SIXTH ANNUAL REPORT

—OF THE—

CHIEF INSPECTOR OF MACHINERY

—FOR THE—

YEAR ENDING DECEMBER 31ST, 1907.

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

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1908.

REPORT OF THE CHIEF INSPECTOR OF MACHINERY.

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NEW WESTMINSTER, B. C., January 1st, 1908.

The Hon. Chief Commissioner of Lands and Works,
Victoria, B. C.:

SIR,—I have the honour to submit to you the Sixth Annual Report of the operation of the steam boiler and machinery inspection service for the year ending December 31st, 1907.

Before proceeding with the detail matters of my report, I consider it fitting that I should refer to the loss we have sustained by the death of one of the members of our staff, Mr. Thomas H. Goldie, a man of sterling worth, a citizen who was foremost in advancing the interests of the city in which he lived and an official in whom the public, as well as the Inspection Department, placed implicit confidence.

Mr. Goldie was born at Old Cumnock, Ayrshire, Scotland, in 1867, received his education at the Public School, and was later apprenticed to a well-known engineering firm in the same town. After completing his apprenticeship, he was employed for some time as erecting engineer, and during this time he took a prominent part in the installation of several large plants in different parts of the United Kingdom, but his ambition to travel, for the purpose of gaining a wider experience, led him to Canada, where he at once secured remunerative employment with a large engineering firm in Ontario. After thoroughly familiarising himself with Canadian methods, he formed an opinion that the West offered special advantages and came on to British Columbia, where he was employed by different engineering firms in a variety of capacities, from machinist to works superintendent, and also as chief engineer in some of the largest steam plants in the Province.

In June, 1901, he entered the competitive examinations for Inspectors of Steam Boilers and Machinery. His work during the week of examination was most satisfactory and he was at once appointed Inspector of District A. During my association with him in this work I found him a most able officer; his close and careful study of conditions in his district, and his keen appreciation of the different personalities with which he had to deal in the discharge of his duties, made it possible for him to bring about an improved condition of affairs, without opposition from parties with whom he came in contact.

As soon as the serious nature of Mr. Goldie's illness was realised, Mr. F. K. Dunlop was appointed Acting Inspector, to assist in carrying on the work in the meantime, and after Mr. Goldie's death the services of Mr. Dunlop were retained, until examinations were held and a permanent appointment made.

At the last session of the Legislature provisions were made for two additional Inspectors, and competitive examinations were held at Victoria in June. The following gentlemen received the highest number of marks and were appointed to the different positions:—Mr. John Downie to fill the vacancy caused by the death of Mr. Goldie, and Mr. John D. Kay and Mr. George C. McGown for the two new positions.

The personnel of the service at present consists of the Chief Inspector, six District Inspectors and one clerk, located as follows:—Chief Inspector, two Inspectors for District A and clerk in New Westminster; two Inspectors for District B in Victoria; Inspector for District C at Nelson, and Inspector for District D in Vancouver.

Since the appointment of the new men, Mr. Downie has been employed a greater part of the time on calculations for new designs, the arrangements respecting these being such that the manufacturers send blue prints and specifications showing all details of construction, together with a fee of $5. These prints and specifications are carefully gone over and calculations made on all parts. If any part figures below the working pressure required, the manufacturer is so informed, and after the design has been made to comply with the requirements of the Act it is registered. The affidavits for all future boilers built to this design have the design number placed on them, and when received at this office are compared with the original specifications and design register sheet, and a copy of the latter, together with the specification sheet, is sent to the Inspector of the district to which the boiler is being shipped (if he has not already received

these documents for similar boilers). The sheets contain all the information he requires at the first inspection, and the boiler can be passed without the delays that used to occur while we were waiting for blue prints, etc., from the manufacturers. This arrangement is very much appreciated by all parties concerned, besides giving us an absolute check on everything.

The following is a summary, in part, of the work performed in this office during the year, in connection with the construction and inspection of steam boilers and machinery:—

Letters inward	3,219
Telegrams inward	62
Letters outward	3,077
Telegrams outward	83
Forms acknowledging receipt of copies of Act, etc.	223
Inspectors' monthly reports examined and checked	60
Machinery inspection reports examined, checked and filed	1,382
Boiler designs examined, calculated and reported on	103
Fees for above	$ 530
Number of miles travelled by Chief Inspector	2,480

I am again able to report that there have been no boiler explosions during the year on steam plants subject to inspection. There was, however, an explosion of a cast-iron boiler under two-horse power in Vancouver on November 5th. This boiler was used at Messrs. J. Y. Griffin's for heating the building, and also for heating water. The force of the explosion blew out the front windows and wrecked part of the building. I visited the building shortly after the explosion and measured up the heating surface, for the purpose of calculating the nominal horse-power, which I found to be 1½, and, therefore, not within the jurisdiction of the Inspection Act. This being the case, the company decided that they would not allow me to fully investigate the cause, but while there I noticed that a stop valve had been placed between the boiler and the safety valve. This valve had been closed on the previous day and had evidently not been opened when steam was being raised. The company have since put in a new boiler above two-horse power and it has been inspected.

There have been four accidents to persons working around steam plants, which are reported fully in the District Inspectors' reports.

The testing of plates for new boilers shows that the sales houses have been more careful about their deliveries to British Columbia than they were last year, but as there were twenty plates condemned, it shows the importance of carefully watching the kind of material that is to be used.

The number of new boilers inspected during the year exceeds that of 1906 by more than one-third, the increased number built in British Columbia being also about one-third.

The total number of boilers now on our books is 2,486; the number inspected last year was 1,382, leaving 1,104 boilers on which no inspection was made.

The defects observed during inspections were about the same as last year, when the increased number of inspections is taken into consideration, but the defects that can be remedied by the engineers, and those caused by their negligence, should be reduced. I have reference to such cases as are shown under the following headings particularly:—Saftey valves inoperative and overloaded, pressure gauges inoperative and defective, cases of sediment on fire sheets, incrustations, defective feed water arrangements, defective water gauges and serious leakage of fittings. I am taking up these matters with the Inspectors, and hope that they will be able to use their influence with the engineers in such a way as to reduce the defects.

The summary of total work done gives a complete account of the work performed by the whole of the staff, while summaries under the headings of "District Inspectors' Reports" show the work done in each of the districts. I may say, however, that District A has not been as completely covered as usual on account of the changes during the year.

In conclusion, I desire to thank you for the prompt attention given to all matters in connection with this branch of the service, and for your support given to this office in its effort to improve the administration of the Act, and particularly for the additional assistance, of which we were so very much in need.

I also wish to thank each member of the staff for the able and efficient manner in which they have carried on their part of the work.

I have, etc.,
JOHN PECK,
Chief Inspector.

SUMMARY OF TOTAL WORK DONE BY DISTRICT INSPECTORS IN 1907.

Number of drawings and specifications calculated for new boilers	177
" boiler plates inspected	312
" boiler plates rejected	20
" boilers built under inspection in British Columbia	110
" boilers built under inspection in Eastern Canada	76
" boilers built in Eastern Canada not under inspection	33
" new boilers inspected built in the United States	96
" new boilers inspected built in England	2
" new boilers inspected built in British Columbia	11
" new boilers inspected (total)	323
" boilers imported from Eastern Canada (second-hand)	7
" boilers imported from United States (second-hand)	11
" boilers unclassified	28
" first inspections	377
" inspections, external and internal	1,300
" internal inspections only	24
" external inspections only	71
" special inspections after repairs	89
" visits in addition to inspections	792
" boilers subjected to hydrostatic test	1,224
" boilers on which pressure was reduced	44
" boilers unsafe without extensive repairs	24
" boilers repaired under Inspector's directions	114
" boilers considered unfit for further use	10
" accidents to engines and boilers	23
" accidents resulting in personal injury (not fatal)	4
" investigations	4
" inspections completed	1,382
Total horse-power of boilers inspected	68,539
Number of defects observed as per summary	1,740
Number of defects considered dangerous	105
Inspection fees earned	$11,785.26
Inspection fees collected	$11,334.87
Miles travelled by the Inspectors	27,685
Letters inward	2,453
Letters outward	2,613
Telegrams inward	45
Telegrams outward	45
Boilers taken out of service	22

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety valves inoperative	3	3
Boilers with safety valves overloaded	15	7
Boilers with safety valves defective in construction	21	4
Pressure gauges inoperative	14	8
Pressure gauges defective	157	3
Cases of insufficient staying or bracing	24	2
" defective stays	30	2
" broken rivets	21	2
" defective riveting	16	..
" broken stays or braces	60	4
" loose stays or braces	51	..
Boilers damaged by low water	2	..
Defective settings	67	2
Boilers with fractured plates	28	7
" laminated plates	5	..

SUMMARY OF DEFECTS OBSERVED.—*Concluded.*

Nature of Defects.	Number.	Dangerous.
Boilers with burned plates	11	..
" blistered plates	6	..
Cases of sediment on fire sheets	78	5
" internal corrosion	88	4
" scale or incrustation	99	..
" internal grooving	3	..
" external corrosion	132	8
" defective tubes	56	..
" defective feed water arrangement	56	3
" broken feed valves	4	..
Serious leakage around tube ends	97	1
Serious leakage in rivet joints	23	2
Defective blow-off pipes or cocks	89	7
Defective water-gauges	38	7
Broken blow-off pipes or cocks	20	1
Water columns without blow-outs	21	1
Cases of broken test cocks	122	..
Connections to water columns without valves	18	1
Neutral sheets not stayed	15	..
Neutral sheets improperly stayed	4	..
Furnaces out of shape	2	..
Boilers without fusible plugs	62	..
Boilers low at front end	67	..
Cases of serious leakage of fittings	38	1
Number of hand-holes, door having bolts and dogs burned off	18	7
Defects in engines	17	6
Boilers without hand-holes	11	..
Boilers without stop-valves	13	..
Cases of defective steam pipes	31	1
Unclassified defects	62	3
Total	1,747	109

REPORT OF THE CHIEF ENGINEER EXAMINER.

———:o:———

To the Honourable Chief Commissioner of Lands and Works, Victoria, B. C.

Sir,—I have the honour to submit to you the following report with respect to the examination of candidates for engineers' certificates for the year ending December 31st, 1907.

During the year I have received 599 applications for engineers' certificates; on December 31st, 1906, I had on file 241 applications, making a total of 840. Of these 627 have been examined, 106 applicants have had their fees returned as they had not the practical qualifications required by the Act, and there are still on file 107 application forms.

Results of Examinations.

Grade.	No. Examined.	Passed.	Failed.
First	3	3	0
Second	41	17	24
Third	204	159	45
Fourth	210	172	38
Fifth	114	102	12
Temporary	55	55	0
Totals	627	508	119

Examination fees collected by Chief Inspector	$2,342 50
" " Inspector District B.	142 50
" " " " C.	135 00
Total	$2,620 00

The work done by the candidates at their examinations was not up to the average, and, consequently, there were a larger number of failures than usual.

Trusting this report will meet with your approval,

I have, etc.,

John Peck,

Chief Engineer Examiner.

SENIOR INSPECTOR'S REPORT, DISTRICT "A."

:o:

NEW WESTMINSTER, B. C., January 1st, 1908.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour herewith to submit report of work done by me in this district from July 8th, the date of my appointment, to December 31st, 1907.

My time has been divided between the various duties connected with this office and district, which duties consisted of calculating, reporting upon and registering boiler designs, assisting with engineer's examinations and testing and inspecting boilers.

In September, with yourself, I visited the upper parts of this district and assisted you in holding examinations for engineers at Golden, Revelstoke, Vernon and Kamloops, at the same time inspecting two newly installed plants.

The Columbia River Lumber Company have installed a large and up-to-date saw-mill plant at Golden, one interesting feature of which is the water-jacketted burner, whereby the feed water to boilers is heated and a considerable part of the scale-forming matter is deposited, thereby increasing the efficiency of the boilers and saving labour in boiler cleaning.

Several accidents have occurred in this district, but none of a serious nature. In one of the coast sawmills the engineer was injured by the bursting of a cored piston he was heating at a fire, in order to remove it from the rod, the explosion being caused by water in the internal space generating steam for which no means of escape was provided.

In boilers I inspected, the most general causes of deterioration has resulted from leaky boiler-house roofs, more especially around chimneys, where no attempt has been made to render the roof water-proof.

The above gives you a general idea of the work done, which I trust will meet with your approval.

Appended please find list of defects in detail.

I have, etc.,
JOHN DOWNIE,
Senior Inspector, District A.

JUNIOR INSPECTOR'S REPORT, DISTRICT "A."

:o:

NEW WESTMINSTER, B. C., January 1st, 1908.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B. C.

SIR,—I beg to hand herewith my report from the date of entering service, July 8th, 1907, to December 31st, 1907, inclusive.

From the tabulated list you will observe the work attempted, completed, and the character of defects which have come under observation.

The journeys made were one trip through Kamloops District and touching Okanagan, and one trip on main line to Golden, down Okanagan and Okanagan Lake, taking in also, by request, through the Similkameen country. This latter trip, owing to heavy roads and poor means of locomotion, swelled my expense account. The work, however, had to be done sometime, and I hope that the result of my labours in that country is satisfactory.

A number of local trips have been made from time to time, at the request of steam users in the immediate vicinity.

I now submit my report for your consideration and trust that it will meet with your approval.

I have, etc.,
GEO. C. MCGOWN,
Junior Inspector, District "A."

SUMMARY OF WORK DONE IN DISTRICT "A" IN 1907.

Number of drawings and specifications calculated for new boilers	103
" boiler plates inspected	10
" boilers built under inspection in British Columbia	7
" boilers built under inspection in Eastern Canada	22
" boilers built in Eastern Canada not under inspection	10
" new boilers inspected built in United States	18
" new boilers inspected built in British Columbia	6
" new boilers inspected (total)	63
" boilers unclassified	4
" first inspections	79
" inspections, external and internal	317
" internal inspections only	12
" external inspections only	6
" special inspections after repairs	5
" visits in addition to inspections	41
" boilers subjected to hydrostatic test	289
" boilers on which pressure was reduced	12
" boilers unsafe without extensive repairs	7
" boilers repaired under Inspector's directions	34
" boilers considered unfit for further use	8
" accidents to engines and boilers	9
" accidents resulting in personal injury (not fatal)	1
" inspections completed	323
Total horse-power of boilers inspected	18,495
Number of defects observed as per summary	383
Number of defects considered dangerous	14
Inspection fees earned	$ 2,821.72
Inspection fees collected	$ 2,566.42
Miles travelled by the Inspector	8,216

SUMMARY OF WORK DONE IN DISTRICT "A" IN 1907.—*Concluded.*

Letters inward	502
Letters outward	613
Telegrams inward	8
Telegrams outward	14
Boilers taken out of service	7

WORK DONE FOR OTHER DISTRICTS.

Inspected six boilers in District "D."
Assisted at examinations in District "D."

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety valves inoperative	1	1
Boilers with safety valves overloaded	1	1
Boilers with safety valves defective in construction	7	2
Pressure gauges inoperative	4	..
Pressure gauges defective	60	..
Cases of insufficient staying or bracing	7	..
" defective stays	5	..
" broken rivets	4	..
" defective riveting	3	..
" loose stays or braces	8	..
Boilers damaged by low water	1	..
Defective settings	5	..
Boilers with burned plates	2	..
" blistered plates	5	..
Cases of sediment on fire sheets	5	..
" internal corrosion	27	..
" scale or incrustation	23	..
" internal grooving	2	..
" external corrosion	26	..
" defective tubes	8	..
" defective feed water arrangement	19	..
Serious leakage around tube ends	10	..
Serious leakage in rivet joints	7	2
Defective blow-off pipe or cocks	22	3
Defective water-gauges	13	..
Broken blow-off pipes or cocks	4	..
Water columns without blow-outs	2	..
Cases of broken test cocks	27	..
Neutral sheets not stayed	11	..
Neutral sheets improperly stayed	2	..
Furnaces out of shape	1	..
Boilers without fusible plugs	12	..
Cases of serious leakage of fittings	5	..
Number of hand-holes, doors having bolts and dogs burned off	5	2
Defects in engines	7	2
Boilers without hand-holes	3	..
Boilers without stop-valves	6	..
Cases of defective steam pipes	6	1
Unclassified defects	15	..
Total	381	14

JOHN DOWNIE,
GEO. C. MCGOWN.
Inspectors of Steam Boilers, District "A."

SENIOR INSPECTOR'S REPORT, DISTRICT "B."

———:o:———

VICTORIA, B. C., January 1st, 1908.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B. C.

SIR,—I have the honour to submit my annual report regarding the supervision and inspection of steam plants, the examination of engineers and such other duties as appertain to my office. During the year I have been enabled to get to nearly every part of my extensive district, but the tax on my time and energies has all along been much too great, so it was with much relief that I learned that the Government had granted us increased assistance by appointing two extra Inspectors. In August Mr. Kay was appointed to this district, and with his assistance I have been enabled to overtake a lot of arrears of work, and from now on hope to keep up to date without having so much night work in the office or making so many inspections out of official hours. Travelling, of course, has to be done at any and all hours, as suits boats and trains, but that is to be expected. I am pleased to report that I find Mr. Kay an able and willing colleague, and I appreciate his assistance very much.

During the year just past I have held examinations for the different grades for engineers at the following points :—Atlin, Skidegate (Queen Charlotte Islands), Port Essington, Pender and Salt Spring Islands, Bella Coola, Namu, Clayoquot, Alberni, Nanaimo, Wellington and, at frequent intervals, in Victoria.

I have examined applicants for the different grades of certificates as follows :—One second class, twenty-two third class, twenty fourth class, three fifth class and twenty-two for temporary certificates. Of these eight failed to obtain sufficient marks to pass. As a rule, however, most of the candidates show a better knowledge, seem to be more observant, and, I should think, were safer and more useful men to be placed in charge of the high-pressured and expensive machinery that obtains in most manufactories at the present day.

I also assisted at the general examinations held at New Westminster, Victoria and Nanaimo, when there was a sufficient number of candidates to warrant yourself and other Inspectors in coming to the above-mentioned points.

In addition to making the annual inspections, I visit all steam plants as frequently as possible, but, owing to my wide field of labour, that is not very often. This I regret, as I consider that the Inspectors should visit the plants when under steam and see conditions as they are in every day operation, as well as when the plants are shut down and made ready for inspection ; as you know, we have to give several days' notice when we desire to inspect. More frequent visits would be beneficial to both owners and engineers, the former knowing that their plants are looked after better, and the latter, if surprise visits are likely to made, will attend more closely to details, thus saving many dollars to the steam users.

The past year has seen many new saw and shingle mills erected, while continued development in the whaling business and coal mining industry has been very noticeable. I also noticed an increased use of steam shovels in the placer mining, with very satisfactory results.

I am again pleased to report that there have been no fatal accidents, nor have there been any of serious consequences to boilers in the district ; and when one reads of so many boiler explosions in other parts of the Continent, with such disastrous results, I think that there is reason for congratulation that this Province has been so singularly free from such accidents. But safety is only attained by continual vigilance and precautionary measures, either in attending to weak spots and having same repaired, or by the judicious reduction of steam pressure to the safe limit for such boilers as show fatigue or deterioration. There have been a few accidents to persons and machinery, but in most cases these could have been avoided by a little more care on the part of the attendants.

In August I received a report that a man was badly scalded at steam plant No. 669. On investigating, I found that the foreman of the factory had gone on top of the boiler before the arrival of the engineer in the early morning, and had opened the main steam valve too rapidly,

causing the boiler to prime and lifting a body of water upwards with such violence that the safety valve opened and threw the scalding water over him. He had to be removed to the hospital, but afterwards recovered. Cause, his own imprudence in interfering with another person's duties.

A serious accident occurred to the engineer of steam plant No. 653 (a logging engine). While he was hauling logs close to the engine one log suddenly jumped out of place, striking him and throwing him under the crank and badly breaking his leg and ankle, the cross-head also cutting open his thigh. Cause, unexpected springing of log.

In October an engine in a local mill was smashed beyond further use, by the connecting rod strap breaking and allowing the piston to fly through the cylinder cover. Fortunately, no one was standing in the path of the flying portions of metal, nor was anyone scalded by the escaping steam. Cause, weakening of strap by too large an oil cup hole.

A large steam separator also burst during this same month, filling the engine room with steam, but, fortunately, all the attendants escaped uninjured. The cause was too rapid opening of the steam valve, combined with the settling of the steam pipe at one portion of it so that water was trapped, thus causing heavy water hammer, with the above result. Remedy, a drain put in at low portion.

These are the more noticeable of the accidents reported, and which I investigated.

The only work I have done for other districts was aiding in general examinations and sending sundry reports to Inspectors of other offices about boilers moving from this district to theirs.

I append herewith a list of candidates, with their grades and results, also a detailed account of defects observed in my inspections of the various steam plants.

I have, etc.,

S. BAXTER,
Senior Inspector, District "B."

JUNIOR INSPECTOR'S REPORT, DISTRICT "B."

:o:

Victoria, B. C., January 1st, 1908.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B. C.

Sir,—I have the honour to submit my report for that portion of 1907 during which I have had the honour to be Inspector of Boilers and Machinery.

On July 8th I was officially notified of my appointment, and from that date to the end of the year have been endeavouring to satisfactorily perform my various duties.

On July 8th and 9th I was in the New Westminster office, calculating from blue prints and boiler specifications and otherwise getting familiarized with the office work.

From July 10th to 29th I was assisting Mr. Madigan with the inspection of boilers in District D.

On July 30th I came to Victoria, having been appointed Junior Inspector of District B, and have been working in this district since then.

Most of the defects noted in the attached summary were of minor importance, but in the case of boiler No. 491 (a logging locomotive) might have been attended with serious results. This boiler was being tested after repairs to the fire box, when the dome cracked in two places. This boiler was being tested after repairs to the fire-box, when the dome cracked in two places. The boiler was originally designed to work at 180 lbs. per square inch, but had been cut down by Mr. Baxter to 140 lbs. On applying the hydrostatic test the forward side of the dome cracked at 160 lbs., and as the boiler-makers were still on the work, I had them cut out a large portion of the defective plate and put on a patch. On again applying the test the opposite side cracked at 160 lbs., and I then ordered the dome to be taken off and a new one put on. The failure of this dome was undoubtedly due to bad boiler practice, the holes having been punched before flanging and the plate burned during flanging.

No. 225, a locomotive type boiler, used for heating purposes, had been left through the summer with wet ashes in contact with the fire-box, with the result that the plate was practically corroded through and necessitated considerable patching.

One boiler, No. 315, was burned through sediment on the fire sheet. This boiler had a uniform deposit on the bottom $\frac{3}{8}$ of an inch thick.

No. 615 was found with the safety valve greatly overloaded. A few days before inspection the boiler had had several new tubes put in, and the boiler-makers had screwed down the safety valve to test their work and had neglected to screw it up again. Fortunately, this boiler is only used, at a very low pressure, for boiling dye.

While in the Comox District I inspected the locomotives of the Wellington Colliery Co. for the first time, as they are now operated apart from the E. & N. Railway.

I have inspected boilers in Victoria, along the E. & N. Railway, at Port Renfrew, Comox, and on some of the islands. With the exception of some of the logging boilers, all the others had the necessary certificated engineers in charge. In the case of the logging boilers, it was chiefly their inability to get certificated men that prevented the employers having the same.

Through my rounds of inspection I have received the utmost courtesy and consideration from the owners and also from the engineers, and in all cases an honest effort seemed to be made to live up to the spirit of the Act.

Attached is a detailed summary of the work done.

I have, etc.,

John D. Kay,

Junior Inspector, District "B."

REMARKS.

During the year we took applications for examination with us to all outlying points and examined candidates as I moved from place to place. Examinations were held at the following points :—Wellington, Salt Spring Island, Pender Island, Skidegate, Port Essington, Bella Coola, Namu, Atlin, Clayoquot, Alberni, Nanaimo, Coburn, Union Bay, Cumberland, Courtenay, and at frequent intervals in Victoria office, besides assisting with general examinations at Victoria and Nanaimo.

SUMMARY OF WORK DONE IN DISTRICT "B" IN 1907.

Number of	drawings and specifications calculated for new boilers	46
"	boiler plates inspected	73
"	boiler plates rejected	6
"	boilers built under inspection in British Columbia	21
"	boilers built under inspection in Eastern Canada	20
"	boilers built in Eastern Canada not under inspection	8
"	new boilers inspected built in United States	15
"	new boilers inspected built in British Columbia	3
"	new boilers inspected (total)	62
"	boilers imported from Eastern Canada (second-hand)	7
"	boilers imported from United States (second-hand)	2
"	boilers unclassified	13
"	first inspections	81
"	inspections, external and internal	457
"	internal inspections only	4
"	external inspections only	57
"	special inspections after repairs	42
"	visits in addition to inspections	182
"	boilers subjected to hydrostatic test	412
"	boilers on which pressure was reduced	28
"	boilers unsafe without extensive repairs	13
"	boilers repaired under Inspector's directions	37
"	boilers considered unfit for further use	1
"	accidents to engines and boilers	6
"	accidents resulting in personal injury (not fatal)	2
"	investigations	3
"	inspections completed	520
"	Total horse-power of boilers inspected	20,788
"	Number of defects observed as per summary	635
"	Number of defects considered dangerous	54
"	Inspection fees earned	$ 3,851.30
"	Inspection fees collected	$ 3,768.80
"	Miles travelled by the Inspector	12,220
"	Letters inward	1,013
"	Telegrams inwards	18
"	Letters outward	1,163
"	Telegrams outward	12
"	Boilers taken out of service	11

WORK DONE FOR OTHER DISTRICTS.

Sent sundry reports on boilers moved to other districts.

Assisted in office at New Westminster July 8th and 9th, and assisted at inspection of boilers in District "D" from July 10th to 29th.

Inspector of "D" District inspected one boiler for this district.

Summary of Defects Observed.

Nature of Defects.	Number.	Dangerous.
Boilers with safety valves inoperative	2	2
Boilers with safety valves overloaded	3	1
Boilers with safety valves defective in construction	3	1
Pressure gauges inoperative	5	3
Pressure gauges defective	56	1
Cases of insufficient staying or bracing	8	2
" defective stays	21	2
" broken rivets	9	1
" broken stays or braces	53	3
" loose stays or braces	28	..
Defective settings	23	2
Boilers with fractured plates	10	5
" laminated plates	5	..
" burned plates	3	..
" blistered plates	1	..
Cases of sediment on fire sheets	27	..
" internal corrosion	47	4
" scale or incrustation	38	..
" external corrosion	79	8
" defective tubes	21	..
" defective feed water arrangement	8	3
" broken feed valves	2	..
Serious leakage around tube ends	21	1
Serious leakage in rivet joints	1	..
Defective blow-off pipes or cocks	10	3
Defective water-gauges	6	..
Broken blow-off pipes or cocks	12	..
Water columns without blow-outs	12	1
Cases of broken test cocks	46	..
Connections to water columns without valves	5	1
Netural sheets not stayed	4	..
Neutral sheets improperly stayed	1	..
Boilers without fusible plugs	18	..
Boilers low at front end	23	..
Cases of serious leakage of fittings	5	1
Number of hand-holes, doors having bolts and dogs burned off	8	3
Defects in engines	2	2
Boilers without hand-holes	2	..
Boilers without stop-valves	1	..
Cases of defective steam pipes	2	1
Unclassified defects	14	3
Total	644	58

S. Baxter,
John D. Kay,
Inspectors of Steam Boilers.

INSPECTOR'S REPORT, DISTRICT "C."

———:o———

NELSON, B. C., January 1st, 1908.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B. C.:

SIR,—I have the honour to submit the following report for the year ending December, 31st, 1907 :—

During the year two hundred and five boilers have been inspected, the greater number of which are in service in the saw-mills of the district. Thirty-nine of these boilers were installed this year, eighteen of which were built in Eastern Canada under inspection, thirteen new and six second-hand boilers were imported from the United States, and two were built in British Columbia, one at the Vancouver Engineering Works in Vancouver and one in Rossland. The latter was to be used for heating purposes and was not built under inspection. The boilers imported second-hand from the United States had to be altered, so as to comply with the British Columbia Inspection Act.

The lumber mills in the district were operating to their fullest capacity during the summer, and there was not one idle boiler in the whole of the Crow's Nest District. In the mining district of West Kootenay many of the steam plants were idle, partly on account of the mines being closed down, but in many cases electricity has been substituted for steam. Very few inspections were made in the Boundary District, which accounts for the reduced number of boilers inspected this year. Nearly every plant in the Boundary was closed down during the last three months of the year, and the inspections were left over until the plants were about to start work, in order to save the owners the trouble and expense of filling the boilers for the hydrostatic test. None of these plants were in operation at the end of the year, although one was preparing to operate. The number of new boilers being installed at different times made several extra trips necessary.

No serious accidents happened during the year, with the exception of the breaking of the engine in the Kootenay Shingle Co.'s plant at Salmo and the accident to the haulage engine at Coal Creek. In the former the junk ring bolt in the piston broke, with the result that the piston was broken and the crank shaft bent in the main bearing. No one was hurt. The main shaft was turned end for end; that is, the crank disc was put on the other end of the shaft and the bent part turned up true for the outer bearing. The main shaft of the haulage engine at Coal Creek mines broke near the outer bearing, on account of the weight of cable wound on the drum causing the shaft to spring and in time breaking it.

There were more defects found in boilers of the locomotive type than in any of the other classes, and several of the furnace plates were found to have cracks in them. These cracks were generally at the stay or around the rivets at the furnace door. One crack was discovered between two rows of stays and the plate was found to be laminated, though the piece cut out was subjected to the bending test and did not show any signs of cracking.

During the earlier part of the summer engineers were scarce, and several plants were being operated by men who had no certificates, some of the owners making no effort to employ licensed men, even when asked to do so. Up to the present there have been no prosecutions under sec. 35 of the Boiler Inspection Act in this district, and this has been taken advantage of by the steam users. When an engineer leaves, either with or without giving sufficient notice of his intention to do so, the owner generally employs a man without a certificate to operate his steam plant, and, when written to about the matter, begins to inquire about a permit for his present engineer, which is rather unsatisfactory and is annoying to everyone, except, perhaps, the engineer.

Engineers' examinations were held in Fernie and Cranbrook during the month of October, but very few availed themselves of the opportunity to attend. Many of the mills were closed down at the time and the engineers had gone to Alberta for the threshing. Examinations are

held in Nelson any time I am at home, and thirty-one candidates were examined during the year. During the latter part of February and during the whole of March I assisted with engineers' examinations held in New Westminster.

All of which is respectfully submitted.

I have, etc.,
Andrew Sutherland,
Inspector District "C."

Summary of Work done in District "C" in 1907.

Number of boilers built under inspection in British Columbia	1
" boilers built under inspection in Eastern Canada	18
" new boilers inspected built in United States	13
" new boilers inspected built in British Columbia	2
" new boilers inspected (total)	34
" boilers imported from United States (second-hand)	6
" boilers unclassified	2
" first inspections	43
" inspections, external and internal	200
" external inspections only	8
" special inspections after repairs	12
" visits in addition to inspections	157
" boilers subjected to hydrostatic test	201
" boilers on which pressure was reduced	1
" boilers unsafe without extensive repairs	1
" boilers repaired under Inspector's direction	13
" accidents to engines and boilers	1
" inspections completed	205
Total horse-power of boilers inspected	14,734.7
Number of defects observed as per summary	380
Number of defects considered dangerous	18
Inspection fees earned	$2,388.75
Inspection fees collected	$2,385.80
Miles travelled by the Inspector	6,019
Letters inward	295
Letters outward	271
Telegrams inward	13
Telegrams outward	15

Summary of Defects Observed.

Nature of Defects.	Number.	Dangerous.
Boilers with safety valves defective in construction	1	..
Pressure gauges inoperative	3	3
Pressure gauges defective	25	..
Cases of insufficient staying or bracing	5	..
" defective stays	2	..
" broken rivets	3	1
" defective riveting	1	..
" broken stays or braces	3	1
" loose stays or braces	15	..
Defective settings	30	..
Boilers with fractured plates	7	1
" burnt plates	5	..
Cases of sediment on fire sheets	37	5
" scale or incrustation	38	..
" external corrosion	10	..
" defective tubes	17	..

SUMMARY OF DEFECTS OBSERVED.—*Concluded.*

Nature of Defects.	Number.	Dangerous.
Cases of defective feed water arrangement	7	..
" broken feed valves	1	..
Serious leakage around tube ends	5	..
Defective blow-off pipes or cocks	4	..
Defective water-gauges	13	6
Broken blow-off pipes or cocks	3	..
Water columns without blow-outs	3	..
Cases of broken test cocks	49	..
Connections to water columns without valves	9	..
Neutral sheets improperly stayed	1	..
Furnaces out of shape	1	..
Boilers without fusible plugs	10	..
Boilers low at front end	44	..
Cases of serious leakage of fittings	8	..
Defects in engines	5	..
Boilers without stop-valves	4	..
Cases of defective steam pipes	6	1
Unclassified defects	5	..
Total	380	18

ANDREW SUTHERLAND,
Inspector of Steam Boilers, District "C."

INSPECTOR'S REPORT, DISTRICT "D."

:o:

Vancouver, B. C., January 1st, 1908.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B. C.

Sir,—I have the honour to submit the following report for the year ending December 31st, 1907 (*see* tabulated report):—

In addition to work mentioned in same, I assisted at engineers' examinations, both in New Westminster and Vancouver, and also at the Inspectors' examination in Victoria.

The only serious accident in this district during 1907 was to a log-haul engineer, operating without a certificate, and employed at the Gulf Lumber Company's camp, Jervis Inlet. The throttle valve on the logging engine was said to be leaking, and, in order to haul off some line, the engineer stood up on the side of the bull-wheel. The engine made one stroke and jammed his foot between the wheel and frame, and in his excitement he reached for the throttle to close it, pulled it too far and opened up the steam port, starting the engine up and taking his leg off above the knee before assistance arrived.

Two boilers passed through fire during the year, one at the Rose Hill Dye Works and the other at the Vancouver Steam Laundry.

A fly-wheel on a factory engine belonging to the Anglo-American Lumber Co., was found to be cracked and was condemned.

The cylinder head of the main engine at the W. F. Huntting Lumber Co.'s plant was found springing badly and pressure was reduced on the boilers to prevent an accident.

The boiler in the World Printing & Publishing Co.'s plant was damaged by low water while the regular engineer was off watch.

A cast-iron heating boiler ($1\frac{1}{2}$ horse-power, not under the jurisdiction of the Inspection Act) at J. Y. Griffin's plant exploded on November 5th, wrecked part of the building. This was apparently caused by there being a stop valve between the safety valve and the boiler, which was shut off when the boiler was cleaned out the previous day and forgotten, thus allowing the pressure to exceed the safety limit.

The ammonia compressor at the Vancouver Breweries was wrecked on April 21st, owing to the fireman starting up the engine with the ammonia discharge valve closed, in spite of the direct orders of the engineer, who happened to be in another part of the building.

The crosshead of the engine at the Dominion Steam Laundry was broken through the drain of the heater being frozen up, thus causing the water of condensation in the pipe to tank on top of the building to back up through the heater into the cylinder, when the steam was shut off. This prevented the piston from coming to the end of the stroke, and the momentum of the fly-wheel drove the cross-head into the rod, splitting it. The cross-head was renewed and again broken before I was notified, and on going over the plant I found conditions as above and remedied same.

The locomotive on the McNair Timber Co.'s logging railway at Capilano ran away and jumped the track twice, fortunately not injuring anybody seriously.

I would remark that the grade on logging railways should, in my opinion, be limited to prevent accidents of this kind happening through the wheels skidding on the track when the brakes are applied, and thus endangering the lives of the engineers and firemen.

I was again unable to inspect the logging boilers on the upper Coast this year, owing to pressure of work in Vancouver, and would suggest providing for assistance in this office. I would draw your attention to the number of new boilers built and imported into this district during the year, and point out that visits have to be made to one or another of the boiler shops every day while boilers are under construction, and it is almost impossible to leave the city for more than a few days without seriously inconveniencing the manufacturers.

Trusting that the work of the year has been satisfactory,

I have, etc.,

George O. Madigan,
Inspector District "D."

SUMMARY OF WORK DONE IN DISTRICT "D" IN 1907.

Number of drawings and specifications calculated for new boilers	28
" boiler plates inspected	229
" boiler plates rejected	14
" boilers built under inspection in British Columbia	81
" boilers built under inspection in Eastern Canada	16
" boilers built in Eastern Canada not under inspection	15
" new boilers inspected built in United States	50
" new boilers inspected built in England	2
" new boilers inspected (total)	164
" boilers imported from United States (second-hand)	3
" boilers unclassified	9
" first inspections	174
" inspections, external and internal	326
" internal inspections only	8
" special inspections after repairs	30
" visits in addition to inspections	412
" boilers subjected to hydrostatic test	322
" boilers on which pressure was reduced	3
" boilers unsafe without extensive repairs	3
" boilers repaired under Inspector's directions	30
" boilers considered unfit for further use	1
" accidents to engines and boilers	7
" accidents resulting in personal injury (not fatal)	1
" investigations	1
" inspections completed	334
Total horse-power of boilers inspected	14,522
Number of defects observed as per summary	342
Number of defects considered dangerous	19
Inspection fees earned	$ 2,723.45
Inspection fees collected	$ 2,613.85
Miles travelled by the Inspector	1,230
Letters inward	643
Letters outward	566
Telegrams inward	6
Telegrams outward	4
Boilers taken out of service	4

WORK DONE FOR OTHER DISTRICTS.

Thirty-six boilers inspected and shipped into District "A."
Twenty " " " "B."
One " " " "C."
Two " " North-West Territory.

WORK DONE BY OTHER INSPECTORS FOR THIS DISTRICT.

Mr. Dunlop and Mr. Kay inspected 32 boilers in District "D."

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety valves overloaded	11	5
Boilers with safety valves defective in construction	10	1
Pressure gauges inoperative	2	2
Pressure gauges defective	16	2
Cases of insufficient staying or bracing	4	..
" defective stays	2	..
" broken rivets	5	..
" defective rivetting	12	..

SUMMARY OF DEFECTS OBSERVED.—*Concluded.*

Nature of Defects.	Number.	Dangerous.
Cases of broken stays or braces	4	..
" loose stays or braces	8	..
Boilers damaged by low water	1	..
Defective settings	9	..
Boilers with fractured plates	11	1
Boilers with burned plates	1	..
Cases of sediment on fire sheets	9	..
" internal corrosion	14	..
" internal grooving	1	..
" external corrosion	17	..
" defective tubes	10	..
" defective feed water arrangement	22	..
" broken feed valves	1	..
Serious leakage around tube ends	11	..
Serious leakage in rivet joints	15	..
Defective blow-off pipes or cocks	13	1
Defective water-gauges	6	1
Broken blow-off pipes or cocks	1	1
Water columns without blow-outs	4	..
Connections to water columns without valves	4	..
Boilers without fusible plugs	22	..
Cases of serious leakage of fittings	20	..
Number of hand-holes, doors having bolts and dogs burned off	5	2
Defects in engines	3	2
Boilers without hand-holes	6	..
Boilers without stop-valves	2	..
Cases of defective steam pipes	17	1
Unclassified defects	28	..
Total	342	19

GEORGE O. MADIGAN,
Inspector of Steam Boilers, District "D."

ENGINEERS WHO OBTAINED CERTIFICATES IN 1907.

:o:

FIRST CLASS.

Downie, Jno	2,399	McGown, G. C	2,400
Kay, J. D	2,500		

SECOND CLASS.

Appleton, G. M	2,286	Leicester, C. H	2,565
Briggs, T. L	2,287	Morell, W. E	2,568
Bennett, A. S	2,310	McLaren, W. W	2,268
Bath, Fredk	2,311	MacIntyre, D. A	2,288
Carruthers, J. A	2,414	Penty, J. B	2,551
Cartlidge, Walter	2,542	Roy, A. T	2,185
Henderson, N. D	2,516	Schell, J. E	2,090
Haggart, T. F	2,562	Stafford, D. G	2,533
Law, Robert	2,461		

THIRD CLASS.

Adam, D. A	2,067	Frenzen, F. J	2,125
Adam, Alex	2,170	Fulton, J. P	2,312
Allison, Robert	2,330	Fox, C. M	2,498
Adams, A. F	2,346	Fisher, A. G	2,642
Abbott, J. G	2,506	Gaerdes, Henry	2,341
Blakeborough, H. A	2,041	Gilmore, W. H	2,422
Brown, H. A	2,081	Greenshields, Geo	2,560
Brown, James	2,096	Garvie, Peter	2,606
Burnet, P. H	2,103	Hartnell, D. M	2,045
Barton, R. J	2,157	Heath, H. R	2,066
Blackwood, James	2,221	Hall, E. B	2,163
Ballantine, Wm	2,274	Henderson, Wm	2,164
Barrie, Charles	2,280	Harris, H. B	2,236
Barnard, T. A	2,281	Headley, Henderson	2,248
Blakley, Alex	2,410	Hampel, Charles	2,249
Bird, M. S	2,411	Honeywood, Robert	2,254
Bradley, G. M. T	2,412	Howard, A. F	2,259
Bennett, A. E	2,413	Hall, Jno	2,313
Baillie, W. E	2,434	Hay, J. A	2,354
Blankenburg, O. E. E	2,437	Hennan, Wm	2,607
Blanchard, W. R	2,572	Haws, R. C	2,636
Basey, A. J	2,594	Jewitt, A. E	2,458
Byatt, Jos	2,595	Jacobsen, Ole	2,459
Cobban, Jas	2,043	Kirkendall, W. M	2,057
Clarke, G. H	2,052	Kendall, I. N	2,075
Campbell, H. H	2,102	Kinna, Fredk	2,137
Chrystie, W. W	2,136	Kirk, A. C	2,563
Cosens, T. J	2,158	Lamport, Sidney	2,146
Clark, Jno	2,350	Lloyd, Frank, Jr	2,215
Chicard, Victor	2,416	Lewis, James	2,223
Clarke, Robert	2,543	Lord, J. F. P	2,319
Cottle, F. C	2,554	Lyttle, Samuel	2,403
Calderhead, J. A	2,641	Lowe, Robert	2,462
Daniels, W. T	2,142	Lewis, I. D	2,463
Dryburgh, James	2,216	Lacher, T. F	2,517
Doxsee, Jos	2,362	Munday, J. A	2,084
Dawson, Edward	2,440	Morrison, Angus	2,086
Duval, Harry	2,442	Macauley, E. H	2,147
Dowman, Thomas	2,501	Moore, Jno	2,276
Dick, A. J	2,558	Mathers, Jno	2,304
Davenport, A. E	2,602	Morrow, Alex	2,398
Ellison, Jno	2,144	Mosher, Trask	2,464
Excell, S. H	2,352	Morton, Robert	2,465
Edwards, Charles	2,363	Marsh, R. W	2,466

THIRD CLASS.—*Concluded.*

Mercer, Jno	2,568
Maitland, Jos	2,614
Madigan, Benjamin	2,643
McMillan, G. W	2,148
McLean, J. A	2,152
McMillan, A. R	2,277
McPhee, W. M	2,405
McGlashan, C. N	2,468
McCook, Jos	2,473
McLaren, J. M	2,521
Mackinnon, Alex	2,644
Neese, W. O	2,256
Nevin, James	2,577
Newbigging, Robert	2,651
Phillips, W. H	2,166
Phadden, Henry	2,210
Ponsford, H. F	2,269
Potvin, L. A	2,335
Pement, A. L	2,343
Pearson, Albert	2,380
Peacock, F. W	2,578
Phibbs, C. J. P	2,622
Player, Alex	2,624
Ronalds, Basil	2,047
Riddler, Wm	2,073
Robbins, C. W	2,098
Rexford, F. E	2,099
Read, A. S	2,180
Rodgers, W. J	2,218
Ross, George	2,252
Ringer, J. A	2,253
Rivers, William	2,481
Robinson, H. G	2,482
Robson, Edwin	2,523
Russell, E. S	2,578
Ryder, Robert	2,626
Roy, W. A	2,627
Stringer, W. L	2,106
Sherwood, L. H	2,138
Smith, E. G	2,307
Stalvies, C. B. H	2,487
Stewart, J. A	2,490
Spence, J. H	2,527
Stanley, F. E	2,629
Stevenson, Charles	2,630
Thomas, Jos	2,107
Turnell, T. H	2,108
Trautman, G. A	2,118
Twa, T. H. A	2,119
Turner, E. O	2,181
Tyner, R. E	2,285
Tweedie, E. D	2,360
Trewhella, Jno	2,372
Trevelyan, H. B	2,408
Thurm, Richard	2,499
Taylor, A. J	2,569
Wheatley, M. S	2,034
Wyatt, Thomas	2,040
Watson, A. J	2,217
Wadhams, W. A	2,302
Websdale, F. C	2,328
Woodward, A. J	2,329
Westwater, Thomas	2,344
Welsh, Jno	2,361
Watson, E. P	2,409
Weeks, Arthur	2,430
Walker, James	2,531
Walker, Wm	2,532
White, Wm	2,634
Whelan, George	2,635

FOURTH CLASS.

Anderson, Martin	2,135
Atkinson, J. M	2,171
Abram, Robt	2,507
Armstrong, F. A	2,541
Allin, G. W	2,590
Bond, C. J	2,069
Billington, J. H	2,139
Butler, Frank	2,212
Byers, Thos	2,213
Broder, R. R	2,238
Bates, S. J	2,242
Beeson, E. T	2,264
Brown, J. S	2,314
Bentley, Herbert	2,338
Bucknam, A. V	2,347
Blaney, D. J	2,436
Boddie, J. E	2,510
Booth, W. M	2,592
Conner, S. W	2,061
Corlett, W. E	2,093
Cosens, J. T	2,097
Carmichal, J. A	2,100
Cote, Paul	2,140
Cary, Leonard	2,214
Cundell, C. W	2,237
Clemes, Henry	2,245
Clapperton, W. G	2,282
Campbell, F. L	2,331
Creelman, W. A	2,332
Champion, C. B	2,381
Chubb, Chas	2,383
Coulter, Frank	2,415
Crozier, Augustine	2,417
Croucher, Ernest	2,438
Cary, T. H	2,511
Clark, W. T	2,555
Croucher, E. A	2,598
Clauson, J. J	2,600
Davidson, R. A	2,143
Duncan, Jno	2,159
Draney, Jno	2,192
Duncan, J. W	2,193
Dixon, Harry	2,222
Dickson, Jas	2,265
Drake, G. A	2,419
Davenport, A. E	2,443
Eggen, Edward	2,160
Eaton, R. W	2,444
Elliott, Ritchey	2,445
Ells, F. B	2,513
Frederick, W. J	2,036
Fawcett, W. H	2,037
Fletcher, A. N	2,071
Flynn, R. H	2,367
Fraser, Hugh	2,420
Fergusson, Jas	2,514
Fuller, Albert	2,603
Fraser, Donald	2,604
Geizer, Louis	2,083
George, S. E	2,126
Graham, Chas	2,161
Graham, W. J	2,162
Gordon, G. C	2,451
Godfrey, A. J	2,571
Hartnell, R. S	2,039
Hermon, F. B	2,044

FOURTH CLASS.—*Concluded.*

Henderson, Chas	2,056
Hutchinson, J. P	2,063
Hubly, C. A	2,127
Hunter, Floyd	2,258
Hogan, A. H	2,305
Hull, H. L	2,317
Hurd, W. C	2,379
Hooper, A. W	2,401
Hardie, Alex	2,402
Huycke, H. C.	2,423
Henderson. Thos	2,424
Henderson, R. L	2,452
Humphrey, Jno., Jr	2,515
Harris, J. E	2,608
Harvey, G. B	2,610
Inglis, Alex	2,611
Ireland, T. H	2,650
Kelly, J. W	2,046
Kopp, Felix	2,091
Kemsley, Ernest	2,460
Larson, P. M	2,104
Lewis, Emery	2,113
Lewis, O. G	2,145
Langworthy, W. H	2,320
Lesley, B. K	2,518
Lougheed, H. W	2,612
Mortelette, H. C	2,053
Meacher, P. T. W	2,054
Mulock, J. I	2,151
Magnone, Romo	2,283
Medway, Lyle	2,321
Mini, W. A	2,333
Mosher, Foster	2,369
Mearns, Wm	2,370
Milne, Jas	2,404
Milne, Jas	2,425
McDonald, C. J	2,065
McLaren, J. M	2,087
McDonald, Donald	2,105
McCausland, C. A	2,251
Macdonald, R. G	2,262
McGuire, Jas	2,323
Macleod, Duncan	2,342
McCarty, Florence	2,428
McDonald, H. L	2,470
McIntyre, J. A	2,472
McMillan, Hugh	2,520
McLauchlan, J. S	2,576
McIntyre, Wm	2,617
McKenzie, Jas	2,616
McLean, U. G	2,618
Macdonald, A. C	2,620
Niebergall, Jno	2,114
Nisbet, Donald	2,149
Nixon, Herbert	2,371
Nicholson, H. L	2,389
Nixon, R. W	2,475
Newnham, J. J	2,550
Olson, Frank	2,077
Orr, W. H	2,089
Ostrom, J. A	2,115
Osler, Edward	2,406
Pearson, Albert	2,032
Price, Wm	2,079
Price, A. A	2,116
Parkes, J. W	2,165
Parkin, Edwin	2,187
Pendygrasse, J. S	2,357
Poole, H. J	2,358
Predergast, Edward	2,477
Perry, H. C	2,623
Poole, H. O	2,625
Richardson, J. T	2,030
Ratcliff, A. J	2,132
Renwick, Thos	2,483
Ray, A. L	2,524
Ross, J. D	2,552
Roach, W. G	2,645
Selwood, G. A	2,074
Steeves, G. H	2,101
Silverson, A. J	2,133
Stanley, F. E	2,278
Sangstad, T. P	2,306
Smith, C. B	2,327
Stewart, Angus	2,374
Sterz, Emil	2,429
Shaw, G. W. J	2,488
Stanhope, P. W	2,504
Stevens, E. W	2,631
Tanner, W. G	2,109
Thompson, Jos	2,121
Thom, Jas	2,529
Taylor, Ernest	2,651
Ure, Jas	2,239
Watt, Wm	2,048
Whelan, Geo	2,110
Williams, G. C	2,270
Wallas, G. W	2,273
Woods, F. F	2,337
Wanrecka, Konrad	2,393
Warnock, J. W	2,493
Watson, C. H	2,583
Wardill, C. A., Jr	2,648
Young, Andrew	2,156

FIFTH CLASS.

Allen, J. M	2,031
Alexander, Arch	2,219
Aveldson, August	2,345
Brandrith, B. J	2,035
Bonson, H. W	2,042
Bryant, Thos	2,123
Boley, T. L	2,172
Brims, Alex	2,229
Bowman, Orion	2,244
Bergman, Ludwig	2,297
Bond, A. J	2,382
Battison, F. W	2,433
Bird, C. R	2,435
Boggs, Hugh	2,509
Benz, W. F	2,591
Bain, Jno	2,640
Clark, I. E	2,060
Cedarfeldt, Oscar	2,082
Coulthard, G. H	2,141
Cornell, Gordon	2,174
Cassey, Anthony	2,257
Cameron, W. K	2,439
Clunon, Herbert	2,536
Connors, Thos	2,599
Dix, Frank	2,124
De Long, Earle	2,175
Dean, Jno	2,189
Dignas, Jins	2,199
Dignas, Anton	2,208
Droskie, J. F	2,351
Davies, Evan	2,556
Ertle, Jos	2,246

Fifth Class.—*Concluded.*

Faulkner, J. E	2,243
Farrell, Jos	2,378
Garner, Jas	2,111
Granger, Henry	2,295
Gammond, Orlando	2,309
Gregson, Jos	2,386
Green, G. L	2,448
Greenhalgh, Alex	2,449
Hustrad, T. A	2,128
Hollingsworth, W. H	2,150
Hilton, Moses	2,176
Hefferman, J. J	2,201
Hemer, F. W	2,206
Henry, W. J	2,240
Hartnell, S. J	2,247
Hyde, J. W	2,271
Hand, R. M	2,303
Heaslip, T. F	2,353
Holland, T. W	2,457
Jones, O. C	2,112
Jones, M. S	2,177
Johnston, A. E	2,220
Kenwood, Alex	2,129
Keetch, S. N	2,298
Kennedy, Wm	2,387
Low, Wm	2,064
Linnenberger, J. A	2,103
Lyford, Fred'k	2,195
Lewis, Wm	2,223
Laird, Fred'k	2,564
Myles, J. A	2,076
Meier, Konrad	2,209
Middleton, H. B	2,322
Martin, E. C	2,356
Moilliet, T. M	2,426
Moss, J. S	2,540
McDonald, Dugald	2,153
McKay, R. J	2,178
McConald, Colin	2,211
McKean, Saml	2,292
McCraw, O. C	2,294
McLean, Alex	2,300
McDonald, W. R	2,334
McLellan, Malcolm	2,469
O'Brien, J. K	2,224
Porter, Bertie	2,131
Peterson, Jno	2,263
Parmiter, A. J	2,375
Quimby, Fred	2,179
Rubard, Jno	2,225
Roberts, J. M	2,226
Simpson, Stanley	2,117
Schofield, Arthur	2,279
Shields, Geo	2,296
Strand, E. A	2,325
Savage, Jno	2,326
Stevinson, T. L	2,485
Sutherland, Wm	2,486
Tardis, Eugene	2.027
Thompson, Arthur	2,190
Telford, J. L	2,198
Taylor, W. M	2,205
Taylor, A. F	2,241
Trimble, Wm	2,365
White, Leonard	2,134
Wood, Chas	2,202
Wolfe, Edward	2,492
Wade, L. C	2,494
Watt, Jas	2,496
Yeisley, D. H	2,207

Temporary Certificates

Ahlers, Carl	2,335
Adams, Wm	2,431
Brown, A. S	2,227
Braithwaite, W. R	2,396
Barron, E. D	2,585
Brice, Sam'l	2,638
Calkins, R. N	2,092
Crapo, Geo	2,275
Cox, G. H	2,366
Charter, W. B	2.502
Coulthard, F. J	2,571
Dougan, J. B	2,637
Ford, Walter	2,029
Fraser, Alex	2,033
Fall, H. T	2,195
Ford, Aaron	2,308
Fox, Thos	2,384
Flanagan, M. P	2,385
Fleming, J. C	2,559
Gravelle, J. A	2,204
Healy, H. A	2,203
Hoover, Dan	2,231
Haines, R. J	2,376
Huxtable, W. H	2,392
Haegraves, Wm	2,455
Hicks, Wm	2,652
Klausman, Nicholas	2,232
Lamberton, W. H	2,026
Lloyd, L. P. H	2,122
Martineau, Jos	2,049
Morgan, Jno	2,196
Maitland, W. A. M	2,388
McKay, J. D	2,228
McGregor, A. E	2,397
Niven, R. T	2,233
Nevin, David	2,290
Nicholas, W. C	2,649
Phillips, F. G	2,522
Russell, H. J	2,324
Richards, T. E	2,484
Reiswig, Geo	2,639
Stone, Carlton	2,028
Smith, E. G	2,168
Stevens, A. C	2,197
Svedmark, C. O	2,364
Selk, G. J	2,373
Sheridan, H. H	2,390
Smiley, Levi	2,391
Sanderson, Robt	2,394
Salmon, E. T	2,526
Steinler, Louis	2,646
Tweedie, C. J	2,169
Tait, G. L	2,505
Wood, W. R	2,495
Worth, F. J	2,535

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