softer sorts shipped from Singapore are crop gums for which the trees are cut or tapped. In consequence of the melting-point being low, besides other and technical objections, these resins are unfit for use in making oil varnishes. The botanical source of the Manila copals is unknown, but we are inclined to think they are exudations of trees belonging to the natural order Dipterocarpeæ, and perhaps to some species of *Dammara* or closely allied coniferous plant. Commercially they do not hold the position in esteem or value of other fossilised resins.

Pages 46 to 53: Kauri.—Fifty years ago the kauri-gum of New Zealand was practically unknown; it therefore says much for the enterprise of the colonists that they have brought to such perfection in so short a time the collecting, cleaning, and sorting of this important product as to command a supremacy of the market. There is, however, we fear, a shadow to this pleasant picture, and, as it is as well sometimes to anticipate disaster, it behoves those interested to consider what the position will be when the kauri-fields begin to give out; for the excessive production stimulated by the ever-increasing demand is without doubt rapidly exhausting the known sources of supply. If it were not akin to heresy to make such a proposition, one would be inclined to suggest that the colonists should place an export tax on the gum. No other fossil resin could take its place, from a peculiarity it possesses (entirely its own) of assimilating with oils more readily and at an easier temperature than any other gum, not excepting those of a lower melting-point. The Manila copals enter largely into competition with kauri, but, as we have already stated, they are treacherous in use, and mostly contain strong acids and other objectionable substances, thereby upsetting all theory and practice, and resulting in injury to the manufactured article and regret to those who employ them. Kauri-gum is the product of the *Dammara australis*, and the quality is very diversified. The range of value in kauri is perhaps wider than in any other kind, so that consumers may choose qualities at prices from £20 to £300 per ton. There is a great variety of colour, from dark, almost black, to clear white, invaluable for certain kinds of varnish. Kauri is used by the leading makers of varnish in every country where made. This universal favour we by no means attribute to the superior results to be obtained by its use, but rather to the fact that it is easier to manipulate—that is, it unites with linseed-oil quicker and at a lower temperature than any other resin. It is probable that the essential oil it contains acts as a solvent; hence carbonisation is minimised, and a paler varnish is produced. The exports of this gum amount to 8,000 tons per annum, of which more than one-half is used in the United States of America. The specific gravity ranges from 1·070 to 1·080, and the loss by distillation in the process of manufacture from 15 to 25 per cent. The melting-point is fairly high, varying from 360° to 460° Fahr.

Pages 54 and 55: Gum damar.—The white damars of Batavia and Sumatra are employed only in the manufacture of colourless spirit or turpentine varnishes, and are commercially of three varieties—viz., the Batavian, from Java, and the Singapore and Padang, from Sumatra. The Batavian is the most valuable, on account of its perfect colour and freedom from yielding a milky solution when dissolved. They are the exudation from the *Dammara orientalis*, the trees being regularly cut for supplies. Their melting-point is about 260° Fahr., and specific gravity about 1·80. Several descriptions of dark and black damars are collected in India by making vertical incisions near the base, fire being set to the tree, and the resin allowed to melt and accumulate. These gums are obtained from the sal tree (*Shorea robusta*), the piney-varnish tree (*Vateria indica*), and probably other allied plants. The black or Kola damar is collected chiefly in the Tinnevelly district, from the *Canarium strictum*. All are of a very low melting-point, freely soluble in turpentine, and consequently useless in the manufacture of oil varnish. Indeed, they are commercially unknown in Europe, where they would have the value of common resin. The Natives of India largely employ these damars in the manufacture of bottle-wax and low-grade turpentine varnishes.

Page 56: Mastics.—Strictly speaking, neither mastic nor the damars can be placed in the category of fossil or semi-fossil resins; but, as they are indispensable for certain special purposes, they are worthy of mention among the varnish-gums. Mastic, the exudation of the mastic or lentisk tree (*Pistachia lentiscus*, natural order Perebinthaseæ) is a recent or crop gum. The best and palest qualities come from the Island of Chios. Considerable quantities of the finest kinds are consumed in Turkey and the East for beautifying the teeth. Small parcels of inferior and yellowish quality reach this country from Morocco and other places in the Mediterranean. It is in limited demand in Europe for making a colourless varish used by artists to preserve oil paintings, &c.; and, as the resin is readily soluble in alcohol or turpentine, its varnish can with facility be removed when discoloured by age or dirt.

Pages 57 and 58: Conclusion.—Although small shipments of so-called bastard animis and copals arrive from districts new to the English markets, the foregoing constitute principally the list of resins used in making oil and turpentine varnishes. The mistake with first consignments of any new description is that the resin is collected from the trees themselves, or from the immediate surface, instead of some few feet below the surface. Consequently we receive new and soft gums, useless and valueless for varnish-making, instead of hard and fossilised kinds, for which there is always a demand. Generally we are inclined to think that the degrees of hardness should be the principal consideration in estimating the commercial value of all resins, and as a rule it might be taken that, the higher the melting-point, the older and more fossilised is the gum. We conclude with thanks to Mr. John R. Jackson, Curator of the Museums at the Royal Gardens, Kew, who has kindly furnished us with such information on the subjects as the gardens afford.

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