

of a clayey composition, as in operating the fumigator on sandy or gravelly soils the poisonous gas escapes, or else an insufficient amount penetrates the holes to complete the asphyxiation of the rabbits. Absolutely the most effective mode of ridding any enclosures of the pest is to trap continually, and systematically dig out burrows and under-runners.

An occasional "drive" by the full strength of the gang is often the means of cornering a number of hares, which are thus easily caught by greyhounds or shot by armed members of the hunting party.

The enforcement of these stringent measures to extirpate such ground-game before the commencement of planting is occasionally referred to lightly by those unaware of the immense amount of damage resulting from the presence of the pest. Although the ravages of both hares and rabbits are not at all restricted to any special period of the year, perhaps during frosty weather, or immediately following a fall of snow, when the young tree-tops become very conspicuous, the injury created is greatest. The destructive animals appear to be more partial to larch and ash, and the various pines also rarely escape the injury of having their leaders bitten off; by the judicious cutting-back to ground-surface of such injured deciduous trees as ash, oak, and sycamore, and subsequent disbudding when the young shoots make their appearance, it is possible to effect a remedy, but with larch or pines the result of such treatment is more problematical, and these varieties rarely respond in the manner desired to any such artificial measures.

Although the amount of damage occasioned by the entry of both the red and fallow deer into our southernmost plantations has not, so far, been extensive, there is not the slightest doubt but that wholesale destruction to young trees would eventuate if the animals were allowed to remain in the enclosures for any length of time.

FORMATION OF FIRE-BREAKS.

Perhaps fire-prevention is one of the most difficult problems attached to our afforestation-work. Notwithstanding our experience of one or two conflagrations of a more or less serious nature, any person sufficiently interested to fully examine the method adopted for guarding against the ingress or spread of fires will realize the immense amount of labour done in this direction.

Continental ideas are freely introduced as far as the actual fire-break allocations are concerned, and our system cannot in justice be denounced because a conflagration originates amongst the trees through carelessness or mishap by perhaps a visitor.

Through the presence of rank fern and tussock undergrowth up to a certain stage, a continual source of danger is apparent; but with the advancement of trees a canopy is formed, and the eventuating shade soon kills out all undergrowth. The fern, tutu, and other vegetation is then rapidly converted into moisture-retaining humus, and the risk of surface fires from this stage is considerably minimized.

If the planting-ground possesses a fairly even surface, blocks of about 300 acres are intersected by fire-lines from 1 to 2 chains in width, although in hilly country every effort is made to locate the fire-breaks on the leading ridges, so that equal advantage of combating any outbreak may be gained, no matter from which quarter the wind is blowing.

The formation of roads for vehicular traffic is also undertaken in the centre of fire-breaks, although where the gradient makes haulage impossible deviations are made to one side or the other.

Another safeguard, and perhaps the most important, is the boundary fire-break, which is usually half a chain in width, and follows as nearly as possible the fence-line. Along the interior of this outer break, or fringing the plantation, two or more rows of the partially fire-resisting English birch are planted, and by keeping the surface free from inflammable vegetation by ploughing or cultivating, any encroaching grass-fires may be easily suppressed before any damage is done. The internal fire-break course being decided upon, a heavy double-furrow plough drawn by five horses is then requisitioned, and by gathering the furrows to the centre, and gradually working to the desired width, a serviceable road-crown is thus made, in addition to the preliminary labour connected with fire-barrier formation. Either ploughing, discing, cultivating, or harrowing fire-breaks is commenced towards the latter part of spring, after the transport of trees from nurseries is completed: this gives ample time to finish all horsework before the grass reaches the seeding-stage. A constant vigilance for any outbreak of fire during the summer months is maintained by the adoption of a system of patrol duty, which is undertaken on holidays and Sundays by any one employee. The annual expense thus incurred is only trifling, but with such precaution a feeling of greater security exists amongst responsible officers of plantations.

In conspicuous places fire-notices are erected, and serve to warn persons frequenting the locality of the danger associated with the lighting of fires and of the penalty enforced should any outbreak extend to the planted reserve.

It may be interesting to mention that throughout the South Island plantations thirty-six miles of combined roads and fire-breaks, averaging 50 ft. in width, are cultivated annually, and the expenditure attached to this item alone reaches £138 per annum. When one considers that over 218 acres are actually ploughed and cultivated in this maintenance and formation labour, the amount per acre—12s. 8d.—will appear to be a perfectly reasonable figure. There is, however, every reason to anticipate that in the near future we shall not require to be burdened with this fire-break labour, as the conversion of our present internal lanes into grazing-areas, and judiciously stocking them with sheep, should bring about equally effective results.

CLEARING AND DRAINING.

Much importance must be attributed to the preliminary clearing-work, as the thorough removal of manuka-scrub, fern, tutu, danthonia grass, &c., by cutting and burning not only facilitates pitting and planting operations, but influences to some extent the amount of subsequent maintenance-work. If