ment to appoint a board to examine it, and I unhesitatingly wrote and signed a recommendation to the Secretary of the Navy. A board of Naval Engineers was ordered, they examined it and their report was so favorable that orders were sent from the Bureau of Steam Engineering, placing at the disposal of Col. Foote the United States steamer "Palos," to be fitted with his invention. A certain amount of money was also appropriated by Government for the expenses, and every facility in the way of tools, workshops and labour afforded him. While Col. Foote was experimenting the construction of his apparatus, a series of experiments with coal were made on the "Palos" by orders from Government. In the first experiment, fires were lighted under one boiler only, and the coal was limited to 8 lbs. per square foot of grate surface; but after running the engines 50 minutes the steam had fallen so low that the engines stopped, there being only 5 lbs. pressure in the boiler. It was then determined to use both boilers, with 8 lbs. of grate surface per hour, which was done, the experiment lasting for three days consecutively. Every pound of coal was weighed, and every ounce of water measured. The engines made 33 revolutions per minute, and steam was carried at 30 lbs. by throttling closely. The evaporation was very good, giving between 7 and 8 lbs. of water per pound of coal. After thoroughly cleaning the flues the last experiment was commenced, and continued also for three days. There was no limit to the coal, but only 36 revolutions could be obtained from the engines, and the evaporation only slightly increased, being about 8 lbs. of water per pound of coal.

On the 21st of March, Col. Foote's apparatus having been fitted to the "Palos," fires were lighted under one boiler; steam was rapidly generated, and the engine driven at 34 revolutions, with thirty pounds of steam, for nearly three hours, when we extinguished the fires to make some needed changes. All felt well satisfied with the first trial—as it was not to be expected that the apparatus could be perfectly proportioned at the first, and it was assumed from the first that the fires would have to be lighted a few hours at a time, for several days before the apparatus could be pronounced to be perfectly adjusted. On Thursday, the 4th of April, the fires were lighted under both boilers, and, in 47 minutes from lighting the first fire, we had 30 lbs. of steam, and started the engines; and although the throttle was wide open, and the engines were making 50 revolutions, the steam increased, and we were obliged to shut off two of the fires; but the engine still kept up her revolutions, and the steam held steadily. On comparing the number of pounds of oil used, to the number of pounds of coal needed to produce the same effect, as ascertained by former experiments, the ratio was found to be 1 lb. of oil to 8 of coal.

We are now daily making changes and lighting fires to see the effect of the alterations, and are at this moment burning less than half the oil, with the same effect as regards quantity of water evaporated.

I cannot conclude without thanking you for the zeal you have manifested in regard to these experiments. Many of the slight changes made were at your suggestion, and they have shown their great utility at once.

I presume we shall be associated together for some time yet, and it gives me much pleasure to have so able a coadjutor.

I am yours very truly,

G. B. N. Tower,

Late Chief Engineer U. S. Navy.

Henry Lester, Esq.,
American House, Boston, Mass.

The *Oil Trade Review* says:—"A large common service boiler, one belonging to the *Teazer* gunboat, is being fitted up at Woolwich Dockyard for trials between coal and oil as fuels. Two days are to be given to coal—the first with the usual firing, the second with forced firing, to obtain the highest results the boiler is capable of giving. The coal grates are then to be taken out, and oil grates under Mr. Richardson's directions substituted.

PETROLEUM—THE UTILIZATION OF WASTE.

In our issue of November 3 last we had occasion to notice a patent taken out by Mr. J. Lundy, of Leith, to protect his method of treating the residues obtained from the distillation and purification of mineral oils. Subsequently reference was made to the process successfully adopted by Mr. A. M. Fell, manager of the West Calder Oil Company's Works, and some samples of the commercial products obtained from residue by Mr. Fell, which were at the time in our office, were examined with much interest by many persons connected with the mineral oil trade. We have now received from the West Calder Oil Company a box of samples, which show plainly that Mr. Fell has made great progress in his efforts to turn the refuse of his Company's works into money. The samples, which will be on view for a few weeks at *The Oil Trade Review* Office, consist of—

1. A piece of pitch from the still, very dense, of exceptionally good quality, and eminently adapted for the manufacture of artificial fuel.

2. Samples of coke obtained by continuing the process a little further. This is a very pure carbonaceous substance, and in appearance and form unlike the coke which generally comes from oil stills. It is evidently a valuable coke for special purposes.

3. About half a pint of the first product from the refining waste. This is a liquid of about the same colour and consistency as copal varnish, and by the uninitiated might be mistaken for that substance. The smell is unobjectionable, and not so strong as that emitted by the previous specimens sent to us from the West Calder Works.

4. A sample of burning oil from the above. It is of a very pale straw colour, of 820 gravity, and, generally speaking, an excellent sample of burning oil. We are not informed in what proportion it is yielded from the first product.

5. Lubricating oil of a colour to suit the stupid prejudice of the age in favor of a pale tint. The gravity of this is 860, and the smell almost without trace of the chemicals.

6. Pit hutch oil. A greenish fluid of the consistency of treacle. Although we have recollections of scenting a more agreeable perfume than is given out by the contents of this bottle, we also remember suffering under a worse smell coming from a similar product. As hutch oil it is likely to become a favourite article. Price 9*l.* per ton.

7. Sample of waggon grease, another product of the waste. A stiff paste, of peculiar smoothness, possessing no more smell than a fair sample of crude shale oil. Sold at 8*l.* 10s. per ton.

8. Sample of hot neck grease, similar to but finer than the last-named, but not quite so dense. This