

1935.
NEW ZEALAND.

FIRE BRIGADES OF THE DOMINION

(REPORT ON THE) FOR THE YEAR ENDED 31ST MARCH, 1935, BY THE
INSPECTOR OF FIRE BRIGADES.

Presented to both Houses of the General Assembly by Command of His Excellency.

The INSPECTOR OF FIRE BRIGADES to the Hon. the MINISTER OF INTERNAL AFFAIRS.
Office of Inspector of Fire Brigades,
Wellington, 15th October, 1935.

SIR,—

I have the honour to submit the twenty-seventh annual report for the year ending 31st March, 1935, on the working of the Fire Brigades Act, 1926.

FIRE DISTRICTS.

The Dunedin Metropolitan Fire Board was formed during the year to control the metropolitan fire district consisting of the City of Dunedin and the Borough of Mosgiel. The Mosgiel Fire Board was dissolved, and the number of fire districts in operation at the end of the year was fifty-three.

DOMINION FIRE WASTE.

The national loss by fire during the year 1934, estimated on the same conservative basis as in previous years—*i.e.*, the total of the actual payments made by the insurance companies, plus an allowance of 12½ per cent. for uninsured fire loss—was £566,112. This is a drop of £78,669, or 12·2 per cent., on the previous year, which, allowing for the improved methods of collection of the statistics, was considered to be comparable with the lowest fire-loss figure recorded for the past thirty years. The reduced losses for 1934 are, however, accompanied by a slight increase in the number of property fires, and the drop in total loss is more than accounted for by the lesser number of fires involving loss exceeding £5,000, referred to elsewhere in this report.

The fire-loss figures are best considered in relation to population, and for purposes of comparison the following table shows the fire losses in New Zealand, Great Britain, Canada, and the United States of America. These figures show that the reduction in fire loss in New Zealand in 1934 as compared with the five-year average 1927–31 (which included the highest fire-loss years) was 65·4 per cent., while the corresponding percentage reduction in the other countries quoted was—Great Britain, 18·3; Canada, 42·6; and the United States of America, 46·4.

	New Zealand Fire Loss.	Fire Loss per Head.			
		New Zealand.	Great Britain.	Canada.	United States of America.
	£	s. d.	s. d.	s. d.	s. d.
Average (1927–31)	1,332,032	18 1	5 0	17 5	16 0
1932	867,714	11 5	3 9	16 8	13 2
1933	644,781	8 4	4 7	12 11	8 10
1934	566,112	7 3	4 1	10 0	8 7

The view is very commonly held that under conditions of minor economic depression, or “bad times,” fire losses tend to rise owing to what is known as the “moral hazard.” It is interesting to note that the world-wide major depression of the past four years appears to have had exactly the opposite effect. In discussing the reduction in the American fire

loss the general opinion expressed in insurance journals is that this is in the main due to an improvement in the "moral hazard." It is considered that not only are there fewer incendiaristic fires, but there is also a positive effort on the part of owners to safeguard property against fire in view of the undoubted loss which would result in the event of a forced realization of assets due to fire.

It is perhaps significant that, allowing for some time-lag, the fire losses in the countries shown above appear to follow very closely the course of the depression. In Great Britain, owing partly to the almost universal use of brick, stone, or concrete in building construction and partly to the general stability of an old-established community, the fire losses are normally much lower than in America and in the British dominions. It was therefore to be expected that marked variations of loss would not be shown, but it will be noted that the low fire-loss figure in 1932 followed the financial crisis which resulted in the formation of the National Government at the end of 1931.

With regard to the United States, the reference in my last annual report indicates that the sharp drop in fire loss in 1933 followed the financial collapse which caused the suspension of payments by insurance companies for two months. In Canada the effects of the depression were probably less sharply felt and the fire-loss curve approximates that in New Zealand, although the actual reduction has been proportionately less.

There appears to be no reason to modify greatly the reasons assigned in previous reports for the very satisfactory reduction in the New Zealand fire wastage shown by the 1934 figures. The extensive fire-prevention campaigns which were undertaken in the early stages of the depression undoubtedly had the effect of bringing home to the public the inadequacy of present-day insurance recoveries in relation to pre-depression values of property, and thereby inducing much greater care with respect to fire. This is indicated by the fact that the number of property fires occurring in fire districts (in which the most intensive fire-prevention efforts were made) have remained practically stationary for the last three years at less than two-thirds of the number occurring during the previous five-year period. In addition to this there has been a definite improvement in the fire-protection services throughout the country, and there is some reason for assigning to this cause a greater share of the credit than was previously indicated. It must also be remembered that the fire-loss figures are based on the insurance companies' payments, and these have been reduced in proportion to the drop in property values resulting from the depression. To this extent the reduction in loss is more apparent than real.

In a country such as New Zealand there is a definite limit to which the fire losses may be expected to fall. The overwhelming majority of the dwellings and a fair proportion of the business premises, particularly in the country towns, are built entirely of wood and, in most cases, with flimsy interior linings. The towns are mostly hilly and the residential areas widely spread, so that in most towns there are considerable areas in which the water-supply is not reasonably efficient for fire-fighting. It must also be noted that probably 25 per cent. of the insurable property is situated outside areas protected by fire brigades.

It is therefore likely that the loss per head for the year under review represents something approaching the minimum loss to be expected under the most favourable conditions. With the passing of the depression there is some evidence of a rise in property values, which will have an immediate effect in increasing the apparent fire loss. Unless measures are taken to check this, moreover, the re-establishment of normal business on a post-depression basis of values is likely to bring in its train the same public carelessness with respect to fire as existed during the high fire-loss period, based on a false sense of security induced by the possession of an insurance cover which is high in relation to the purchase value of the property.

It was noted in the last annual report that the maintenance of the present satisfactory fire-loss position was largely in the hands of the insurance companies themselves and that occasion had been taken by many of them to reduce insurance cover to proper limits and to tighten up the inspection of their risks. It would appear from the figures now available that this policy could, with advantage both to the companies and to the public, be carried to a much greater extent. In consequence of the reduced fire loss, premium rates on dwellings were reduced towards the end of 1933, and, in addition, there has been a considerable amount of cutting of rates on business premises. The returns show that the reduction in insurance cover and the reduction in rates is reflected in the fall in insurance premiums collected in New Zealand, as compared with the average for the years 1927-31, by only 10 per cent. in 1933 and 20 per cent. in 1934. The major part of this drop would be due to the decrease in rates, and it would appear that the insurance cover on property has not been reduced to an extent in any way commensurate with its existing, or "insurance payout," value, and that over-insurance must still be rife.

The danger of this position has been stressed in both this and in previous reports. The question has been discussed with a number of insurance company managers, and one of the reasons given for the existing over-insurance is worthy of comment. It is stated that many people had taken great exception to the action of the insurance offices in reducing the amount of the cover to conform with present-day values, and, in some instances, the insurance had been transferred to another company which was prepared to issue the larger cover. This objection was commonly experienced in the case of mortgagees, who fairly generally insisted on an insurance cover being held for the full amount of the mortgage, even when advised that in the event of total loss by fire a lesser amount only would be paid.

This attitude evidences a complete misunderstanding of the nature of the insurance contract, which calls only for the payment of the proved value of the insured property at the date of the loss, or, alternatively, at the company's discretion, for the replacement of the property in the same condition as at the time of the fire. The amount of cover set out in the policy has no application except to determine the maximum amount payable. It is desirable that publicity should be given to the facts of the case because, as previously noted, over-insurance resulting from this misunderstanding not only creates a temptation to incendiarism, but by inducing a sense of false security results in carelessness with respect to fire.

FIRE LOSS IN FIRE DISTRICTS.

It will be seen from Tables II and IV attached that the fire loss in fire districts during the year ending 31st March last was £173,172, and in areas protected by Fire Boards, £4,562, or a total loss of £177,734, as compared with £284,353 for the previous year. The number of fires involving property was 753 in fire districts and 22 in protected areas, or a total of 775 as compared with 732 and 737 in the two previous years. The decrease in the total loss figure was due to the occurrence of a lesser number of large fires, only four fires occurring with loss exceeding £5,000. The fires referred to were those at the Morningside Timber Co., Auckland (£5,032), Woolworth's Ltd., Auckland (£30,626), Palace Theatre, Palmerston North (£5,400), and Ross and Glendinning's warehouse, Invercargill (£7,241). The loss per head in fire districts was 4s. 6d., as compared with 7s. 3d. for the whole Dominion.

CAUSES OF FIRE.

The year's records show that there has been a slight increase in the number of fires occurring throughout the Dominion—about 5 per cent.—but there has been little variation in the relative importance of the principal causes of fire, which have been given in detail from year to year in these reports. To illustrate the position a table has been prepared (Table I) setting out the causes of the fires which occurred during the year in the seven principal cities. This will give a cross-section of the causes of fire and the resulting loss in areas having a high standard of fire-protection, but it includes only fires which the brigade attended. In addition, there would be a considerable number of similar fires which would be extinguished by the occupiers of the building, but the loss in these cases would be small.

The figures are interesting as showing the value of fire-protection in reducing the fire loss. The average loss in dwellings was £81 where the cause was ascertained, and £275 in fires of unknown origin. In non-protected areas similar fires would in most cases have resulted in a total loss. Fires shown arising from unknown causes are generally those in which the fire has a good hold when the brigade is called, so that evidence of its origin is destroyed, but it is practically certain that the actual cause is one or other of those enumerated. It will also be noted that fires in unoccupied dwellings were in most cases serious, the average loss being £292. The loss was less than £100 in the case of 72 per cent. of the fires, and in only 5 per cent. did the loss exceed £500.

The indications from the year under review are that electrical fires, defective chimneys and fireplaces, sparks from fireplaces, disposal of ashes, and smokers' carelessness are the major causes of fire. In country areas the proportion of fires arising from naked lights and sparks from fireplaces increases considerably, and the proportion of electrical fires is reduced.

INCENDIARISM.

The decrease referred to in the last annual report in the number of fires recorded as of suspicious origin has been fully maintained. The special inquiries by the police into all fires the cause of which is not clearly accidental are still carried out, but the number of extensive inquiries found necessary is less than one-fourth of those made when the present system was commenced. Only six coroners' inquiries into fires were held during the year.

While the present position may be regarded as satisfactory it must be noted that it is mainly the result of police activity during recent years in conjunction with the fact that most people are now aware that it is unprofitable to have a fire owing to the insurance recoveries being based on the lower property values at present existing. With the rise in these values the temptation to arson as a means of release from financial difficulties will increase, and, as indicated elsewhere in this report, it is most important that measures should be taken to reduce over-insurance to the minimum. Details of prosecutions taken during the past few years are set out in the following table:—

Year.	Prosecutions for Arson.	Convictions.	Dismissals.	Coronial Inquiries into Fires.
1931	28	16	12	5
1932	27	21	6	15
1933	13	7	6	7
1934	10	5	5	6

DEATHS AND INJURIES IN FIRES.

The number of fatalities due to fire recorded during the year was seventeen, including no less than six children, as compared with seven for each of the last two years. The immediate causes of death were—persons trapped in burning buildings (7), clothing catching on fire from open fires, &c. (5), and the use of petrol or similar inflammable spirits inside buildings (5). The number of injuries caused by fire appears to have been lower than in most years, only twelve cases being reported which were sufficiently serious to necessitate the removal of the patient to hospital.

FIRE-PROTECTION SERVICE.

During the past few years there has been a very definite advance in the general organization and equipment, and a consequential improvement in the fire-fighting methods, of the fire brigades of New Zealand. As indicated in the comments regarding the Dominion fire losses, the opinion has been formed that this advance has been a more important factor than is generally realized in the reduction which has been achieved in the fire wastage. A careful study of the results obtained by individual brigades offers convincing evidence that the general extension of the developments which are taking place will produce results in the saving of life and property which will more than justify the cost. The principal matters to which attention is directed are—

(1) *Alarm System.*—Most of the larger towns have a street-alarm system with an attendant always on duty at the fire station. In the smaller towns the method usually adopted is the placing of a distant-control switch in the telephone exchange, by which the exchange attendant operates the alarm bell or syren. There are still a number of towns in which the arrangements for calling the brigade are defective.

(2) *Brigade Turnout.*—A considerable improvement is noticeable in the brigade response to fire calls. In even the smaller towns arrangements are now made for some of the brigade members to sleep on the station, but in many cases there is evident a weakness in the organization with respect to evening and week-end calls. In a number of the larger towns where limited permanent personnel is available arrangements have been made for a squad of volunteer or auxiliary firemen to be on duty from 7 p.m. to 7 a.m., which is the period when most severe fires occur. An extension of this system is desirable. It has been noted that with even the permanent brigades an improvement in turnout time is obtained by the use of a timing clock, which introduces a competitive factor. The average over the past twelve months for one city station operating with this device was 25.8 seconds for day time and 30.2 seconds for night calls. It is now becoming standard practice to turn out two machines to every call where they are available, unless the fire is known to be of a minor nature. This insures against breakdown or accident.

(3) *Fire-engines.*—This is the principal weakness in most brigade organizations. The great majority of the brigades are equipped with hose-tenders, which are, properly speaking, not fire-engines at all, and are effective only for the transport of personnel and equipment. For the reasons set out in last year's report the provision of fire-pumps is essential for efficiency, except in a few towns where either both the pressure and the volume of water available are exceptional or where the supply-system is operated by pumps which maintain the pressure under the heavy drawoff required in fighting fire. The modern light, high-powered trucks have now been adapted for fire-engine purposes and can be purchased complete with pump and body adapted for local requirements at a cost of £600 to £900. The motor-vehicle regulations give fire-engines the right of way and provide for the carrying of a distinguishing red light at night. Owing to the improved acceleration and braking this type of vehicle can safely be driven at an average speed of 30 m.p.h. in traffic and at considerably higher speeds when the route is clear. Their use not only improves the operating efficiency, but by reducing the running-time lessens the delay in attacking the fire and increases the effective radius of operation from the individual fire stations. Nine brigades—Wellington (2), Wanganui, Nelson, Auckland, Te Aroha, Te Awamutu, Tauranga, Wairoa, and Timaru—have been equipped with new fire-pumps during the year under review.

(4) *Smoke-protection Equipment.*—The advantages of efficient apparatus for protection against heavy smoke and toxic atmospheres have been amply demonstrated during the past few years. Its use has enabled the firemen to penetrate to the seat of the fire under conditions that would be impossible for unprotected operation, and has resulted in the extinguishing of a number of fires in their early stages which would otherwise have resulted in heavy loss. It has also been found of great service in salvaging work and in the ventilation of buildings to lessen the smoke damage. Two types of apparatus are in use, one similar to the war-time gas-mask, but fitted with a special filtering-canister for fire-brigade work, and the other a self-contained oxygen-breathing apparatus of the type used for mine rescue work. The supply of these appliances is at present confined to the city and a few of the large town brigades, and the general extension of their use is desirable both in the interests of operating efficiency and to provide protection to the firemen against the gruelling conditions experienced at the more serious fires.

(5) *Salvage Equipment.*—Most of the large brigades now carry salvaging equipment consisting of canvas sheets for covering furniture and goods against water damage, sawdust, towels, &c., to prevent the spread of water, and brooms, mops, &c., for clearing up after fires are extinguished. The use of this equipment has undoubtedly resulted in a considerable

reduction of the fire loss. The work of several of the secondary brigades has demonstrated that equally effective work can be carried out in the small towns and that the extension of salvaging work as a standard operation throughout the fire service is desirable.

(6) *Training.*—It is noted elsewhere in this report that an improvement in brigade training has been evidenced in most cases. The aspect which calls for reference here is that more brigade work is being carried out and the men are being exercised in the layout of plant and equipment required for dealing with large fires, which, while they do not occur frequently, are the cause of the major part of the fire loss. Training is also carried out on the actual buildings which constitute the principal fire risks, and in a number of cases the equipment for this work has been improved by the provision of breechings, standards, &c., for throwing large extinguishing streams.

The improvement of the brigade organization and equipment to a satisfactory standard on the lines indicated above would not involve a great increase in annual cost taken over the whole fire service, but in individual cases, and particularly in the smaller towns, the capital expenditure involved in, for instance, the purchase of a fire-pump is a matter of concern to the local ratepayers. From the practical point of view the question cannot be considered apart from the insurance position. In the first place, the figures for insurance premiums are the only reliable indication available of the property under protection in the individual district; secondly, the insurance companies who pay approximately half the fire-brigade costs have an interest in the relationship of fire-brigade levies to insurance premiums; and, thirdly, because when additional expenditure is proposed the local-authority representatives almost invariably raise the question as to whether the increased efficiency of the fire-protection service will also result in a corresponding benefit to the ratepayers by a reduction of the insurance tariff.

In theory insurance tariff rates are based on the situation of the property and the occupational hazard of the building, but in practice there are so many factors variable from time to time, such as the alteration in the character of a town or district, the type of buildings, water-supply, or fire service, and the like that the existing tariff is largely a compromise based on negotiations between local authorities and the underwriters. It is notoriously difficult to increase rates once established, and, as insurance is based on averages, inequalities have arisen as between districts, which are not justifiable on the facts but which could probably not be corrected without something approaching a complete reclassification.

The tables of average statistics published in these reports for the past three years were designed to provide an indication, based on a sufficiently long period to be of value, of the fire-loss position in the individual fire district. The insured fire losses shown for the year covered by each report refer to fires which the brigades attended, but do not include a considerable number of small fires on which insurance is paid. It was found by experience over several years that the payment made on these fires was approximately the same on the average as the uninsured loss returned in the brigade reports, and the total-loss figure has therefore been used in compiling the average statistics. The latter may be taken as correct within about 5 per cent., and apply to the respective years ending 31st March.

Prior to 1930 there was no co-ordination between the statistical returns prepared for these reports and those prepared by the Government Statistician, but since that date the reports on fires received from fire districts have been checked against the insurance companies' returns. The following table sets out the average position for the last five and three year periods as disclosed by these figures, and for purposes of comparison the ten-years average for the whole Dominion has been included. The first five years of the ten-year period were the peak years for high fire losses (in 1928 the insured loss was £1,454,328), but it is evident that the reduction in fire loss, particularly during the last three years, has been sufficient to compensate for this, and the ten-year average discloses an underwriting position by no means unfavourable. The figures shown for non-protected areas were obtained by difference after deducting figures for areas protected by municipal brigades estimated on the same basis as for the small fire districts.

	Insurance Premiums.	Insurance Companies' Payments.				Percentages of Total Payments to Premium Income.
		Fire Board Levies.	Percentage of Premium Income.	Payments in respect of Fire Loss.	Percentage of Premium Income.	
Whole Dominion : Ten-year average ..	£ 1,894,952	£ 63,675	£ 3.36	£ 975,903	51.50	54.86
Whole Dominion : Five-year average ..	1,855,508	67,743	3.65	801,847	43.21	46.86
Fire districts : Five-year average ..	929,280	67,034	7.21	294,080	31.65	38.86
Non-protected areas : Five-year average ..	740,677	..	..	448,391	60.55	60.55
Whole Dominion : Three-year average ..	1,761,751	66,483	3.77	615,883	34.96	38.73
Fire Districts : Three-year average ..	904,155	66,076	7.31	220,988	24.44	31.75
Non-protected areas : Three-year average ..	681,421	..	..	351,732	51.62	51.62

These figures show that over the five-year period the fire districts, despite the lower tariff rates in force in most of these areas, produced 50.1 per cent. of the premium income and were responsible for 41.5 per cent. of the loss, whereas in unprotected areas the relation

was reversed, premium income being 39.9 per cent. and loss 51.6 per cent. The figures are strictly comparable, as the Fire Board levies are treated as loss for the purposes of the calculation.

It is not within the province of this report to enter into a discussion as to the equity or otherwise of the existing insurance tariff rates as they apply to fire districts, and for this reason the detailed figures on which the table is based are not published. As far as can be ascertained no reliable figures are available from any other source showing the incidence of fire losses in these districts in relation to insurance premiums, and it was therefore considered that the information would be of general interest as showing the value of fire-protection.

The principal purpose in the preparation of the average tables has been to determine whether the fire-loss figures taken over a period would confirm the impression gained from the examination of the work of brigades at individual fires, referred to at the commencement of this section of the report, that the additional cost of bringing the organization and equipment of the brigades up to a higher standard would be justified by the resulting decrease in fire loss. It is considered that, allowing for the difficulties with respect to water-supply and equipment under which many brigades are now operating, the figures amply confirm this conclusion.

HAND FIRE-EXTINGUISHERS.

The Departmental Technical Committee referred to in the last annual report has had a number of meetings since it was set up. A circular has been sent to all suppliers of fire-extinguishers requesting information as to the specification to which these extinguishers are manufactured, and further information is being obtained from Great Britain. It will not be possible to complete the work of the Committee for some time owing to the necessity for obtaining the fullest possible information before a final decision is reached regarding the standards of construction and maintenance to be adopted. The Committee has, however, recommended that the following conditions should apply in the meantime to extinguishers for use in departmental buildings:—

- (1) No new extinguishers to be purchased unless complying with the British Board of Trade standard and tested by the manufacturer to a pressure not less than 350 lb. to the square inch.
- (2) All extinguishers now in use to be submitted to a hydraulic pressure test of 300 lb. to the square inch, and a similar test to be applied every fourth year.
- (3) Maintenance: Acid-soda extinguishers of the turn-over type to be examined for corrosion and operating-defects and recharged annually. Acid-soda extinguishers of the sealed-bottle type to be examined annually and the alkaline solution to be replaced at not greater intervals than three years. Foam extinguishers to be examined annually, and the constituents tested for foam-producing content and replaced at not greater intervals than two years. Tetrachloride extinguishers to be examined six-monthly to check operating-mechanism and to see that extinguisher is fully charged.

During the course of the investigations made by the Committee a considerable number of cases have been noted where extinguishers of the break-bottle type, particularly conical extinguishers of the "Quenchee" and "Minimax" types, have been fitted with a sealed bottle containing an excessive quantity or strength of acid. This applies particularly to the 10-pint extinguisher, which is commonly found equipped with the acid bottle designed for the 2-gallon type, and in some cases even with the excessive strength charge intended for the 2-gallon type.

The Committee decided that a public warning should be issued regarding this matter, since there is a serious hazard in the use of an extinguisher with an excessive acid charge, owing to the fact that in the event of the blockage of the delivery, sufficiently high pressures may be developed to cause the explosion of the extinguisher. The importance of this warning may be gauged from the fact that the use of the standard 2-gallon acid charge in a 10-pint extinguisher would create an excess pressure of approximately 60 per cent., while the high-strength charge referred to is capable of producing a pressure from 300 per cent. to 400 per cent. of that developed by the standard charge.

There is little doubt that the use of a non-standard acid charge was mainly responsible for the fatality which occurred in the use of an extinguisher of this type at Hastings in 1933. The inquiries indicate that a number of these charges are still in use, for the supply of which the makers of the extinguishers disclaim all responsibility. It is therefore strongly recommended that all owners of sealed-bottle type of extinguishers purchased prior to 1933 should make arrangements for their examination by the manufacturers or selling-agents, or by some other person competent to ensure that the correct charge is installed.

The servicing of hand fire-extinguishers in commercial use by the local fire brigades has been further extended during the year. The brigade records show that a further development of this work is most desirable, as a considerable number of extinguishers have come under notice which were in bad condition or improperly charged. The records also show the value of this first-aid equipment in dealing with fires in incipient stages—in Auckland City alone no less than thirty-two extinguishers being used on incipient fires in premises where the equipment is serviced by the brigade.

CONSTRUCTION OF BUILDINGS.

Reference has been made in these reports at intervals during the past twenty-six years to the unnecessary loss by fire which has occurred owing to the faulty construction of buildings. This is in the main due not to any additional cost of the protective measures which are desirable, but to the fact that the local-authority by-laws have not in most cases any requirements with respect to fire protection.

As a result of the serious earthquakes which have occurred during recent years, the question of building by-laws has been brought prominently before the public, and a number of local authorities have made by-laws providing for earthquake-resisting construction on the lines recommended by the Committee of experts set up by the Government in 1931. It was pointed out in this report last year that effective protection against earthquake involved also the consideration of the fire hazards in building construction.

The question of fire protection of buildings is becoming more important from year to year, since the greater height and floor area of the modern industrial building renders fire-fighting difficult unless reasonable provisions are made. In order to bring the question in concrete form before local authorities which may be contemplating the provision of new building by-laws, the principal requirements which are considered desirable are set out for consideration:—

- (1) The protection of window and other openings from exposure to fire in the same (in light areas, &c.) or in other buildings.

This is best arranged by requiring that window openings shall be protected by wired glass in metal frames, installed to a standard specification, and that doors opening into adjoining buildings and between separate sections of the same building shall be of fire-resisting construction.

- (2) The protection of lifts and stairways to prevent communication of fire through the building.

These are the natural draught outlets for the building, and experience shows that they are a general source of communication of fire from one floor to another.

- (3) The installation of internal fire-fighting water-supply in all buildings of three storeys or more.

This should consist of one or more rising mains fitted with the type of hose-coupling used by the fire brigade operating in the district. First-aid hose-reels are also desirable, and the value of hand extinguishers is emphasized in this report.

- (4) The installation of automatic fire-alarms or sprinkler system in all buildings exceeding specified heights and floor areas.

The reduction in insurance rates obtainable where buildings are protected as suggested above will in most cases more than cover any additional construction cost involved.

FIRE-PREVENTION.

The annual fire-prevention week was held in the early part of 1935 (18th to 23rd March) and there is reason to be satisfied with the results achieved. The publicity matter distributed included posters, householders' circulars, and an instruction card of a permanent character for use in shops, offices, factories, &c. The local authorities and fire-brigade authorities co-operated very satisfactorily, but it would be impossible to carry out this fire-prevention work effectively were it not for the assistance given by the members of the volunteer fire brigades. Arrangements were made in most towns for the brigade to give demonstrations of its work, and the whole of the publicity matter was distributed by the brigadesmen.

One of the most important sections of the propaganda work during fire-prevention week is the giving of lessons to the children in the schools, and in most towns this was undertaken by the brigade officers. In some cases the fire engines were taken to the schools to show the method of giving the alarm and the nature and use of the brigade equipment. Broadcast talks were given from all the principal stations, and the press throughout New Zealand gave considerable prominence to the question both in news items and editorials.

INSPECTIONS.

It was not found possible to make a complete inspection of all the brigades during the year, but the majority were visited at least once. Close touch was kept with the activities of all districts by means of newspaper references, and where necessary several inspections were made. The conditions found were generally satisfactory, and, as indicated elsewhere in this report, a number of the brigades have reached a very high standard so far as is possible within the limitations of the existing organization and equipment.

It is proposed during the coming year to extend the inspection work and to make something in the nature of a fire survey of as many of the fire districts as possible, and to make recommendations to the Boards for the improvement of the organization on the lines

mentioned in this report. This work will require a considerable amount of additional time, as it is necessary in most cases to make tests on the water-supply under both winter and summer conditions.

The usual reports were made during the year on inspections of public buildings and institutions, and advice has been given to Fire Boards and other local bodies with regard to equipment and fire-station sites and buildings. A number of reports were also made to the Local Government Loans Board on loans proposed for fire-prevention, water supply, and reticulation purposes.

I have, &c.,
R. GIRLING-BUTCHER,
Inspector of Fire Brigades.

TABLE I.—SHOWING CAUSES OF FIRE IN CITY AREAS.

Cause.	Dwellings (including Hotels and Boardinghouses)		Business Premises.		Total.	
	Number of Fires.	Fire Loss.	Number of Fires.	Fire Loss.	Number of Fires.	Fire Loss.
		£		£		£
Defective electrical installation	1	1	5	119	6	120
Electric irons and radiators left on	13	2,083	4	218	17	2,301
Short circuits and overheating	5	132	18	1,607	23	1,739
Other electrical faults	1	21	2	16	3	37
Gas-explosions	1	11	..	..	1	11
Gas rings, &c., left on or in contact with curtains, &c. ..	6	143	2	114	8	257
Defective gas-installations	1	5	3	645	4	650
Candles in contact with curtains, &c.	3	1,646	..	..	3	1,646
Lamps, stoves, overturned or exploded	2	407	4	54	6	461
Miscellaneous, due to naked lights	4	626	1	7	5	633
Defective chimneys and flues	22	2,534	6	44	28	2,578
Defective hearths, fireplaces, and furnaces	17	1,179	3	146	20	1,325
Defective hot-water systems	3	991	..	..	3	991
Lighted match dropped	11	755	9	86	20	841
Children playing with matches	9	38	..	..	9	38
Smoking in bed	5	31	..	..	5	31
Cigarette or cigar butts dropped	8	490	17	9,161	25	9,651
Ashes from pipes, sparks from cigarettes	4	102	..	..	4	102
Rats chewing matches	1	7	1	1,024	2	1,031
Miscellaneous causes—smoking and matches	2	76	1	25	3	101
Sparks from fireplaces, furnaces, &c.	36	2,572	12	1,408	48	3,980
Airing clothes before a fire	3	514	..	..	3	514
Ashes placed in wooden boxes, &c.	11	1,026	4	32	15	1,058
Heating tar, polishes, &c.	3	124	11	1,943	14	2,067
Spontaneous combustion	3	364	7	128	10	492
Allowing benzine, &c., near naked lights	11	630	5	835	16	1,465
Arson	2	32	2	2,090	4	2,122
Suspicious origin	11	2,939	8	2,184	19	5,123
Overheating of and sparks from machinery .. .. .	..	..	5	4,920	5	4,920
Sparks from bush and gorse fires	7	107	4	104	11	211
Sparks from rubbish fires	8	38	..	..	8	38
Sparks from chimneys, locomotives, &c.	10	60	30	5,391	40	5,451
Blow-lamps used for burning off paint	14	297	2	8	16	305
Fires spread from other buildings	11	147	4	699	15	846
Miscellaneous known causes .. .. .	..	..	19	384	19	384
Total, known causes	249	20,128	189	33,392	438	53,520
Unknown causes	68	18,689	59	56,851	127	75,540
Grand total	317	38,817	248	90,243	565	129,060
Known causes—Loss per fire .. .. .	..	81	..	177	..	122
Unknown causes—Loss per fire .. .. .	..	275	..	964	..	594
All causes—Loss per fire .. .. .	..	122	..	364	..	228
Unoccupied dwellings—Loss per fire .. .. .	..	292	..	..	..	..

TABLE II.—MISCELLANEOUS STATISTICS FOR FIRE DISTRICTS.

District.	Population.	Rateable Capital Value.	Insurance Companies Premium Income.	Number of Fire Calls.	Fires involving Loss of Property.	Insurances on Property involved in Fires.	Insured Fire Loss, Buildings and Contents.	Uninsured Fire Loss, Buildings and Contents.	Total Fire Loss.	Authorized Expenditure for Year ending 31st March, 1936.
		£	£			£	£	£	£	£
Auckland Metropolitan	185,650	69,867,091	199,865	971	159	601,386	59,198	2,682	61,880	30,220
Balclutha ..	1,650	277,970	2,016	4	..	..	..	..	..	224
Birkenhead ..	3,450	752,455	3,819	10	..	..	..	..	..	570
Cambridge ..	2,220	722,455	3,079	10	2	6,240	3,153	22	3,175	489
Christchurch ..	92,900	29,104,462	98,597	363	94	456,094	5,992	1,690	7,682	13,500
Dannevirke ..	4,620	1,404,881	5,875	16	7	5,555	154	8	162	638
Dargaville ..	2,030	492,022	3,123	8	3	995	995	1	996	493
Dunedin Metropolitan	72,590	17,525,793	72,867	425	62	140,990	14,256	2,052	16,308	12,500
Eltham ..	2,040	361,461	2,014	3	3	2,625	483	10	493	419
Feilding ..	4,550	1,404,352	5,556	13	5	3,200	1	8	9	750
Foxton ..	1,740	259,516	1,643	3	2	2,350	1,890	..	1,890	421
Gisborne ..	14,700	4,597,916	19,791	29	17	62,878	6,567	529	7,096	2,523
Greymouth ..	7,750	1,304,887	7,750	15	6	18,120	1,492	20	1,512	1,051
Hamilton ..	16,050	5,132,981	16,417	92	16	24,335	3,358	1,817	5,175	2,661
Hastings ..	12,600	3,592,750	14,945	42	17	48,110	2,358	67	2,425	2,544
Hawera ..	4,780	1,336,460	7,070	24	2	110	11	1	12	1,136
Hikurangi ..	1,000	162,446	961	3	3	1,250	929	275	1,204	165
Hokitika ..	2,620	393,061	2,819	..	..	..	..	..	..	611
Invercargill ..	21,500	5,255,831	23,124	104	39	97,527	10,227	576	10,803	5,031
Kaipoi ..	1,740	316,703	1,953	11	3	4,566	1,013	240	1,253	500
Kaitangata ..	1,350	102,375	1,097	3	..	..	..	..	..	117
Lawrence ..	640	57,165	626	2	..	..	..	..	..	85
Levin ..	2,840	761,281	3,256	14	4	51	49	80	129	521
Masterton ..	8,950	2,542,047	11,699	54	11	25,289	1,088	117	1,205	2,411
Milton ..	1,600	226,493	2,098	7	2	875	10	..	10	165
Napier ..	16,550	4,065,461	23,625	36	13	26,676	2,508	33	2,541	4,131
Nelson ..	11,300	2,934,035	15,880	26	8	61,605	1,362	..	1,362	2,051
New Plymouth ..	16,800	5,016,058	17,042	55	11	9,209	1,571	266	1,837	1,850
Oamaru ..	7,700	1,542,183	7,653	12	5	6,045	668	47	715	951
Ohakune ..	1,350	108,945	1,150	10	4	1,645	1,610	300	1,910	294
Opotiki ..	1,360	326,487	1,858	4	3	1,100	125	250	375	498
Otaki ..	1,680	305,017	1,673	6	1	17	17	28	45	368
Pahiatua ..	1,580	351,225	3,109	7	2	2,050	720	..	720	304
Palmerston North	22,250	7,477,445	28,299	118	20	84,300	5,611	68	5,679	4,341
Petone ..	11,230	3,117,568	12,701	24	3	1,710	469	..	469	1,841
Port Chalmers ..	2,560	304,771	1,804	2	1	500	360	..	360	294
Pukekohe ..	2,580	799,033	2,595	23	2	2,000	550	125	675	750
Rotorua ..	5,250	1,465,959	6,764	25	2	..	..	42	42	1,006
Taihape ..	2,450	410,927	3,303	5	..	..	..	..	..	504
Taumarunui ..	2,650	638,222	2,654	10	3	3,400	75	14	89	431
Tauranga ..	3,350	868,888	3,937	18	4	840	365	80	445	509
Te Aroha ..	2,550	714,073	3,866	9	4	2,700	1,423	2	1,425	324
Te Awamutu ..	2,020	643,298	3,195	14	5	750	411	54	465	554
Timaru ..	17,750	5,205,112	16,620	58	17	31,830	1,547	18	1,565	2,481
Waihi ..	3,500	274,567	2,613	17	4	2,560	346	1	347	673
Waipukurau ..	2,050	499,642	2,503	5	1	1,625	6	..	6	400
Wairoa ..	2,450	540,907	3,678	5	1	200	125	10	135	664
Waitara ..	1,950	316,668	2,579	..	..	..	..	..	..	245
Wanganui ..	24,850	5,973,503	29,695	193	31	61,254	3,757	475	4,232	6,510
Wellington ..	114,950	52,383,765	164,899	863	140	687,573	18,043	2,252	20,295	29,324
Westport ..	4,090	517,053	3,994	16	7	4,330	3,149	70	3,219	640
Whangarei ..	8,000	2,328,802	7,816	7	2	800	400	110	510	1,016
Woodville ..	1,120	165,872	1,365	3	2	290	290	..	290	318
	767,480	247,250,340	888,930	3,797	753	2,497,555	158,732	14,440	173,172	143,017

TABLE IIIA.—AVERAGE STATISTICS FOR ALL FIRE DISTRICTS WHICH HAVE BEEN IN OPERATION FOR THE TWELVE YEARS 1924-35.

District.	Population.	Municipal Rates.	Rates per Head.	Insurance Premiums.	Insurance Premiums per Head.	Number of Fires.	Fires per 1,000 of Population.	Highest Fire Loss in any Individual Year.	Fire Loss.	Fire Loss per Head.	Loss per Fire.	Fire Brigade Expenditure.	Expenditure per Head.	District.
		£	£ s. d.	£	£ s. d.			£	£	£ s. d.	£	£	s. d.	
Auckland Metropolitan*	122,940	596,311	4 17 0	175,351	1 8 6	193	1.57	114,709	68,039	0 11 1	353	23,119	3 9	Auckland Mtrpltn.*
Balclutha	1,574	3,725	2 7 4	2,047	1 6 0	37	1.37	7,090	962	0 12 3	445	351	4 6	Balclutha.
Christchurch	87,747	233,579	2 13 3	114,020	1 6 0	137	1.56	96,575	45,943	0 10 6	335	12,446	2 10	Christchurch.
Dannevirke	4,408	11,262	2 11 1	7,821	1 15 6	6	1.47	8,680	1,035	0 4 9	159	696	3 2	Dannevirke.
Dargaville	2,040	12,569	6 3 3	3,643	1 15 9	5	2.53	4,655	2,423	1 3 9	470	553	5 5	Dargaville.
Dunedin Metropolitan	68,548	190,014	2 15 5	80,008	1 3 4	110	1.60	59,793	27,864	0 8 1	254	14,052	4 1	Dunedin Mtrpltn.
Feilding	4,425	16,166	3 12 8	6,830	1 10 11	6	1.43	5,044	1,915	0 8 8	303	718	3 3	Feilding.
Foxton	1,750	4,651	2 13 2	1,869	1 1 4	4	2.14	6,830	2,733	1 11 3	726	467	5 4	Foxton.
Gisborne	13,891	61,734	4 8 11	23,594	1 14 0	22	1.61	24,240	11,901	0 17 2	531	2,467	3 7	Gisborne.
Greymouth	6,041	16,292	2 13 11	7,446	1 4 8	9	1.54	32,174	9,667	1 12 0	1,039	1,017	3 4	Greymouth.
Hamilton	14,959	58,802	3 18 8	21,433	1 8 8	21	1.39	25,746	4,797	0 6 5	231	2,706	3 7	Hamilton.
Hastings	11,246	36,035	3 4 1	16,252	1 8 11	19	1.70	24,504	8,234	0 14 8	432	1,709	3 0	Hastings.
Hawera	4,675	15,489	3 6 4	7,931	1 13 11	8	1.71	11,876	2,088	0 8 11	261	1,166	5 0	Hawera.
Hokitika	2,492	3,782	3 13 5	2,898	1 3 3	5	2.14	8,591	2,727	1 1 11	511	578	4 8	Hokitika.
Invercargill	19,338	71,005	3 13 5	23,391	1 4 2	38	1.95	47,221	13,943	0 14 5	370	5,376	5 7	Invercargill.
Kaipoi	1,727	2,170	1 5 2	2,434	1 8 2	4	2.51	25,984	4,155	2 8 1	960	679	7 10	Kaipoi.
Kaitangata	1,483	1,683	1 2 8	1,114	0 15 0	2	1.18	4,343	888	0 12 0	507	163	2 2	Kaitangata.
Lawrence	661	1,271	1 18 6	724	1 10 10	2	2.27	3,770	491	0 14 11	327	90	2 9	Lawrence.
Levin	2,586	6,073	2 7 0	3,866	1 9 2	5	2.06	9,745	2,096	0 16 3	393	640	4 11	Levin.
Masterton	8,543	27,463	3 4 4	12,819	1 10 0	14	1.60	18,539	6,459	0 15 2	473	1,968	4 7	Masterton.
Milton	1,533	3,998	2 12 2	2,216	1 8 11	1	0.97	1,000	177	0 2 4	118	187	4 5	Milton.
Napier	15,945	56,961	3 11 5	27,833†	1 14 11	22†	1.35	24,692	10,096†	0 12 9	470	3,951	5 0	Napier.
New Plymouth	15,226	54,549	3 11 8	18,981	1 4 11	17	1.13	9,593	5,220	0 6 10	304	2,019	2 8	New Plymouth.
Oamaru	7,433	26,217	3 10 7	8,066	1 1 8	7	0.96	23,878	4,907	0 13 2	687	1,088	2 11	Oamaru.
Ohakune	2,436	2,436	1 12 11	1,414	0 19 2	5	3.59	11,825	3,663	2 9 5	687	439	5 11	Ohakune.
Palmerston North	19,918	70,812	3 11 1	31,078	1 11 2	37	1.84	31,637	14,156	0 14 3	387	3,898	3 11	Palmerston North.
Petone	10,301	25,312	2 9 2	13,191	1 5 7	9	0.92	5,070	1,849	0 3 7	196	1,638	3 2	Petone.
Port Chalmers	2,578	4,385	1 14 0	2,286	0 17 8	3	1.19	2,135	836	0 6 6	273	244	1 11	Port Chalmers.
Rotorua	4,931	8,870	1 16 0	7,008	1 8 5	3	1.88	7,416	2,860	0 11 7	309	1,080	4 5	Rotorua.
Taumarunui	2,467	8,085	3 5 7	3,306	1 6 10	6	2.60	7,942	1,734	0 14 1	270	526	4 3	Taumarunui.
Tauranga	2,823	8,070	2 17 3	4,216§	1 9 11	4	1.59	5,074	1,957	0 13 10	436	647	4 7	Tauranga.
Te Aroha	6,319	21,434	3 11 11	3,805	1 11 3	4	1.81	4,426	1,961	0 16 1	445	618	5 1	Te Aroha.
Timaru	16,401	53,972	3 5 10	18,021	1 2 0	17	1.07	19,457	5,404	0 6 7	309	2,501	3 0	Timaru.
Waihi	3,401	4,696	1 5 8	2,819	0 16 7	10	3.01	5,909	2,913	0 17 1	284	692	4 1	Waihi.
Waitara	1,813	4,262	2 7 0	2,565	1 8 4	2	1.01	5,044	1,756	0 19 4	958	229	2 6	Waitara.
Wanganui	24,497	96,711	3 19 0	35,393	1 8 11	40	1.62	14,074	8,515	0 6 11	215	7,113	5 10	Wanganui.
Whangarei	6,953	25,124	3 12 3	8,088	1 3 3	8	1.17	36,569	6,406	0 18 5	784	1,059	3 0	Whangarei.
All districts	521,211	1,830,855	3 10 3	705,797	1 7 1	812	1.56	..	292,770	0 11 3	361	98,890	3 10	All districts.
Eleven years' average, whole Dominion*	1,476,923	5,353,225	3 12 6	1,883,859	1 5 6	4,620	3.13	1,636,119	1,098,016	0 14 10	238	..	..	Eleven years' average, whole Dominion.

* Includes statistics for Onehunga, Mount Roskill, and Newmarket Fire Boards from date of inception to date of incorporation in Auckland Metropolitan Fire Board. † Eight-year average. ‡ Eleven-year average. § Nine-year average.

TABLE III.—AVERAGE STATISTICS FOR OTHER FIRE DISTRICTS.

District.	Period of Average (Years).	Population.	Municipal Rates.	Rates per Head.	Insurance Premiums.	Insurance Premiums per Head.	Number of Fires.	Fires per 1,000 of Population.	Highest Fire Loss in any Individual Year.	Fire Loss.	Fire Loss per Head.	Loss per Fire.	Fire Brigade Expenditure.	Expenditure per Head.	District.
			£	£ s. d.	£	£ s. d.			£	£	£ s. d.	£	£	s. d.	
Birkenhead..	3	3,437	12,534	3 12 11	4,209	1 4 6	1	0.19	802	267	0 1 7	401	498	2 11	Birkenhead.
Cambridge..	4	2,185	8,017	3 13 4	3,251	1 9 9	3	1.51	3,175	1,337	0 12 3	405	495	4 6	Cambridge.
Eltham..	11	2,040	6,584	3 4 7	2,641	1 5 11	3	1.65	2,672	973	0 9 7	290	462	4 6	Eltham.
Hikurangi..	7	1,234	2,181	1 15 4	1,181	0 19 2	2	1.38	1,204	484	0 7 10	285	225	3 8	Hikurangi.
Nelson..	2	11,250	35,678	3 3 6	16,164	1 8 9	11	1.02	3,924	2,643	0 4 8	230	2,278	4 0	Nelson.
Oporiki..	6	1,313	3,964	3 0 4	2,081	1 11 9	3	2.54	3,609	997	0 15 2	299	579	8 10	Oporiki.
Otaki..	10	1,615	4,647	2 17 9	1,920*	1 3 10	3	2.04	2,855	941	0 11 8	285	342	4 3	Otaki.
Pahiataua..	9	1,525	4,107	2 13 11	3,280	2 3 0	3	1.82	11,775	2,828	1 17 1	1,021	378	5 0	Pahiataua.
Pukekohe..	9	2,513	12,733	5 1 4	3,237	1 5 9	3	1.23	5,680	908	0 7 3	338	656	6 0	Pukekohe.
Taihape..	5	2,460	9,422	3 16 8	3,799	1 13 4	2	0.73	856	245	0 2 0	136	530	4 4	Taihape.
Te Awamutu..	8	1,845	9,845	5 6 9	3,379	1 16 8	3	1.49	4,510	1,017	0 11 0	285	483	5 3	Te Awamutu.
Waipukurau..	9	1,938	6,007	3 1 5	3,148	1 12 2	4	2.10	7,167	1,858	0 19 0	452	332	3 5	Waipukurau.
Wairoa..	9	2,464	10,034	4 1 5	4,187	1 14 0	5	2.03	101,707†	14,197†	5 15 4	2,839	532	4 4	Wairoa.
Wellington..	9	109,461	459,415	4 3 11	190,420	1 14 10	189	1.73	294,070	94,472	0 17 3	499	27,492	5 0	Wellington.
Westport..	11	3,949	9,182	2 6 6	4,271	1 1 8	6	1.41	11,889	2,807	0 14 3	506	634	3 3	Westport.
Woodville..	4	1,122	2,693	2 8 0	1,453	1 5 11	3	2.90	2,105	814	0 14 6	250	384	6 10	Woodville.

* Five-year average. † Fire-loss figures corrected in accordance with returns supplied subsequently.

TABLE IV.—AREAS PROTECTED BY FIRE BOARDS.

District.	Population.	Rateable Capital Value.	Number of Fire Calls.	Fires Involving Loss of Property.	Insured Fire Loss, Buildings and Contents.	Uninsured Fire Loss, Buildings and Contents.	Total Fire Loss.	Protected by	Remarks.
		£			£	£	£		
Belfast (works only)	..	..	1	1	1,950	50	2,000	Christchurch Fire Board	..
Feilding (works only)	..	..	..	..	..	..	..	Feilding Fire Board	..
Green Island	2,450	385,880	14	3	239	20	259	Dunedin Metropolitan Fire Board	..
Hawera..	600*	210,000*	..	..	..	..	..	Hawera Fire Board	..
Mangere..	760*	522,000*	2	1	377	..	377	Auckland Metropolitan Fire Board	..
New Lynn..	3,210	644,969	8	2	500	1	501	Auckland Metropolitan Fire Board	..
Cashmere	..	..	..	..	..	..	..	Christchurch Fire Board	..
Fendalton	11,280	3,824,638*	42	11	457	135	592	Christchurch Fire Board	..
Riccarton	..	..	..	..	..	..	..	Christchurch Fire Board	..
St. Kilda	8,390	1,776,261	30	4	813	20	833	Dunedin Metropolitan Fire Board	..
West Harbour (works only)	..	..	..	..	..	..	..	Dunedin Metropolitan Fire Board	..
	26,690	7,363,748	97	22	4,336	226	4,562		

* Estimated.

Approximate Cost of Paper.—Preparation, not given; printing (1,910 copies), £18 10s.

