

to the wide-spread distribution of naturally regenerated pine-trees, the stark, blackened boles of which will remain an eyesore long after the scrub and fern have become re-established. Kaingaroa State Forest fire-fighting organization, including the radio equipment, was fully and successfully tested in the fire, and valuable experience gained. The great value of the "Indian" hand-operated fire-fighting pumps coupled to a metal water-container carried over the shoulders was adequately demonstrated. A supply of these pumps is invaluable to loggers, millers, and forest owners and can be purchased from stocks held by the E.P.S. branch of the National Service Department. Other damage to scenic amenities occurred in Southland, where as a result of a very low summer rainfall two serious fires flared up in the Queenstown locality, doing some damage to scenic reserves.

Two points emerge from the Taupo and Wairakei fires, the most regrettable feature of which was that virtually all the damage which did occur could have been quite easily prevented by prompt suppression of the initial outbreaks. Unfortunately, however, no local body or other authority, &c., considered itself either responsible for or justified in dealing with the fires in their incipient stages. At Taupo the outbreaks were small local fires for several days before working up to sizeable proportions, and not till this occurred and house and other property were actually threatened was any action taken to control the outbreak. The only practical corrective is to see that such important localities are brought under the operations of the Forests Act and its Forest (Fire-prevention) Regulations. As the legislation now stands, however, this can be achieved only by some responsible body, firm, &c., applying to be created a forest fire district, whereas what are wanted are compulsory powers for the gazetting of forest fire districts wherever the fire hazard warrants their creation.

The destruction of 70 acres of exotic forest in the Taupo fire was no less regrettable from the fact that had the forest-owner taken his own appropriate protection measures the loss could have been avoided. More significant, however, is the fact that, even had this forest been in a forest fire district administered by another forest-owner or a local body as the original applicant for its creation, no power exists whereby the forest-owner could be compelled to take appropriate protective measures. This is seen in both State forest and private fire districts, where numerous forest-owners take little, if any, protective measures, leaving the administering authority to provide virtually the whole of the fire protection for the district. The principle of all forest-owners bearing an equitable share of the cost of forest protection in any area is widely recognized in most countries with a sound and progressive forest policy, and is advocated as essential to the adequate protection of both the dwindling indigenous forest resource and the expanding exotic resource.

During the same season a fire spread over 190 acres of the Guildford Estate, in Upper Hutt, endangering a local hospital; the estate plantations were, however, only slightly damaged; fire-fighting personnel was provided by the Army, and officers of this Service co-operated. Nelson had a very dry summer, numerous fires being reported in the vicinity of State forests: the largest fire was at Westhaven, where 200 acres of indigenous forest were destroyed. In Canterbury only one small fire occurred in State forest, although the season was the worst experienced for some years: a noticeable increase in the co-operation of the general public is recorded; the Canterbury Rural Fire Committees also functioned very meritoriously. In Southland the summer rainfall was very low; the two serious fires occurred in the Queenstown locality, endangering that town and doing some damage to scenic reserves.

Two causes of origin of forest fires not previously recorded in New Zealand have appeared during the year—namely, Verey light and tracer bullets. Verey lights were fired as signals from an aircraft, causing a grass fire near a Canterbury State forest. The fire was extinguished without damage by a forest patrol, who secured rapid assistance from the ground staff of a nearby aerodrome. The fact that it took nineteen men about a quarter of an hour to extinguish a fire caught in its very early stages shows the extreme danger arising from this cause in a bad season. During the same period a similar incident was alleged to have caused loss of grass pasture, fencing, pine plantation, and flax in Marlborough.

Late in the fire season a tracer bullet used by a deer-shooter set fire to a pine compartment in a State forest in the Rotorua district. These cases of known and certain origin are probably unavoidable in times of war in areas where troops are training, but they usefully illustrate how fires could arise in times of peace by negligent or illegal use of dangerous missiles. Administrative powers will be sought to regulate the use of such missiles throughout the Dominion in more normal times.

Two sawmills were destroyed by fire during the year, owned respectively by J. C. Malfroy and Co. (Westland) and Standard Timber Co. (Southland). In addition, a dry kiln and a considerable quantity of timber in Baigent's Mill at Berlin's was burnt, and the Egmont Box Co., Ltd. (Taranaki), also suffered fire damage.

44. *Fire Hazard and Lookout Stations, &c.*—The 1943–44 fire season was characterized by conditions of moderate hazard over fairly long periods in many localities. Short periods of very high hazard were much fewer than usual. Further study has been made of forest and tree mosses and liverworts as fire-hazard indicators, but their value is strictly limited, and this season's experience has again proved that measurements of relative humidity constitute the only reliable means of recording rapid changes from moderate to highly hazardous conditions. Local factors of wind direction and fuel types, however, are now proving of more significance and receiving more attention by observers.

Faulty location of fires by inaccurate intersectioning of lookout bearings was traced to improvised alidades and inaccurate maps, and corrective measures will be instituted as rapidly as staffing and equipment difficulties will permit. It is hoped to establish at least one new major and four minor lookout stations on Kaingaroa State Forest during the coming year.