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# Damar in the Pasar of Manado, North Sulawesi

A Search for Resins in an Indonesian Market

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In the summer of 1997 I conducted a short research project which consisted of the collection of commercial tree resins[1] (damar) in the markets (pasar) of Manado, North Sulawesi, Indonesia. The objective of the study was simply to determine the local name(s) (Indonesian as well as local), intended use(s), and perceived source(s) (botanical, geographic and/or ethnic locality) of each specimen. Upon successfully completing that phase of the project, I returned to the University of Hawai'i at Manoa where I conducted a follow-up library investigation of the data I had gathered. Results from both phases of this on-going research are provided here together with a synthesized version of my fieldnotes.

## Introduction

As raw materials, resins have played a role in most cultures.[2] This is true for three principle reasons. First, they occur in a diversity of enviroments and are, therefore, accessible to the many people who use them. Second, on the whole, they travel and preserve well. The same properties which allow them to protect plants also allow them to be packaged and transported long distances without harmful effects. The third and most important reason for their ubiquity in the

material culture of the world is their extensive array of functional attributes. Adhesiveness, insolubility in water, inflammability, healing and poisoning properties, fragrance, plasticity, vitreosity, colorability, and pigment mediability are qualities that apply, to a greater or lesser degree, to all resins.[3] "Taken altogether, the employment of resinous substances has been exceedingly varied and extensive from time immemorial."[4] Thus, this class of raw materials is deserving of far more attention than it has received in the anthropological literature.

The western third of the vast and diverse floral region known as Malesia,[5] situated on the Sunda Shelf and including the major landmasses of Sumatra, Malaysia, Borneo, and Java, houses a rich dipterocarp tropical rainforest which is particularly abundant in resiniferous trees. Resins have long been known to be a significant resource there.[6] Intra-regional trade in resins, collectively referred to as damar, may date back to Neolithic times.[7] Recent historical and anthropological studies have gone on to suggest that an interdependence based on trade of certain resins between interior and coastal entrepôt settlements may have even contributed to the development of complex societies in Southeast Asia. As a resource, resins were not only valued by the locals, but also by peoples living some distance away. The Chinese in particular were willing to pay high prices for many kinds of aromatics and drugs, such as frankincense, asafoetida, benzoin, and gaharuwood (which in good-quality pieces contains more resin than wood).[8]

Although there is only scant evidence in the Chinese and Arabic sources concerning either volume or the profitability of the trade in damar before the sixteenth century arrival of the Europeans to Southeast Asian waters, it is clear that damar was in great and constant demand throughout Asia and that trade in them remained highly lucrative even at times when political and economic circumstances at one or more points in the Asian trading network were adverse.

A major shortcoming of ancient texts which contain data concerning Southeast Asia and its people, and recently written histories based on those texts, is that they often neglect, due to their reliance on second or third-hand reports, a view of certain processes from the local perspective. Although there are references in the ethnographic literature to resin use in many regional contexts, the data are fragmented and dispersed.[9] Therefore, if further progress is to be made, an investigation which focuses on contemporary resin use in Southeast Asia is required.

## Damar in the Pasar: Method in Manado

While any successful ethnological study of a culture needs to focus in particular on one or a few aspects of that culture, often the focus is on a domain of culture (kinship or political economy) which is likely to be central to its social organization. The study of resins in the material culture of an area offers a means of reflecting other aspects of culture: for example, the economic and symbolic. Any adequate investigation of resin use--in trade, traditional medicine, ceremony and asssociated ideology--inevitably requires a knowledge of the larger system within which these processes occur. As a research topic, the pasar provides valuable access to a number of issues relating to the local system: the structure of goods offered, the typology of traders, the enterprises, the customers, even the economic and social organization of trading, market prices,

credits, selling and buying strategies, the communicative and cultural aspects of the market-day, and so forth. For the purposes of this study, which focuses more on the identification and uses of resins than on markets, the pasar provided a uniquely local environment for the collection of cultural data.

My project, specifically, was to collect a set of damar specimens in the pasar of Manado. Each item in the collection was to be labeled with its local name(s), intended use(s), and perceived source(s). A condensed version of my fieldnotes are provided below. They are based entirely on information gathered in the pasar of Manado. Information gathered from a post-field library investigation has also been provided so as to relate the data to a wider ecological, cultural and historical context. Where the name of a substance is given in parentheses, this represents the local (i.e., Malay and/or Minahasan) word for the substance (as opposed to the standard Indonesian).

## Results

Pasar Ikan Tua

Damar dari Lolak

description: a long (16in.) stick of hard, dark resin wrapped in a yellow coconut leaf.
use: For calking boats.[10] The damar is mixed with coconut oil until it becomes a gel and is used to fill seams between planks of wooden boats
source: Gathered in the village of Lolak[11] by local farmers.
price: Rp 250 per stick.

Damar Kayu Ting

description: Redish oleo-resin.
use: For tanning nets. White nets are dyed red so that fish will not see them, thus tricking the fish to swim into the net.
source: From bark of the *kayu ting* tree which grows along the coast.
price: Rp 250 per stick.

The substance is most likely a product of mangrove swamps which occur along the shoreline. Mangroves have long been known as a source of tanning materials in western Malesia. Burkill mentions several species of tree producing a resinous bark used for tanning fishing-nets. The bark of Eugenia palembanica, for example, was used for tanning nets and caulking boats in Penang, and the oleo-resin minyak keruing was used throughout Malaya (in combination with Melaleuca bark) for caulking boats, coating wood (as protection from weather), making torches, and for medicinal purposes.[12]

Damar Turi

Description: Opaque gummy resin.
use: For strengthening fishing nets. Fishing nets are coated directly with the damar with resists deterioration and increases the net's durability.
source: From the bark of turi tree (pohon turi)
price: Rp 250 per piece.

Pasar Bersehati

Damar Kuning
description: A clear/yellow piece of glass-like resin containing several impurities.
use: (1) to fasten knife blades onto wooden handles, (2) to coat and seal earthenware pots,[13] and (3) as an *obat* (traditional medicine) to treat "allergies."
source: Gathered in Gorontalo[14] by local farmers.
price: Rp 250 per piece.

For gluing surfaces together, a range of plant substances have similar adhering properties as some resins and are sometimes avaiable and used by preindustrial peoples; however, except for latex, these alternatives are water-soluble (as opposed to resins which are not). Resins are used as a prime material for hafting points and blades,[15] and for gluing pottery appliques[16] in many parts of the world, including Southeast Asia. They have also been used to coat, seal, and waterproof containers of all kinds, including earthenware pots, in Europe,[17] Egypt,[18] North America,[19] South America,[20] and Southeast Asia.[21] Damar has long been used throughout the Malay world as an adhesive agent in the making of kris daggers, and is often included as part of the rituals and complex mystical ideology associated with the kris and the kris-making ceremony.[22]

Toko Utama

Damar Mata Kucing (Damar Kuning)
description: Small, yellow pieces of fossilized resin, sold in packets (with some sediment).
use: An obat (traditional medicine) to relieve pain after childbirth. source: Gathered by "Dayak people" in East Kalimantan.
price: Rp 100 per packet.

Damar mata kucing, literally translated as "cat's eye resin" is a clear to yellow crystalline resin produced by certain dipterocarp species such as Hopea (including H. dryobalanoindes Miq. [Malaysia, Sumatra, Borneo] and H. celebica Burck. [Sulawesi]) and Shorea (including S. javanica K. and V. [Sumatra], S. lamallata Foxw. [Malaysia, Sumatra, Borneo], S. virescens Parijs [Borneo, the Philippines], S. retinodes Sloot. [Sumatra], S. guiso (Blco) Bl. [Thailand, Malaysia, Sumatra, Borneo, the Philippines] and S. robusta Gaertn. f. [India]). It is obtained by tapping the tree and is mostly produced in South and West Sumatra and West Kalimantan. In South Sumatra, damar mata kucing is often obtained from Shorea javanica agroforests (kebun damar). According to Gimlette and Thompson, damar mata kucing is used as a treatment for loss of virility among Malays and also as a topical in the early stages of leprosy. The damar is

pounded and mixed with coconut oil before it is rubbed into the patient's skin.[23]

Jadam (Damar Hitam)
description: Small, dark pieces of glass-like resin sold in packets.
use: An obat (traditional medicine) in the treatment of certain allergies.
source: Saudi Arabia.
price: Rp 100 per packet.

Jadam is an extract of Aloe vera (Linn., var. chinensis): an herb of African origin which spread by cultivation throughout the tropics. According to Burkill, "the Malays rely for medicine on the imported extract" rather than on the cultivated plant. It is also known as jadam arab, in confusion with myrrh. [24] The name clearly indicates the source, as the extract is carried eastward, and probably has been so carried through the whole period over which Persian and Arab dhows have sailed the Indian Ocean. Laufer in his Sino-iranica explains how the Chinese, during the Tang Dynasty (618-907 C.E.), received both aloe-extracts and myrrh via western Malesia and erroneously assumed that both were produced in western Malesia.[25] Jadam is noted as being used in Malaysia to treat wounds and swelling of the abdomen after "confinement." In Ambon it is mixed with sugar and taken for asthma; for coughs, poulticing burns and on the forehead for headache in Java; in India for poulticing boils; and in the Philippines it is applied to contusions. M. Grieve notes in A Modern Herbal that preparations of aloes (e.g., jadam) are rarely prescribed alone, but rather require the addition of carminatives to moderate the tendency to "griping."[26] Gimlette and Thompson note several preparations of jadam in which asafoetida [27] and sandal-wood are used.

Inggu (Tai Setan)
description: Small, tears of reddish-brown, strong-smelling resin.
use: An obat (traditional medicine) for the treatment of (1) high blood pressure in men, (2) mata tinggi (epilepsy?) in children below the age of five (anak balita[28]), and (3) nuisancing evil spirits (burned as a fumigant).
source: India, from pohon inggu (inggu tree).
price: Rp 2000 a portion.

According to Gimlette's Dictionary of Malayan Medicine, Inggu (sometimes hinggu[29]) is the Malay word used to refer to asafoetida, a fetid oleo-gum resin obtained from the roots of plants of the Ferula family which are indigenous to "Persia, Afghanistan, and the Punjab." The word "inggu" comes from the Persian word "anghozeh," or as Wolters suggests, from the Iranian word "angu" or "angwa,"[30] and in Hindi it is often referred to as "hing." The English word "asafoetida" is derived from the latinized form of the Persian "aza" or mastic plus "foetida" which is the feminized form of "foetidus," meaning ill-smelling or stinking. In Manado, as in many other parts of the Malay world, it has acquried the name "tai setan" (devils dung). Gimlette notes that "the product is imported into Malaya via Bombay in masses composed of dull-yellow tears set in a darker-colored softer gum resin...the medicinal properties depend upon the presence of a volatile oil which contains oil of garlic...in English medicine asafoetida is prescribed as an adjunct to aloes and as a stimulant to the intestinal muscles." Gimlette writes that the Malays

give inggu in pill form (coated with flour to mask its foul taste) for amenorrhoea which is associated with chronic constipation, and as a the purgative given for megrim. For sakit pedas hati (heartburn), inggu is mixed with air limau nipis, the juice of the common, green, thin-skinned lime. For external uses, it is combined with cloves and yellow sandalwood in a paste used to induce sweating in fevers. It is also applied to the gums for aching teeth accompanied with bleeding and suppuration.[31]

Kemenyan Api (Kamania)

Grade A
description: Dark grey, rock-shape with impurities and sediment.
use: (1) Catholic church ceremonies: (a) in the remembrance of the birth of Jesus Christ, (b) in funerals and other rituals honoring the dead. (2) Burned in the mesjid (mosque) before prayer.
source: Sumatra
price: Rp 1500 per piece.

Grade B
description: Similar to Grade A but more glassy and of a lighter color.
use: Same as Grade A but less formal due to inferior quality
source: Sumatra
price: Rp 1000 per piece

Grade C
description: Whitish tears embedded in a matrix of reddish-brown resin. [32]
use: By "opo-opo" (indigenous "priests" or "shaman") to create an environment conductive to "spiritual activity".
source: Sumatra
price: Rp 750 a packet.

All three of these substances I believe to be benzoin, a balsam obtained from trees of the genus Styrax. There are two types of benzoin in Southeast Asian commerce: Siam benzoin from S. tonkinensis and Sumatra benzoin from S. benzoin. Burkill notes that Sumatra benzoin is divided by gatherers into three grades and mentions a kind which when broken glistens more than the others and is less scented, known as "Penang benzoin" (grade B), and another kind called "Palembang benzoin."[33] In Indonesia, Sumatra benzoin is called frankincense, although in English this term is usually taken to mean the resinous exudate from Boswellia spp. of Arabia and Africa. Wolters suggests that by about 500 C.E. western Indonesian benzoin was regarded in southern China as a substitute for myrrh (Commiphora mukul Engl.),[34] known in Sanskrit as guggulu and in the classical world as bdellium. A study of the use and trade in the ancient old world of frankincense and myrrh highlights the important role these resins have played in religious ceremonies around the world. Valued as precious commodities, they were offered as gifts to honored personages: in the Bible frankincense and myrrh were two of the gifts the wise men of the East brought to the infant Jesus.

In association with concepts of purity and pollution, incense resins play a major role in purification rites and customs of nearly all religious practices. Incense smoke is used for these purposes because of the transforming powers of fire, as well as the seemingly purificatory powers of sweet smells. Because its fragrance is thought to be pleasing to the gods, incense has played an important role in worship and is used in prayer, intercession, or purification ceremonies. In Manado/Minahasa, local opo-opo use "Grade C" kemenyan to attract the attention of, or establish a connection with, a deity and also to exorcise evil or harmful forces. The red color of the incense is reportedly what gives it its "magical" power. Based on what what I heard in the markets and elsewhere in Manado/Minahasa, the mystical opo-opo rituals are still widely practiced throughout Minahasa, particularly in the area of Tombulu.[35] In Minahasa, the local shaman can be recognized by the red sashes worn around their waist. The sympathetic practice of attributing spiritual "potency" to the color red in Minahasa is an interesting subject worthy of follow-up investigation. It is interesting to note also that in Manado, which is predominantly Christian, the "same" kinds of resin are used in Catholic, Muslim, Chinese Buddhist/ Confucian/Taoist, and indigenous religious practices, often in similar application (death rites and/or ancestor worship).

*Pasar Touminting and Pasar Paal II*

**Kemenyan Api (Kamania)**
description: Same as Grades B and C from Toko Utama [36] but smaller portions.
price: Rp 250 a packet.

**Damar Kuning**
description: Same as *damar kuning* found in *Pasar Bersehati*.
price: Rp250 a packet.

**Dupa Mekah**
description: Small, granular pieces of amber-colored resin.
use:As incense with no apparent ceremonial purpose.
source: Originally from Mecca. [37]
price: Rp500 a packet.

*Toko Besi (Iron Shops) in Tomohon and Manado*

**Damar Batu**
description: An orange-colored, stoned-shaped resin, solid (hard) with some residue.
use: For making varnish and for soldering and metallurgy.
source: Sumatra.
price: Rp750/oz.

Most of the resin used for varnish making in Indonesia is obtained from Pinus mekusii, which grows in abundance all-over North Sulawesi. The pine resin is usually collected and shipped to Java for processing, and local use of it is minimal. Some local use of "raw" resin as varnish

occurs in Minahasa, such as with this "damar batu" found in the iron shops. This kind of resin is used in conjunction with processed varnishes in cottage furniture industries found in Minahasan villages, such as Lelem, where it is use to cover nail holes/heads and gaps in newly built wooden furniture. In Central Asia,[38] Central America, and elsewhere resin has been used as a flux in metal-working although this would be more because it is an organic substance that can react with oxides that form on the surface of metals when heated.

## Conclusion

Most of the data gathered in the pasar of Manado concerning the names, uses, and sources of certain resins seems to correlate with information found in other textual sources concerning western Malesia. It should be noted, however, that North Sulawesi is not part of the same botanical zone (i.e., western Malesia), but rather lies to the east of the Wallace Line, an imaginary border which marks a clear distinction between the respective flora and fauna. Most of the resins I found were not produced in North Sulawesi; rather they came to the area from outside sources. The presence of these resins seems to suggest the existance of what once must have been a very active inter-island trade in resins and resin culture which seems to have declined with the onset of "modern" technology and development. It seemed more likely that I would find damar from Pinus merkusii, which grows in abundance in North Sulawesi and is often exploited by Javanese businessmen who extract it via local farmers and ship it to cities in Java for processing to make varnish and paints. A study of these historic and present-day trade links and trading networks would certainly provide a fascinating study of inter-state activity and how culture spreads.

The most-commonly reported use for resins in Manado was undoubtedly as an obat in the "traditional" medicine system (obat makatana). Apparently, the obat makatana system employs many resins and other tree "exudates" which are not sold in markets but, rather, are obtained directly from the botanical source. The collection and use of commercial and non-commercial resins in Minahasa, particularly as medicinal technologies, is something I would like to explore more deeply in the future. Also, a study which compares the functional properties and attributes of resins in nature to their corresponding uses by humans would be an interesting topic for study as well. For instance, one or more of the "non-commercial" plant exudates in Minahasa can be used to heal wounds or punctures in human skin much like the resin "heals" the "wound" inflicted by tappers to the bark (kulit) of a tree. This stretching analogous investigation might also consider the role of resins in the marketplace (both local and global) which have continually "resisted deterioration" in terms of demand through the millenia, much like they "resist decomposition" in nature.

The most fascinating and, by far, the most confusing aspect of resins concerns the issue of names, terms, and classification. The long commercial history of resins in the Malay world resulted in long-distance adulteration and corruption of terms and, sometimes, of the products themselves. This in turn led to frequent mis-naming and false identification of substances: sometimes for the sake of making a sale, other times to make up for depleted (or no longer available) sources.

A good example of the general confusion that can arise when talking about resins and their names in different places can be found in O.W. Wolters monumental work on early Indonesian commerce.[39] In his chapter on "pine resin," I believe that Wolters was mistaken when he said that resin from Pinus merkusii was substituted for frankincense (from Boswellia spp.) in trade with China. He is almost certainly correct in asserting that substance a was substituded for substance b, and that these were referred to as "pine fragrance" and "frankincense," respectively. There is very little evidence, however, supporting the use of Pinus mekusii resin as incense anywhere. I believe that the "pine fragrance" the Chinese (and Wolters) were referring to was, in fact, benzoin which is obtained from Styrax spp. trees in Sumatra (and "Siam"/Laos), not from pine trees. Furthermore, his assertion that benzoin may have been used as a substitute/ replacement for "guggulu" or myrrh (from Commiphora spp) may be slightly mistaken as well, mainly because of the names. "Guggulu" is not myrrh but, rather, a type of frankincense which in India is known as "salai guggul" (from the Boswellia serrata Roxb.). Basically, Wolters was right about the fact that frankincense and myrrh (from Commiphora mukul Engl.) were substituted with western Indonesian substances, but the term "guggulu" should be applied to frankincense, not myrrh, and the source of the "pine fragrance" was not a Pinus (which grows in much more abundance in eastern Indonesia) but perhaps a Styrax (which is found in western Malesia).

I may be guilty of contributing somewhat to this confusion with my less-than-precise use of the term "damar" (as a catch-all term for resins of the Malay world). Nevertheless, the thought of producing a comprehensive study which aims to clarify the general confusion and lack of specificity involved in dealing with substances such as frankencense, myrrh, benzoin, pine resin, gaharu, aloes, etc., is something that deserves consideration, and is a topic that I intend to continue to pursue.

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## Notes

1 The idea to look for tree "exudates" in the pasar of Manado came from Dr. Michael R. Dove who served as research advisor to the project and provided the funds with which the fieldwork was carried out.

2 Thomas Hedley Barry, Natural Varnish Resins (London: Ernest Benn, 1932); F.N. Howes, Vegetable Gums and Resins (Waltham, Mass: Chronica Botanica, 1949); Ernest J. Parry, Gums and Resins: Their Occurrence, Properties and Uses (London: Pitmann, 1920).

3 Rosemary Gianno, Semelai Culture and Resin Technology (New Haven: The Connecticut Academy of Arts and Sciences, 1990).

4 Karl Dieterich, Analysis of Resins, Balsams, and Gum Resins, and Their Chemistry and

Pharmocognosis: For the Use of the Scientific and Technical Research Chemist (London: Scott, Greenwood, 1901), 23.

5 I.H. Burkhill, A Dictionary of the Economic products of the Malay Peninsula, 2d ed. (Kuala Lumpur: The Ministry of Agriculture and Cooperatives, 1966).(London: Crown Agents for the Colonies, 1935); Museum voor Technische en Handlelsbotanie, Bogor, Java). K. Heyne, De Nuttige Planten van Nederlandsch Indie (Batavia:Ruygrok, 2 ed. 3 vols. 1927): D.G. Moon, "Development of Naval Stores and Pulpwood Supplied from Pinus Mercusii of Northern Sumatra" in Science and Scientists in the Netherlands Indies, eds, P. Honig and F. Verdoorn (New York: Board of the Netherland Indies, Surinam and Curacao, 1945).

6 Malesia is a plant-geographical term developed to cover the Malay Archipelago, the southern portion of the Malay Peninsula, New Guinea, and, to a lesser extent, the Solomon Island. see M. Jacobs, "Botanical Panorama of the Malesian Archipelago (Vasular Plants)" in Natural Resources of Humid Tropical Asia (Paris: UNESCO, 1974): 263-9.

7 F.L. Dunn, Rain-Forest Collectors and Traders: A Study of Resource Utilization in Modern and Ancient Malaya, Monographs of the Malysian Branch of the Royal Asiatic Society (Kuala Lumpur: Malaysian Branch of the Royal Asiatic Society, 1975), 120-37.

8 Paul Wheatley, "Geographical Notes on Some Commodities Involved in Sung Maritime Trade," Journal of the Malayan Branch of the Royal Asiatic Society: 32.2, 1959, 5-13; F. Hirth and W. W. Rockhill, Chau Ju-kua: His Work on the Chinese and Arab Trade in the Twelfth and Thirteenth Centuries, Entitled Chu-Fan chi (New York: Paragon, 1966).

9 H.N. Ridley, "Dammar and Wood Oil", Journal of the Straits Branch of the Royal Asiatic Society 34 (1900) 89-94; Walter William Skeat and C. Otto Blagden, Pagan Races of the Malay Peninsula (London: Macmillan, 2 vols. 1906); Nicholas N. Dodge, "The Malay-Aborigine Nexus Under Malay Rule", Bijdragen Tot de Taal-, Land-en Volkenkunde, 137, no. 1 (1982): 1-16.

10 Resins have been used to seal canoes and ocean-going wooden ships for centuries in many parts of the world, including Southeast Asia. See L. Basch and H. Frost, "Another Punic Wreck in Sicily: Its Ram," International Journal of Nautical Archaeology 4, (1975): 201-28; Harry A. Franck, East of Siam: Ramblings in the Five Divisions of French Indo-China (New York: Century, 1926), 98; Erna Gunther, Ethnobotany of Western Washington: The Knowledge and Use of Indigenous Plants by Native Americans (Seattle: University of Washington Press, 1973), 17; Russell Meiggs, Trees and Timber in the Ancient Mediterranean World (Oxford: Clarendon Press, 1982), 467-71; G.H. Monod, Le Cambodgien (Paris: Larose, 1931) 54-55; Lucien de Reinach, Le Laos (Paris: A. Charles, 1901), 50; Paul Wheatley, The Golden Khersonese: Studies in the Historical Geography of the Malay Peninsula Before A.D. 1500 (Kuala Lumpur: Oxford University Press, 1961), 322; John White, A Voyage to Cochin China (London: Longman, Hurst, Rees, Orme, Brown, and Green, 1824; reprint, Kuala Lumpur: Oxford University Press, 1972), 56-57.

11 Lolak is located in the neighboring Bolaang Mongondow regency.

12 Burkill, Dictionary of Economic Products , 838-39, 972.

13 In Minahasa, earthenware pots made from tanah liat clay (tana lilin in Manado Malay/ Minahasan) are produced in the village of Rembokan, located between Lake Tondano and Tomohon. In the final stages of the pot-making process damar is used to provide a waterproof coat and seal. This small production center and its traditional resin technology provides an interesting topic for future investigation.

14 Gorontalo is the name of the western-most regency in North Sulawesi. Various types of damar, in particular the resin from the conifer Agathis, are produced there,

15 Lewis R. Binford, "An Alyawara Day: Flour, Spinifex Gum, and Shifting Perspectives," Journal of Anthropological Research 40 (1984): 157-82; J.G.D. Clark, Prehistoric Europe: The Economic Basis (London: Methuen, 1952), 110; G.B. Gardner, Kris and Other Malay Weapons (Singapore: Progressive Publishing, 1936); Alfred Lucas, Ancient Egyptian Materials and Industries (London: E. Arnold, 1962), 12; Jens Yde, Material Culture of the Waiwai (Copenhagen: Nationalmuseets Skrifter, 1965), 78, 107.

16 Clark, Prehistoric Europe, 208.

17 Daniele Arroba, "Analisi Pollinica di una Resina Fossile Rinvenuta in un Dolia Romano," Pollen et Spores 18 (1976): 385-93; Clark, Prehistoric Europe, 276.

18 Lucas, Ancient Egyptian Materials and Industries, 27.

19 Lydia Wyckoff, "Hopi Ceramics of the Third Mesa: A Study of the Ceramic Domain" (Ph. D. diss., Yale University, 1985).

20 Warren R. DeBoer and Donald W. Lathrap, "The Making and Breaking of Shipobo Conibo Ceramics," in Ethnoarchaeology (New York: Columbia University Press, 1979), 120; Claude Levi-Strauss, "The Nambicuara," in Handbook of South American Indians (Washington D.C.: GPO, 1948), 365; S. Linne, The Technique of South American Ceramics (Gotesborgs: Flanders Boktryckeri Aktiebolag, 1925), 148-58; Yde, Material Culture of the Waiwai, 177, 182.

21 H. D. Conklin, Ethnographic Atlas of Ifugao (New Haven: Yale University Press, 1980), 31-32; Roy F. Ellen and I. C. Glover, "Pottery Manufacture and Trade in the Central Moluccas, Indonesia: The Modern Situation and the Historical Implications," Man 9, no. 3 (1974): 357-8; Ivor H. N. Evans, "Bajau Pottery," Sarawak Museum Journal 6 (1955): 287-300; George M. Foster, "Resin Coated Pottery in the Philippines," American Anthropologist 58 (1956): 732-33; William A. Longcare, "Kalinga Pottery: An Ethnoarchaeological Study," in Patterns of the Past: Studies in Honor of David Clarke (New York: Cambridge University Press, 1981), 49-66;

Theodore Stern, "Resin-Glazed Pottery in the Chin Hills, Burma," American Anthropologist 59, no. 4, (1957): 711-12.

22 G.B.Gardner, Kris and Other Malay Weapons, 85.

23 This method of preparation was often mentioned by those whom I had questioned in Manado. J.D. Gimlette, A Dictionary of Malayan Medicine (London: OxfordUniversity Press, 1939), 48.

24 Burkill, Dictionary of Economic Forest Products, 108-9.

25 Berthold Laufer, Sino-Iranica: Chinese Contributions to the History of Civilizations in Ancient Iran (Field Museum of Natural History, Publ. 201. Anthropological Series, 15, no. 3, 1919), 480; also see O.W. Wolters, Early Indonesian Commerce (Ithaca: Cornell University Press, 1967)141-42.

26 M. Grieve, A Modern Herbal: The Medicinal, Culinary, Cosmetic and Economic Properties, Cultivation and Folk-Lore of Herbs, Fungi, Shrubs and Trees With all their Modern Scientific Uses (New York: Dover Publications, 1959), 29.

27 This was also found in the same store which sold me the jadam.

28 The term "anak balita" is an Indonesian acronym for children (anak) "di bawa lima tahun" (lit. "under five years").

29 This word is used in West Java and other areas.

30 Wolters, Early Indonesian Commerce, 136-37.

31 Gimlette, 48.

32 According to the shop owner from whom I purchased it, this type of resin is treated with a chemical additive to produce a reddish tint.

33 Burkill, Dictionary of Economic Products, 2102.

34 Wolters, Early Indonesian Commerce, 111-127.

35 On July 13, 1997, I conducted an interview with the head of the provincial forestry department in Teling, Manado. He provided a detailed description of the opo-opo rituals that occur in Minahasa.

36 The owner of Toko Utama is the sole supplier of kemenyan and damar mata kucing in Manado.

37 The man who sold it to me said he got it from a friend who had brought it to Indonesia upon his return from haj (pilgimage to Mecca).

38 Laufer, Sino-Iranica, 340.

39 Wolters, Early Indonesian Commerce.