

The CHIEF INSPECTOR of MACHINERY to the SECRETARY of the MARINE DEPARTMENT.

Office of the Chief Inspector of Machinery, Queen's Chambers,
Wellington, 4th April, 1900.

SIR,—

I have the honour to submit my annual report on the working of the Inspection of Machinery Act of 1882 throughout New Zealand during the financial year ended the 31st March, 1900.

The work accomplished has been in excess of that of any previous year, and the natural increase through expansion of industries and from the development of new ones is very marked. Freezing, dairying, and mining account for most of it; but, apart from these, the one desire of owners in the colony seems to be the discarding of obsolete machinery, and of obtaining the latest and best to do their special class of work. Gold-dredging has now become a great industry, and, although Otago could till quite recently boast of having the monopoly, the west coast of the South Island has now begun to establish dredges on the various rivers and alluvial flats there, and, from reports recently issued by experts well qualified to judge, much success should be achieved by dredging in this new field, the expenses in gold-dredging in proportion to the gold returned being so much less than those required to develop a quartz-mine.

Iron Trade.—All the iron trades are busy in all parts of the colony, and at the present time there is every indication of continued prosperity. During the year I visited most of the engineering establishments, and found, in nearly all cases, extension of premises, the employment of the latest tools, installation of the electric light, and contracts in hand—more especially in the South Island—sufficient to keep a numerous staff employed for the next twelve months.

Boiler Inspection.—Regarding the work of inspection of boilers in particular, 3,625 inspections have been made, and certificates issued for same, and all machinery driven by these has been very carefully examined to see that no part that might injure or cause bodily harm to attendants is left unprotected. This is a matter that receives very careful attention, and it is found that owners are only too glad to adopt any plan put forth by practical men to insure the safety of their employes. No accident by explosion of a steam-boiler has occurred to cause loss of life or injury to property of any one in New Zealand during the year, and it might be of interest to summarise the accidents to persons and the destruction of property in Great Britain during the twelve months ending the 30th June, 1899. During that period fifty-two preliminary inquiries and sixteen formal investigations into the cause of boiler-explosions were made under the Acts of 1882–90. These sixty-eight explosions caused the death of thirty-six persons, and inflicted injuries on sixty-seven, making a total number of casualties far higher than the preceding twelve months; but this was largely accounted for by the disastrous effect of a serious accident at Barking, in Essex, where ten persons were killed and twenty-three were injured. Out of the total number of explosions forty-seven were of steam-generators, the remainder being accidents to steam-pipes, valve-chests, cast-iron vessels, and so on. Of the forty-seven boilers, fourteen were of the marine type, fourteen were vertical boilers, nine locomotive type, seven Cornish and horizontal cylindrical, and three water-tube boilers. The number of persons killed by these forty-seven explosions was twenty-seven, and the number injured fifty-six, but if the casualties at Barking are deducted the list of accidents from steam-generator explosions was not very high. It is interesting to note that in a large proportion of them the part of the boiler which gave way was the fire-box. Thus, out of the forty-seven cases no less than twenty-two failed in this part, or, if the boilers which have no fire-boxes are subtracted, quite 50 per cent. failed at this part. Amongst the locomotive boilers five fire-boxes were ruptured, and in one case a stud was blown out of the fire-box. In the remaining three cases plugs for stopping tubes were blown out, each accident resulting in casualties. Among marine boilers only two accidents occurred in the furnaces, but among vertical boilers ten failed in the fire-box; one was blown overboard, and presumably the crown of the box had given way; and the three remaining explosions were failures of small importance. The flues of five Cornish-type boilers gave way, and in the two remaining cases of horizontal land boilers, one of which was egg-ended, the shell ruptured. Out of these forty-seven cases twenty-nine were not inspected. In twelve cases where the inquiry had been completed the owners were blamed for negligence, as a rule, as regarded inspection, and had to pay costs varying from £15 to £125. The following extracts from reports on explosions in Great Britain are worth attention:—

“Many safety-valves are loaded by means of a spring in tension or compression, the pressure being regulated by a screw. When the pressure at which the valve is required to blow off is ascertained, the fitting of a washer or ferrule, to prevent any further screwing of the spring, affords a very simple and inexpensive method of preventing the overloading of the safety-valve. Absence of this fitting has resulted in numerous explosions. The Courts have frequently pointed out the necessity for it, but, unfortunately, this simple precaution is not generally adopted. In three of the cases the Court has called attention to the matter. In the Barking case the Court observe that properly qualified persons were not appointed to manage the works, an observation which was emphasized by the neglect of the manager to see that the washer or ferrule was placed under each of the compressing-nuts of the safety-valve, in order to prevent the nuts being screwed down so as to produce an improper load on the safety-valve. In this case the Court found that the explosion was caused through the safety-valve having been screwed down to a pressure exceeding that of 200 lb. per square inch by the neglect of the mechanic who was employed to adjust them, and they held the owners responsible for his neglect, and for also neglecting to appoint properly qualified managers of their works. The explosion last referred to occurred in engineering-works which were formerly under the management of a retired shipmaster, succeeded by a naval architect, neither of whom possessed the qualifications of an engineer; and the naval architect was succeeded by a mechanic, whom the Court held to be unfit to be manager of engineering-works. They were of opinion that a consulting engineer should have been called in from time to time. As in previous years, several of the explosions have been caused through