

higher grades were sold at from £200 to £240 per ton, but, owing to chemical defects when used for varnish-making, it now only sells for a little more than half these figures. This gum has a light specific gravity—viz., 1.030, and melting-point 450° Fahr. Although a weak gum, the writer thinks well of its practical utility, and regrets that larger and more regular supplies are not forthcoming.

Pages 30 to 37: The copals.—The term “copal” is the generic name given originally to any fossil resins; and consequently those kinds shipped from the west coast of Africa, south of Guinea, bear this name, although they are in character more closely related to the animis of the east coast. Benguela and Angola copals are the most valuable of the west coast varieties. Their botanical source is a matter of doubt. These resins are known to the Natives as “ocote cocoto” or “mucocoto,” and are collected chiefly by the Bunda Natives. These gums are found in the first terraces of a range of mountains running parallel to the coast, and extending from the River Faïre on the north to Cunene on the south; while, as to the width, it narrows to a few miles or broadens out to fifty or more according as the mountains recede or approach the coast-line. The whole region, except where traversed by rivers, is an arid desolate sandy waste. It is a matter of uncertainty whether the tree that produces this gum is still in existence or not. These gums are collected by Natives with crude tools, and disposed of to European traders. From this coast pieces larger than 1 lb. are seldom met with. The gum is generally covered with a thick white coating, and one particular description of Angola has a fiery red incrustation probably due to oxidation, and the character of the soil. All have pronounced facets resembling the “goose-skin” of the Zanzibar animi. We consider them excellent, and the nearest in value to the Zanzibar kind of all the fossil resins known. They have a high melting-point of from 425° to 475° Fahr., and a specific gravity of 1.068.

Pages 38 to 42: Sierra Leone copal.—Sierra Leone copal was known as far back as 1678, when Barbot found some fragments on the beach which he thought was ambergris. The principal producing district is a limited one, extending about two hundred miles north and west of Sierra Leone. Unlike the majority of the varnish gums, it is now regularly taken from the tree (*Copalifera Guibourtiana*). This gum is called by the Natives “thobo,” and is used by them as a remedy for sores and ulcerations, and also as a glazing for earthen pots, &c. The annual gathering of the gum-crop takes place about the end of March, the bark being cut and the gum collected. A strong coating is found on the old gum, which is extremely hard to move, although on the coast some rough attempt is made at cleaning by agitation in a lixivium prepared with the ashes of dry plantain and other stems. A special copal from Sierra Leone, known here as “pebble copal,” is gathered from the beds of rivers, being washed from the mountain-slopes by the periodical rains. Sierra Leone copal is considered a valuable gum, and the imports amount to nearly 500 tons per annum. It is to be regretted that fields of earlier origin are not searched for, as with larger and more regular shipments the consumption would doubtless increase. The melting-point, about 360° Fahr., we do not consider a high one, and from its extremely pale colour and freedom from acid this resin is particularly adapted for some special descriptions of varnish. The specific gravity is about 1.068, and value from £60 to £120 per ton. Copals from Accra, Congo, Gaboon, and Loango occasionally reach England, but they are little known, and are received with such caution by manufacturers that a fair market is hardly open to them. That there are large districts in Africa containing untouched deposits of fossil resin is beyond doubt, for Sir Alfred Maloney, Governor of Lagos, has given particulars of a large district containing a fossil resin called by the natives “ogea,” and Mr. James Heathcote, of Inhambane, East Africa (who was searching for the body of Captain Wybrant), discovered a tract of copal forest two hundred miles long, and collected six tons; but we never heard what became of it—it certainly never reached England as Inhambane copal. The Native names given to this copal are “stakate” and “staka,” and the Zulu name “inthlaka.” The field of supply is a hundred miles inland, and owing to difficulty of access it is unprofitable to open it up.

Page 43: South American copals.—In some parts of South America there are doubtless large undeveloped fields of fossil resins, as shipments arrive from time to time; but the supply is irregular, and varies in quality. It is said that there are trees still producing copals, which may account for the soft and mixed character of consignments. Were digging in old forestal ground resorted to, a much more valuable quality might be obtained. Several kinds of *Hymenaea* and *Leica* are reported to be the parent trees of these gums; but we think it is hardly to be doubted that they originate from the first-named genus, and principally *H. Courbaril*.

Pages 44 to 46: Manila copals.—The above includes all the Asiatic fossil resins at present known. Some of these are peculiar in themselves, resembling no other in appearance or character; others are so like New Zealand kauri that it is almost impossible at sight to distinguish them, the greatest adepts being able to do so by the sense of smell only. There are no fossil resins that require more care in buying and using. Some are so soft that they are little better than ordinary resin; others so hard that it is difficult to melt them; while they all have some tricky characteristic that causes trouble to manufacturers, even months after the varnishes are made. Although called Manila copals, from the fact of Manila being the port of shipment, there is actually no copal produced in the Philippines: the gums really come from other parts of the Malay Archipelago, the best from the Girantalo district of Borneo, and the worst from Ternate. These copals are mostly used in Germany. The largest sales are held in Amsterdam. The sorting and cleaning at port of shipment are all that can be desired, and they are well packed in cane mats or small cases of native make. It is hard to obtain any information concerning the producing districts or method of collecting, but, as gum-pits are spoken of, we may assume that the hard sorts are found some few feet below the surface, and under similar circumstances to the kauri of New Zealand. Many kinds have a tolerably high melting-point—viz., from 375° to 400° Fahr., with a specific gravity of about 1.70. These qualities are useful for certain grades of ordinary varnishes. Some of the