

and homogeneous. It makes an excellent varnish, but in destructive distillation it gives off a large proportion of volatile oil and gas and leaves but little solid resinous matter, and therefore does not make as strong a varnish as the true copal or animi. The specific gravity is 1.030, and the melting-point from 450° to 465° F.

Manila Copal.—This is another resin which is generally referred to as a copal, although it is much more like the kauri than the copal. In fact, it takes an expert to tell the difference between some grades of Manila and the cheaper grades of kauri. It is shipped from Manila, but is found in various parts of the Malay Archipelago, and comes into the market in many varieties which are generally graded into hard and soft resins. It is chiefly sold at Amsterdam, the most of it going to Germany. Although the supply of the different grades keeps up, the qualities vary so much that they are very tricky to manipulate. This resin is seldom used in the best kinds of oil varnishes. The specific gravity is from 1.060 to 1.70, and the melting-point from 375° to 400° F.

Sandarac and Rosin.—These are used only in the cheapest of oil varnishes and cannot be considered as competitors with kauri. The former (specific gravity 1.038 to 1.044 and the melting-point 300° F.) is a recent and bled resin, and comes from the north coast of Africa. Rosin (specific gravity 1.044 to 1.100 and melting-point 212° F.) is also known under the name of "colophony," and is obtained in the distillation of turpentine from gum, the rosin being left behind in the still after the turpentine comes over.

CHIPS AND DUST.

The above low-grade kauri-gum has for many years been exported to Germany in considerable quantities, and the suggestion has been frequently made that it was being used in the manufacture of explosives. Samples of the gum were submitted to the Dominion Analyst, who has furnished the following report:—

"Wellington, N.Z., 29th April, 1916.

"REPORT on Specimen No. G/112 (1-3), forwarded by the Kauri-gum Superintendent, 7 Lower Hobson Street, Auckland. Particulars: Samples of kauri-gum, received in February.

"Your letter advised—'Box 1 contains pure dust; box 2 contains black chips and dust and white chips and dust (in bag).' The white chips and dust I have called No. 2 and the black chips and dust No. 3.

"When these three samples were burned they gave the following percentages of ash: No. 1, 51.4; No. 2, 3.3; No. 3, 33.5. These results show that while No. 2 consists mainly of gum, No. 1 contains less than 50 per cent. of gum and No. 3 not more than 66 per cent. of gum.

"With regard to the possibility of the Germans using such gums as these for the manufacture of explosives: No doubt kauri-gum could be used satisfactorily, especially in the manufacture of bombs, but it does not appear to have any advantages over ordinary resin, which is only £25 per ton, and should be readily procurable from Norway and Sweden if not from the United States.

"J. S. MACLAURIN, Dominion Analyst."

It is interesting to note in regard to sample No. 1 that it was a dust of the finest particles, about the consistency of ordinary wheat-flour.

KAURI-SWAMP TIMBER.

During the past year Dr. MacLaurin has continued his investigations with the object of ascertaining the proportion of gum contained in the swamp timber, and with a view to evolving some economic process of extracting the gum. Special attention has been given to the class of timber called by the digger "corned beef." This consists of roots, knots, and odd pieces thickly encrusted with gum. The digger usually removes any gum that can be easily chipped off and then casts the wood aside.

It will be seen by the following report that the results already obtained by Dr. MacLaurin are very encouraging, and fully justify further investigations being made.

"Wellington, N.Z., 19th April, 1916.

"REPORT on specimen No. F/919 (1-2), forwarded by the Kauri-gum Superintendent, 12 and 13 Warwick Chambers, Queen Street, Auckland. Particulars: Kauri-swamp timber, received in August, 1915.

"Your letter of advice stated—'No. 1 contains pieces from the field; No. 2 contains small knots and bark from the gum-sorting shed, known as "corned beef" by the sorters.'

"No. 1 consisted of fairly large pieces of timber without any adhering gum. Before timber of this kind could be successfully treated by an extraction process it would require to be reduced to a fairly fine state of division, which would largely increase the cost of recovering the gum. It was therefore thought advisable to defer the investigation of such timber until the much more promising material, such as No. 2, had been thoroughly tried.

"'No. 2, corned beef,' consisted of knots and bark. It weighed 23½ lb. The bark and most of the adhering gum were removed from the knots by hammering. The knots after this treatment weighed 9½ lb. and were rejected. The bark, &c., removed from the knots was ground to a fairly fine powder, a portion of the harder bark which did not grind readily being rejected. The ground material weighed 12½ lb. Portions of it were extracted with a suitable solvent and approximately 30 per cent. of extract obtained. This is equivalent to 16 per cent. on the original 'corned beef.' The extract is contaminated by substance other than kauri-gum, dissolved from the bark, but I think it may be possible by modifying the process to obtain a very much purer extract.

"I consider the results obtained are very encouraging, and I intend to continue investigations along these lines.

"J. S. MACLAURIN, Dominion Analyst."