grates that the greatest economic effect is obtained. Lubricating the cylinder has the effect spoken of by our correspondent, but the question of economy is not between fuel and oil, but between repairs and fuel caused by the injurious action of the oil or fat. Engines working moist steam generally require little lubrication of the valves and cylinders; but with vapor of a high temperature the case is different.—EDS. *Scientific American.*]

Marine Boiler Furnaces.

A correspondent of the *Mechanic's Magazine* says:—Although smoke from steam ships is such a recognised nuisance, I see few, if any, means taken to effectually prevent it; and although fuel is an expensive article I still find the apparati for consuming it generally in a very imperfect condition. Always, in going below, a handsome, well-kept pair of engines presents itself to your gaze, but look at the boilers, and the furnace fronts are most likely cracked, the doors in bad repair, and the fire bars more or less out of order, and this when the furnace is an apparatus for consuming fuel every year to nearly half the value of the machinery, and should be kept up in repair as carefully as the slides of the engines themselves. I have lately seen the calorific value of Welsh and Newcastle coal raised nearly 14 per cent., and the power of the boiler producing steam raised to the same extent by the following simple alterations, viz.:—

Reducing the length of the bars so as to increase the proportion of heating surface to about 33 square feet per square foot of grate surface, and securing an efficient combustion chamber, and by adopting a furnace door with the baffle plate alone perforated with as many 7-16th holes as practicable, the door intact, the air coming up through the bottom space only between the door and the baffle plate. Any simple shutter for this bottom space will give the means of regulating the quantity of air going through, which, however, does not seem to be greatly wanted. In a furnace so constructed the most bituminous steam coal may be burned with the greatest economy, almost entirely without smoke by the most careless stoker, and the boiler made to produce the greatest possible amount of steam in a given time.

Singular Detection of Poison.

Paris has recently been much excited by a supposed case of poisoning, and singular discovery of evidence of the crime. A woman died under the care of a homœopathic physician—Dr. Courty de Lapommerais. The Judge of Instruction—the officer charged with the investigations preliminary to the public trial—went to the house of the deceased woman to inspect the room in which she died, but with no fixed idea as to whether he should discover anything at all. He perceived some faint spots on the floor, and found, on inquiry that they were made by the dejections of the sick woman. He ordered the floor to be scraped at the places stained, he carefully collected the scrapings and submitted them to the examination of competent chemists, and these scrapings are going to condemn the prisoner. They contained *digitaline*, the active principle of the *digitalis purpurea*, or purple fox-glove, one of the most deadly poisons of the "Materia Medica," and which acts by diminishing the heart's action. To shew the wonderful power of this medicament, the *digitaline*, as prepared by Homolle and Quevenne, the preparation now principally in use at Paris, is given in doses of one or two milligrammes, or say of one grain, for fifteen days' use.

The chemists commenced by giving small quantities of the scrapings to animals, all of which died in a way to suggest poisoning by *digitaline*. They then selected the frog for the test experiment, because the heart of this animal, when laid bare, continues to beat normally. The test was made on three animals; the heart of the first one was laid bare, and continued its contractions and dilatations as if nothing had occurred; on the naked heart of the second one a minim of a solution of *digitaline* was dropped; the heart commenced to beat slower and slower; presently its pulsations ceased entirely, and the animal was dead. On the heart of the third frog they placed a small quantity of the avenging scrapings from the floor, and they produced exactly the same effect as the drop of *digitaline*; the heart's pulsations slackened by degrees, and presently the animal was dead.

These interesting experiments were made before the Judge of Instruction, and will be repeated before the jury at the trial. Until they were made the prisoner was indifferent and even joyous; he knew that there was no chemical test for the poison he used; he had taken care to nurse the condemned woman himself, and to conceal all the probable sources of discovery; but he had not counted on the spots on the floor, nor on the peculiar properties of the heart of the batrachian tribe. Nevertheless he had occupied himself a great deal with toxicology, and still maintains that he can prove his innocence.