the red-hot crown sheets full bore, the fires at the time being about 7 inches thick, clear and bright, and the dampers wide open. As soon as the feed was turned on, the pressure in the boiler began to rise. In three-quarters of a minute it rose from 6 lbs. to 27 lbs., after which it gradually fell. In 13½ minutes the pressure was again reduced to 6 lbs., and in 20 minutes the water in the boiler was brought up again to the level of the furnace crowns, at which time the steam pressure had fallen to 4 lbs. per sq. inch.

The boiler was so thoroughly heated at this test that two blisters of large area were developed on the left hand furnace crown. On examining the furnace crowns afterwards, the plates were found to have been severely sprung at each of the ring seams over the fire, and on gauging the tubes it was found that the greatest distortion had occurred at the third ring seam over the fire in the right hand furnace tube.

The furnaces were not rent by sudden contraction on the injection of the feed water on the red-hot plates, nor was an ungovernable amount of steam generated. The shell of boiler was not injured at all, neither was there sufficient steam generated to cause the safety valves to blow off. The safety valves were loaded to 50 lbs. per sq. in., and the highest pressure reached during this test was 27 lbs.

A number of tests were made each with positively red-hot furnace crowns, and in near every case, immediately as the cold water came in contact with the red-hot furnace crowns, no great accumulation of pressure took place, but on the contrary it at once began to fall.

Several tests were made under different conditions and pressures, and in one or more of the tests the water was allowed to leave the furnace crowns by gradual evaporation, just as it would in actual work where a fireman might neglect his water feed, but even in that case, when the cold feed water was pumped in on the red hot furnace crowns, no great increase of pressure resulted, neither was the boiler injured any further than the furnace tube joints and plates were sprung. To prove that the furnace crowns had been well overheated it is only necessary to relate that a strip of lead laid across the right hand furnace tube and inside the boiler at a distance of 14 feet from the front of the boiler and 7 feet back of the fire bridge, was melted through, leaving no doubt therefore that the furnace tubes had been red hot.

These experiments (which must have cost the Manchester Steam Users' Association considerable money) have been the means of proving that the most commonly accepted cause for boiler explosions are erroneous and misleading, and have done a good deal toward dispelling the mystery which has been thought to shroud the explosions of steam boilers.

It is a well-known fact to the majority of intelligent and practical engineers, that there is nothing mysterious about the explosion of steam boilers; on the contrary it is generally conceded that it is no hard matter to arrive at fairly accurate and practical conclusions regarding the explosion of a steam boiler, in most cases, by a careful examination of the remains of the exploded boiler and its fittings, assisted by the evidence of such intelligent witnesses as may give evidence before a coroner's jury, which usually enquires into the cause of such accidents, and at times renders some most amusing verdicts.

In conclusion, it can fairly be said that with the present modern construction of steam boilers, as adopted and carried out in our boiler shops, coupled with the large factor of safety which is used in determining the allowable working pressure to be carried, and the better class of engineers in charge, who are certainly better informed on the laws that govern the proper operation and preservation of steam plants than they were 20 or 30 years ago, boiler explosions should be a thing of the past.

But as there are a large number of old worn-out boilers in the country, which, though they be, so to speak, patient and long suffering, yet one by one they let go in disgust, as it were, by the time one batch has all gone up there is another batch coming on slowly but surely, and these are augmented each year by steam users who are satisfied to employ any man who happens along, in the capacity of engineer, and who could not be persuaded that it would be to their advantage to have their boilers regularly inspected by a competent person, and have the little things attended to in their infancy before they become serious, as they certainly will if left to themselves.

And I presume it will be in order for us to look out for boiler explosions, as long as steam is used as a motive power, or, for that matter, used at all, and I am inclined to think that that will be for all time to come.

KEROSENE YACHTS.

BY J. H. KILLEY, HAMILTON.

Having given a great amount of attention for some time past to improvement in gas, kerosene and gasoline power motors and their uses, I still further trespass on your space for a short time to partially describe a beautiful new kerosene yacht or launch that has appeared on Hamilton Bay. This yacht and machinery were built at Grand Rapids, Michigan, by the Scintz Yacht and Motor Company; the hull is 16 feet by 4 feet, drawing 2 feet 6 inches of water; is built of cedar and elm, and finished throughout in the most elaborate manner, having polished brass guard rails fore and aft, the woodwork being smooth and varnished like cabinet work. Looking at her, you see no visible means of propulsion, there being a clear space fore and aft, except near the stern, where a small box-like motor stands level with rail-piece on top of the hull planks; this motor is an excellent piece of mechanical work, having improvements, in the writer's judgment, of the most important character, and such as he has not seen described about any other motor with which he has been made familiar. Nearly if not all the other motors have a power impulse at every other revolution only, while this one has an impulse every revolution, developing the same power with one cylinder as others do with two cylinders, and the consequent complication of parts. Not only is this so, but the machinery connected with it is of the very simplest character; the only parts in motion being the piston, connecting-rod and crank attached to the propeller shaft, and small pump worked from an eccentric, to pump bilge water or water from outside of boat to cool the power cylinder; there are no valves or valve motion in connection with the distribution of the vapor, etc., worked from the motor; the piston does the whole of this work in the most simple manner—one casting forms the cylinder and the close case in which the crank and connecting-rod works; these occupy no more room than is necessary for their motion. The vapor and air are introduced into this part, or rather drawn in by the upward motion of the piston on the down stroke; it is compressed to, perhaps, four