Subsequently, a more elaborate form of apparatus of the same type came into use. This consists of a larger tub, having fine sieves of various meshes in place of the perforated bottom, and provided with a supply of water flowing into the tub, and steel agitators on a central shaft driven by a small engine. The retained material is released by opening a door near the bottom of the tub, and is dried in the air and generally winnowed by hand, but in a few cases a small winnowing-machine is used.

A larger and improved type of machine, designed to work swamp material by a continuous process, is now in operation in two localities. By this machine the swamp material, mixed with water, is raised by a spiral tube elevator from a sump to which the material has been previously conveyed. To the end of the tube elevator beaters are attached for the purpose of stirring up the material in the sump. After being elevated the material passes into a chain disintegrator, with the object of breaking up the soil without unduly crushing the gum. From the disintegrator the material passes into a series of three horizontal cylindrical screens of diminishing mesh, the finest being a 64 slotted mesh. All the material retained by the screens which passes through a seven-eighths mesh, after being dried in the air, is put through a large winnowing-machine, provided with screens which divide the material into different sizes, consisting of nuts, chips, seeds, and dust.

This machine was first used by the Mangatara Syndicate on its property near Dargaville, and is the invention of Mr. C. Suttie. The results of analyses made from waste material passing through the 64-mesh screen show that a smaller amount of gum is lost in the tailings than in the case of any other machine in use. The swamp being worked at present by the syndicate, besides containing an unusually large amount of woody and fibrous material, also contains a large admixture of foreign matter which it is difficult, if not impossible, to separate from the gum by any winnowing process; and we are convinced that on other fields visited in the course of our travels much better results could be obtained by the use of this machine than are realized where it is at present working. The Mangatara Syndicate is entitled to the highest commendation for the enterprise it has shown in pursuing its investigations and the success already attained. In addition to the type of machine above described, the syndicate has also evolved a smaller portable machine, suitable for use by parties of two or more men.

The Parenga Oilfields (Limited) has recently erected a large steam plant at Poroporo, capable of rapidly treating large amounts of swamp material. By means of efficient pumps a head of sea-water derived from the harbour is use to sluice the swamp material into a sump, from which it is raised by means of an hydraulic elevator to a fluming, from which it passes to a series of three concentric cylindrical screens of diminishing mesh. No additional device, such as a chain disintegrator, is used to break up the soil material, and no special process of drying has been installed. Provision has not yet been made for further separation of the gum from the large amount of foreign matter still associated with it.

No account of gum-winning plants would be complete without reference to the operations carried out by Mr. F. V. Raymond and those associated with him near Awanui, where a dredging plant was installed. In consequence of a series of difficulties and misfortunes, the undertaking has not up to the present been a commercial success.

Even the plants established on a commercial scale are largely of an experimental nature, and considerable improvements are still necessary before the best results can be obtained.

In recommending how the methods of recovering kauri-gum from the gum-bearing soils may be improved we suggest—

(1.) That it is necessary to lessen the cost of digging and handling the swamp material before treatment. The most efficient method at present in use is the hydraulic process at Poroporo, as described above. This method, however, can only be used where there is an ample supply of water.

(2.) A thoroughly efficient small washing plant, such as can be operated by two or three men, is required in place of the somewhat primitive tub processes at present in use. As mentioned above, Mr. C. Suttie is at present engaged in developing such a plant, with apparently good prospects of success.