Principes, 38(1), 1994, pp. 36–46

African Bass/Piassava—A Historical Perspective

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Everyday objects and commonplace domestic utensils seldom stimulate enthusiastic enquiry and are rarely the subject of series study. The humble brush or broom is a typical example. However, the provision of natural brush fibers to meet a wide range of household and industrial applications has supported a major international trade in such materials, particularly since the middle of the nineteenth century. Notwithstanding the advent of plastic substitutes, there is still a considerable demand for the traditional natural brush-fibers and, in today's more environmentally conscious ambience, there is a growing movement towards the use of "friendly" products and ones that can be seen to support the economies of developing countries. The palms are a major source of brush-fiber, but here we will concentrate on the rise and decline of the West African trade, based on certain species of the genus *Raphia*, broadly embraced by the term "African Bass."

Brushes and Brushmaking

While this is not the forum to embark upon a detailed account of the complexities of the brush industry, nevertheless, some appreciation of the structure of the trade, past and present, is desirable to understand the role of this specific component of it. Radical changes in the craft occurred in Europe during the mid-nineteenth century (Kerby 1953). Prior to this time, there had been a sharp division between the Craft Guilds of the Brushmakers and the itinerant Broommakers, the latter typically gypsies and in the case of Britain, often Irish. The Brushmakers' Guilds claim to be one of the oldest trade unions and were well versed in the techniques of the "closed shop," price fixing and the usual gamut of restrictive practices. They were an early example of anti-feminist prejudice, excluding cheap female labor and heavily penalizing members who did not comply. Their working materials were primarily derived from animal hair and bristle, often stiffened with split whalebone. The itinerant Broommakers were free spirits, obtaining their materials without cost from the countryside and producing the traditional "Witch's Broom" or "Besom." Such brooms are formed by hand with a simple bundle of twiggy material tied about a central stake, and even today many gardeners still prefer them to the conventional brush for many tasks.

The Introduction of Piassava to Britain

The circumstances in 1843 under which a new and highly versatile vegetable brush-fiber became available to the trade are quite extraordinary, coinciding fortuitously with the expanding demands of the new industries and the rapidly growing population and cities. Prior to this period, there had been little interest in searching out new sources of supply. Despite the long period of European contact with the tropical world and familiarity with some useful fibers from those parts, particularly for marine cordage, sailcloth and the like, brush-fiber appears to have been of little account. A typical example is the Report to the Court of Directors of the Sierra Leone Company of 1798, where Afzelius, an eminent botanist of the period, had been employed to identify native products of potential commercial value. Fibers of any ilk were not even considered. As the nineteenth century progressed, however, it became increasingly apparent that current techniques and traditional materials could not meet demand.

The events are recorded with due sense of occasion by Kiddier in his "The Brushmaker and his Craft" of 1912. This work is most informative on the period but has been out of print for many years and copies are not readily obtainable. The author claims full authenticity for his account, having heard the story from his father, who, as a young apprentice Brushmaker, was present when the material was first offered to his Master, appropriately named Bass! At the time there was a thriving trade in sugar between Brazil and the Port of Liverpool. In the ships' holds, the cases

of sugar were protected on loading, by packing between them a locally abundant fibrous material. On arrival, as the cases were unloaded, this material was dumped on the wharves and often left there, much to the displeasure of the Liverpool Port Authority who, as the problem grew, insisted on prompt removal of the eyesore. I have not been able to trace the name of the "genius," as Kiddier hails him, with perhaps a degree of overenthusiasm, who first spotted the brushmaking potential of these undressed and probably unsavory smelling fibers. One can assume that he made a killing by charging for the removal from the docks and gaining a fair price for the product. Kiddier gives the date as 1843–44 in Loughborough, when Mr. Bass, not without a degree of suspicion, gained his first sight of the fiber and, after some cutting experiments on the neighboring butcher's block, invested in his first consignment. The travelling salesman involved assured him that the fiber was rapidly being taken up by the fraternity in "The North," presumably in the Liverpool area. So it would appear that the generally accepted dating of the early 1840's for the introduction of "Piassava" to Britain is about right.

It is now necessary to consider the origins and usages of the term "piassava" or "piassaba" by which this material came generally to be known. The name derives from "piaçaba" in Tupi, an Amerindian tongue, modified by the alternate "v" and "b" in Portugese, The name applies presumably to the fiber, and not the palm, *Attalea funifera* Mart., from which it is derived. When first introduced to the trade, it was described as "Bahia Bass," but it is significant that the term "piassava" was in common parlance almost immediately after, indicating that contact between Liverpool and the source in Brazil was rapidly established. Hooker (1849) uses the name, noting the value of this replacement for whalebone. He also comments on the admirable quality of the new brooms and the increase in cleanliness of the streets in the developing towns resulting from their use. Such was the demand for the new material that by mid-century a second Brazilian palm fiber, from *Leopoldinia piassaba* Wallace, was on offer on the Liverpool Exchange as "Para Piassava" or "Monkey Bass." This fiber was less hard-wearing than the original but softer and more flexible. Here the term "piassava" is applied as a trade name, being offered as a substitute for the original, the native name being totally linguistically dissimilar, "Chiquichique." Similarly, as we will pursue later, the term has been applied also where there have been other subsequent attempts to place competing palm fibers on the market, primarily from Africa and Madagascar. Other palm and natural brush-fibers, mainly of Asiatic and Central American origin with specific properties of their own, have tended to retain their native or trade names.

The use of the term "Bass" in the trade is of some antiquity and certainly predates the events of 1840's, although its use by the salesman added to the suspicions of our Mr. Bass. The fact that the word appears in reverse in "piassaba" is an odd coincidence, but its almost certainly a corruption of "Bast," the material obtained by stripping the outlayer of phloem fibers from dicotyledenous plant stems. Such strips were widely used in tying the twig bundles in besom making. The Victorian Brushmaker can be forgiven his being unfamiliar with the finer points of plant anatomy in equating the monocotyledonous vascular fibers obtained from the petiole and leaf base of the palm with a well known product.

So, what was so exceptional about the new fiber to engender such enthusiasm and so swiftly transform the craft? The basic construction of a brush involves the insertion of a tuft of fibers, with a pitch or other glue, into the drilled recesses of a stock of variable size and shape. These were either hand- or treadle-drilled, and there is an early reference in the records of the London Society of Journeyman Brushmakers, 1833, forbidding its members to sell drilled stocks to the itinerant "hawkers." The new fiber was of a length never before available that could be cut as required and easily worked by the old hand methods. The great gain, however, was the property of the fiber that permitted it to be folded, perhaps after hot water or steam treatment, and then staple punched into the stock, at first by hand but soon after by the new machines that were developed for the purpose. The fiber was hard-wearing, with the right balance between stiffness and elasticity to give a firm stroke to the brush combined with a self-cleaning reverse-spring action to the punched tufts. The fiber tended to shed water and surface dirt and was capable of taking up colored dyes and waterproof dressings—all-in-all, the near perfect brush-fiber for the outdoor, traditional, yard or stable broom. Even today, top grade, clean, selected Bahia Bass commands a superior place in the affections of the industry and usually a higher price than competing fibers, both plastic and natural, that have since emerged and despite the improved techniques of the manufacturer to blend and adapt the range of materials available to him.

It is, therefore, no surprise that for a period of some forty years, Bahia Bass, and to a much lesser extent (some 4–5% only) Monkey Bass, held a dominant position in the trade. In the 1880's, imports to Britain were running at the order of some 6,000 tons/pa priced at £15–£20/ton. A major industry in "fiber dressing" emerged, particularly around Manchester and Liverpool, the main port of entry, supplying clean, graded fiber to the brushmakers. The British brushmakers had a flying start, having first gained access to these fibers, and even today the traditional yard broom is known as an "English Broom" in parts of Continental Europe. Importation of the fiber, however, also rapidly expanded in mainland Europe, and towards the end of this period the strains were starting to show in the market, as demand began significantly to exceed supply. Overcutting and eradication of the palms was greatly reducing not only supply but also affecting the quality of the fiber. Transport costs within Brazil were increasing as the cutters were forced to move further and further inland. The price rose dramatically, much of the fiber was of inferior quality, and the brush industry was in serious trouble. To quote some prophetic words from Kiddier:

> Piassava had become an indispensable thing. The bass broom could not be done without. Though our grandfathers could put up with the besom we could not. So it is, when the new article affords more comfort than the old, a new need will grow. The new thing may be a luxury to begin with, but directed by the dealer, luxuries become necessities in the end. If the world but knew the secret we would live by one-half of what we now consume.

At this time of crisis, there was a clear market opportunity for any source of fiber that could emulate, if only approximately, at a reasonable price, the South American material. It is against this background, that we come to discuss the rise of the West African trade, the confusions that have arisen over the palms concerned, and the nature of the various fibers involved.

The Rise of the West African Trade

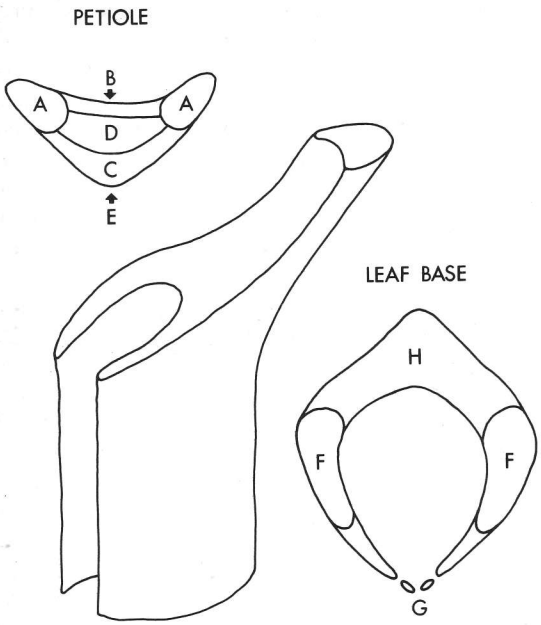
The first commercial shipment of African Bass has been attributed to the initiative of one J. H. Hugges, of Grand Bassa, Liberia in 1889–90. He is reputed to have been the first to recognize the potential of these fibers, well known and widely used in the local economies, as a serious competitor for the now failing supplies of South American piassava. Quite who this gentleman was remains to be elucidated, but there are precise references to him by name via the U.S.A. Consular and Trade Reports and the Consul in Monrovia in both the Kew Bulletin and L'Agric. Prat. Pays Chaude of 1910. However, as we shall see, his claim to fame is perhaps suspect. Interest in these fibers spread rapidly along the Coast at that time and, by 1901, regular shipments were being made, albeit on a modest scale, from virtually all the colonial territories concerned. The archives of the Royal Botanic Gardens, Kew, possess a copy of the poster issued in 1890 by Governor Moloney, at Lagos, calling the trading community of the town to the Customs House to view this new and valuable export commodity and the Kew Bulletin of January 1891 records an exchange of correspondence with the Governor on the topic. As early as February 1890, the Manchester buyers were actively seeking the fiber and were able to send a sample to Lagos, promising a good demand if a similar quality could be imitated and maintained. In October of that year, the first samples from Lagos arrived at the British Colonial Office, then in Downing Street, which were forwarded to Kew for appraisal. Kew in turn consulted one of the major commodity brokers in the trade, Messrs. Ide and Christie, who reported that they were familiar with this fiber and, somewhat surprisingly, that small importations had been made "some years ago." These however, had not been well received by the trade and they were far from enthusiastic regarding the prospects for the new samples, particularly when compared with Bahia Bass. However, almost immediately after this assessment, in a letter to Kew, only a fortnight later, they offer a modified and far more encouraging view. This arose from their attendance at an auction of recently arrived West African fiber which had attracted surprisingly high prices. This may well have been a reflection of the times and panic buying, given the state of the South American trade, as there are records of the first Liberian shipments into Liverpool in 1890 reaching the quite remarkable price of $336, say some £80/ton. It was now apparent that the new fiber, or as it emerged, range of fibers, while perhaps not fully matching the characteristics of the South American material, was nevertheless a reasonable compromise substitute.

From these modest beginnings, the trade in these fibers developed somewhat erratically, with numerous fluctuations in price and demand. The trend to the export statistics, however, shows overall expansion, reaching a peak during the 1950's

and early 1960's and a general decline subsequently. Liberia in the early part of this century dominated the market, largely in response to the high prices being obtained for the product and, by 1904, bass had superseded coffee as the leading export commodity from the country. In 1908, some 7,000 tons were exported, but quality was beginning to suffer and strong competition from other producers along the Coast and also from the South American trade, which was responding to this threat to their market, was forcing down the prices at auction. By 1910, Liberian bass was fetching only some £20/ton. Exports, however, continued, usually around some 3,000–4,000 tons per year, the major part latterly, going to the Netherlands. Nigeria, by 1910, was producing some 300 tons per year which rose to some 3,000 tons per year during the early 1960's and reaching a record 5,000 tons in 1966 at the onset of the Biafran War, Since then, exports have been substantially reduced (Otedoh 1975). Several other sources of supply along the Coast made modest shipments, the then Gold Coast for example, but there any prolonged effort gave way to the more attractive returns from the cacao crop. Prior to the 1914–18 War, the German colonies gained a good reputation for the quality of their fiber. Even The Gambia attempted to develop a foothold in the trade, but by 1918 only some 28 tons were exported and the marketing and processing facilities were in serious trouble (Dawe, 1921). Over the years, however, the dominant participant in the trade has been Sierra Leone, exports progressing from some 7 tons in 1901 to around 5,000 tons per year in the early 1960's, with a record 6,500 tons in 1964 (Martin 1928, Imperial Institute 1935). Numerous trade names became part of the market jargon, Grand Basssa, Junk River, River Cess, Sherbro, Sulima, Calabar, Opobo, Gabon and so on. These, however, tended to be related to the port or adjacent area of shipment rather than to specific differences in the product but, as the trade developed, certain of them gained a reputation for consistent qualities desired by the manufacturers. The export market was directed in the main part to Europe with some direct shipment to the U.S.A. Import statistics in Europe, however, give little indication as to the final destination of the fiber, as the port of arrival is merely indicative of which shipping line called more regularly at which West African port. Prior to relatively recent improvements in port facilities, access to the coast was notoriously difficult and typically involved lighterage by local dugout canoes through the surf, which for much of the rainy season was a hair-raising experience for anyone participating in the transit of goods and persons. Most boats concerned in trading with the Coast were especially built with very shallow drafts to permit as close an approach as possible in the estuaries. In consequence, as many travellers of the times recall, they tended to "roll like pigs" in quite modest swells, to the general discomfort of all on board, usually when crossing the Bay of Biscay. The Sulima bar in Sierra Leone adjacent to the Liberian border, for example, was particularly tricky to cross at certain times of the year, and as a German company made the most regular calls, with a short break for the period of the 1914–18 war, the bulk of the production from those parts finished up in Hamburg, whence it was further distributed throughout the European market. In common with most tropical agricultural commodities, the trade in bass went through very difficult times during the world economic recession of the 1930's. The period of the Second World War saw major interruptions to the flow of goods to and from the Coast. Quite apart from anything else, there were substantial losses of shipping around the Freetown convoy assembly point from German U-Boats operating under cover of the Vichy-held territories. In the British and Free French Territories, there were intensive drives towards self-sufficiency and supporting the war effort, and much of the fiber was diverted to rope making, sacking and bags for agricultural produce, as the supplies of jute had been cut off. An interesting comment appears in a post-war report produced by the Government Printer, Lagos (1945), "A Colony's Effort." It appears that this fiber went to war with the West African Regiments and in the North African, Italian, and Burma Campaigns: the ramrod used to sponge out the barrels of the 25-pounders was known to the gunners as "A Piassava," a term not found in dictionaries!

Fiber Type and Quality

Following this brief outline of the export trade in African Bass up to the mid-1960's, it is now necessary to consider the product in some detail. As with many natural commodities, the definition of "good quality" and the inspection routines to assess it are often largely subjective. While mechanical and chemical testing equipment has become increasingly sophisticated, the innate



1. Diagrammatic representation of petiole and leaf base.

judgement of the experienced buyer/manufacturer still dominates the decision as to acceptance and market value. Initially, the West African product was judged by comparison with Bahia Bass, but as the trade developed and the demand for a wider range of brush types expanded, the various forms of African Bass found niches in the market in their own right. Bass brooms for example, were employed in certain steel founding techniques, to remove surface bubbles from the molten metal. The fiber was known to have a particularly low ash content and had for years been used by West African artisans to produce a very fine textured charcoal. This was much favored for the manufacture of a suitable grade of gunpowder for the locally made flintlock-like "Daneguns."

To appreciate the problems associated with the production of a uniform commercial consignment of acceptable fiber, it is first necessary to understand the construction of the *Raphia* leaf. The leaf in this genus is large, huge in most species, typically exceeding 15 m in length. For our purposes it can be considered as comprising three principal components: the upper leaf stalk (rachis) bearing rows of leaflets on each side; the bare lower leaf stalk (petiole); and the tubular leaf base (Fig. 1). The soft raffia fiber of commerce is obtained by stripping the surface of the leaflets in some species, but it is the two lower parts of the leaf that are concerned in brush-fiber production. The petiole, of the order of some 3–5 m long and some 5–6 cm broad for much of its length, tapers to the junction with the rachis and expands markedly towards the trunk, where it merges into the leaf base. It is broadly triangular in cross-section and gently channelled above. These petioles, when cut, often with a length of the lower rachis left attached, assume the role that bamboo plays in Asiatic societies and are often so-termed where English is used in West African markets. These "bamboos" are employed in a wide range of structural building and craftwork. The tubular leaf bases embrace the trunk and lie in a concentric format, each overlapping one or more of its kind above. As the trunk extends, the lower leaves die back and then fall away, leaving the leaf base and a short length of the old petiole in place. With expansion of the lower trunk, the leaf bases are pressurized in ascending order and a distal, vertical, linear cleavage opens up along the length of the structure. As the cleavage widens, the outer tissues break apart, giving rise to a mass of fibers and interstitial tissue, the nature of which varies considerably with different *Raphia* species and, indeed, is often a useful field character for identifying some of them.

There has always been a degree of confusion in the literature regarding the origins and critical differences between the range of fibers available. This applies particularly to the three main types in the trade, to which all the others can be related, namely: Prime Sherbro, Sulima, and Calabar (Opobo). These fibers are obtained from *Raphia hookeri* Mann & Wendland and *R. palma-pinus* (Gaertn.) Hutch, and although similar materials can be obtained from other members of the genus, these have not been significant in the West African trade. In earlier literature on this topic, *R. hookeri* is often misnamed as *R. vinifera*. As this plant is the well known Wine Palm, widely distributed throughout West Africa, this is an excusable error, but *R. vinifera* is a distinctly different palm which does not yield good fiber but is renowned for the length, strength and longevity of its "bamboos." It has a more restricted distribution in the higher rainfall areas between Ghana and Gabon and, ironically, is a poor wine producer. Similarly, *R. palma-pinus* is also often wrongly referred to as *R. gracilis* or *R. gaertneri* in early reports. This palm is largely confined to coastal swamps of the high rainfall areas from westerly Ghana to the Gambia Valley. It is now considered to have two

distinct forms or subspecies (Otedoh, 1982) which require further study. Whether one or other is the better source of fiber also remains to be established. There is a good research project here for a local botanist, particularly as one form is recorded as forming a "Pseudostem," the precise nature of which has never been described in detail, but it is presumably similar in construction to that found in the bananas and plantains (*Musa* spp.). Whatever, there are fundamental differences in habitat between the two species which bear closely on the type and yield of fiber available.

R. hookeri	*R. palma-pinus*
Tall in the trunk, 5 m plus	Short in the trunk, to some 5 m. Pseudostem sometimes formed
Leaf base long, 3–4 m	Leaf base short, some 1 m only
Petiole 3–4 m long	Petiole to 2 m long
External fibers about trunk long, dark, some broad and contorted	External fibers about trunk shortish, straight, often pale
Trunk single or restricted branching from base	Freely suckering
Ubiquitous, occurs in upland farms and compounds as well as freshwater swamps. Often planted	Swamp palm with fair degree of salt tolerance in coastal areas
Much prized for wine	Minor wine producer

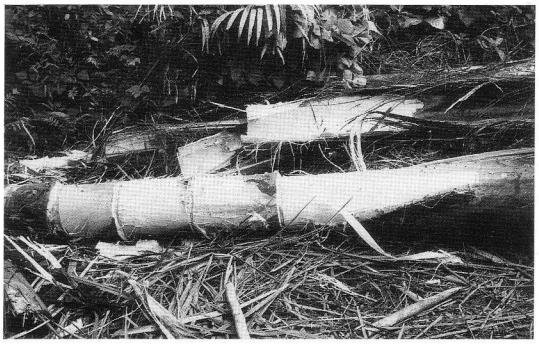
As with many palms, if left to develop naturally, the crown of leaves at the head of the trunk in *Raphia* remains fairly constant in size and number, once the seedling and early development stage is past. This cycle of leaf initiation at the apex, with a concomitant dying away of the older leaves below, continues through the elongation and life of each individual trunk until the inception of flowering. At this stage, further extension growth ceases and, following the completion of fruiting, the trunk dies. In a largely non-suckering species such as *R. hookeri*, where the wine is highly prized and can only be obtained in reasonable quantity at the onset of flowering (Tuley 1965), there will be a degree of reluctance by the cultivator to diminish vigor by the cutting of active leaves for fiber. Mature or moribund leaf stalks, however, can be taken with little effect on eventual wine yields. This would explain why Prime Sherbro, derived as it is from this palm, has always been in shorter supply than Sulima, which is largely obtained from *R. palma-pinus*. Here, the suckering habit will be further stimulated by regular cutting, and the number of leaves available for harvesting greatly increased. Providing a balanced cutting cycle is practiced to prevent the taking of immature leaves, a much higher level of production can be achieved.

It is not generally recognized that there is a fundamental difference between the fibers of the Calabar/Opobo group and the Sherbro/Sulima group. Although both Sherbro and Calabar are derived from the same palm, *R. hookeri*, the former is derived from cut lengths of the petiole while the other is extracted from the tubular leaf bases. This in turn affects the processing procedures. Why these practices have become so divorced towards the extremities of the West Coast is far from clear. However, *R. palma-pinus* is the more dominant species in the coastal areas of the more westerly states. Here, the shorter leaf base precludes the extraction of fiber of reasonable length from this part of the palm and necessitates employing the petiole for this purpose. As this palm dominated the trade in these areas, it might be assumed that similar methodology was applied to the lesser participant, because of the common practice of cutting the petioles of both species more or less at random, with a resultant admixture of the fibers. Indeed, it was the generally held view that the superiority of Sherbro over Sulima was merely a reflection of better processing and grading. By the late 1920's, it was recognized that superior brush-fiber could be obtained from selected parts of the petiole and leaf base. The extent of the variation in fiber conformation within these structures was perhaps not fully appreciated, as a wealth of useful fibers can be extracted from them, ranging from stiff, brittle and woody, then grading through a sequence of increasing flexibility and decreasing strength, finally yielding a soft, sponge-like material. This permits numerous useful applications in local industries and crafts, ropes, matting, wickerwork and the like (Otedoh 1975, Stevens 1945). Indeed, given the value placed upon these materials in native manufacture and their prominence in the traditional markets, it is somewhat surprising that their export potential was not noted before, during the forty year solo reign of South American piassava.

On first inspection, it would appear to be the

2. Felled mature trunk of *R. hookeri*.

case that harvesting cut lengths of petiole from a relatively low growing palm would be an easier option than prizing the tightly-held leaf bases from the trunk. In the event, paddling in the thick mud of a leech-ridden swamp, the typical habitat of *R. palma-pinus*, has little to commend it. It is small wonder that the harvester tends to overcut and take an undesirable proportion of immature leaves, once he has dragged himself into position at the base of the selected palm. With *R. hookeri*, while this does occur as a swamp plant, generally it does not flourish under saline conditions and can usually be approached under more amenable circumstances. If being harvested for the petiole, however, mature palms of some height will offer problems of reach. To part the leaf bases from the trunk requires considerable leverage. This is usually a team effort involving several persons. Stout poles, flattened at the end, are inserted into the sucture of the lowest leaf base and, while additional weight is applied to the remnant stump of petiole,



3. *R. hookeri*—trunk with leaf bases removed.

the whole is levered away from the central axis. The process is then repeated sequentially upwards. It is possible, providing care is taken, to remove older leaf bases from the lower part of the trunk of a standing live palm, but the more common practice is to let each trunk complete its growth cycle, tap if for wine and then fell it (Fig. 2). The leaf bases can then be more conveniently removed from the horizontal posture (Fig. 3).

Marketing, Processing and Grading

Historically, most agricultural exports including bass were traded along the Coast in close-knit marketing-chains, linking the trading companies or marketing boards at the ports with the traditional local markets. Typically, trade goods would move up the chain as export commodities moved down. The middlemen who operated the links in the chain could be either officially appointed agents of the companies or government or local businessmen, or quite often extremely astute businesswomen, operating on their own account. The lady traders of the West African markets could be formidable negotiators. In Sierra Leone and to some extent Liberia, Lebanese dealers were closely identified with the trade. Credit schemes to permit immediate cash payments to the producer at village level were operated in some areas and financed and supervised by the local banks. These activities were often linked into extension programs aimed at improving the quality of the product. Prices at local level were often adjusted drastically downwards to cover the middleman against subsequent grading losses at the buying centers. The prices offered were often punitive and there was therefore little incentive for the producer to clean or grade his fiber to any other than a minimum standard. It also led to bad harvesting practices and

the excessive cutting of immature leaves. Producer cooperatives, promoting good practice and paying fair prices, proved a successful incentive in some areas. Several of the territories involved had active produce inspection departments. Here, the bass could only be shipped under their seal and, while these services remained diligent and incorruptible, they largely eliminated the export of inferior or adulterated produce.

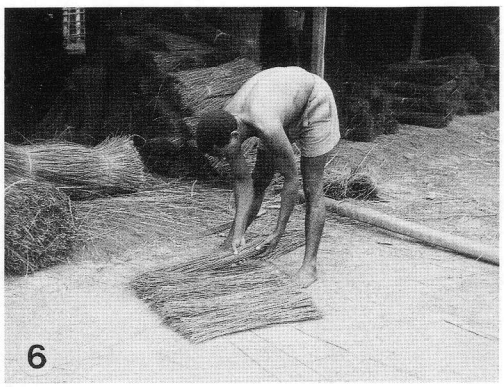
To recapitulate upon the needs of the brush manufacturer, the aim is to obtain a water-resistent, hard-wearing fiber, of adequate strength and length, also possessing the necessary flex/elasticity to permit ease of machine working and to give the desired "springy" action when pushed or drawn across a surface. Figure 1 depicts a general view and cross-section of the leaf base of *R. hookeri* and a median cross-section of the petiole in both species. In the petiole, the best brush-fiber, cylindrical with a softer core, some 1–1.5 mm diameter, is obtained from the "wings" (A) as shown. The fiber derived from *R. hookeri* possesses a smoother surface than that from *R. palma-pinus*, which tends to have a more roughened outer layer (Slack 1947, Kidd 1957). That, from the upper, adaxial surface (B) is also of reasonable status, as are the more flattened fibers from the lower, abaxial surface (C) adjacent to (A). The fibers near the central flattened ridge at (E), however, are thicker, more flattened, woody and distinctly brittle. The central core (D) gives rise to a supple, markedly soft fiber, the so-termed "straw," a common adulterant in commercial samples. A similar "straw" is found if the petiole is cut too long, as, towards the rachis, even the best fiber tapers into a similar material. It is, however, necessary to emphasize that the criteria apply to a mature leaf, as, in a more juvenile condition, there is a general lowering in fiber quality from all parts.

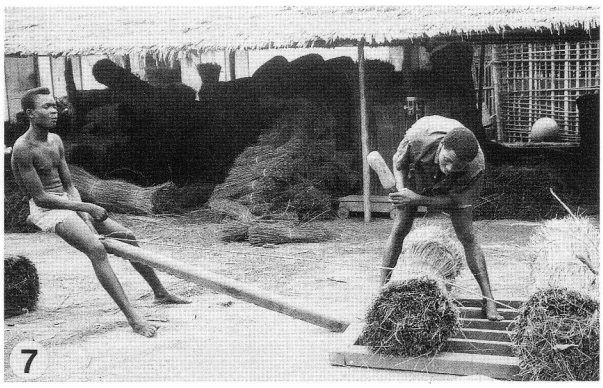
In the leaf base, the objective is to obtain a brush-fiber of very different character. Typical Calabar Bass is solid and flatter in section and distinctly stiffer than Sherbro/Sulima but still with adequate flexibility to be folded for machine punching without snapping. Fiber falling within the ideal size range, some 0.5–4.0 mm broad, is extracted from the zone some third to halfway around the radius, as shown at (F). Towards the line suture (G), the fibers rapidly broaden and become more brittle, at the extremity reaching as much as 4.0 cm across. In the opposite direction, within the thickened body of the structure (H), the fibers progressively become more pliable and softer in texture and more circular in section with a soft core or even a hollow core. The strongest are excellent for platting strong ropes and the remainder are used in a wide range of domestic applications.

To extract the fiber, it can be seen that the differences in the two structures necessitate different methodologies. In the one case, the tubular leaf base, particularly towards the suture line, is already moribund and the background tissue has already started to soften and break down. The outer thicker and more brittle fibers can be stripped off, or in some areas it is the practice to fire the trunk and remove them in this way. Then, starting from the outer wings, the fibers can be sequentially stripped by hand, working round the circumference until the zone of softer fiber at the rear is reached. When the fibers do not part easily, usually in younger leaf bases from the upper part of the trunk, beating the tissue with a stout stick is an effective way of obtaining a reasonable yield. If the leaf bases are particularly recalcitrant, the felled trunk is left to lie exposed to the elements until they are suitably softened.

With the petiole fibers, these are embedded in the cut length of stalk, within a solid matrix of background tissue and the hard outer (epidermal) layer. To remove the fiber here, without undue damage, precludes physical stripping techniques, and the traditional practice is to soften the stalks by immersion in water for a considerable period. In the past there has been a degree of confusion over the detail of this "retting" procedure and there was concern that immersion for a prolonged period would weaken the fiber. In the event, the main difficulty turned out to be the reverse in that the harvester, who was often hard pressed for money and seeking a early return on his investment, was not allowing sufficient time for the background tissue to soften adequately. This was particularly common during the "hungry season" when the farming community was at maximum stress. Some two to three months is generally considered to be the optimal retting period, with the stalks, which split readily along the longitudinal axis, divided into three or four splits, before being tied into bundles for immersion. After this period, the fibers can be stripped out with relative ease.

In the trade, certain color preferences have developed, which in certain cases are related to the retting process. Calabar tends to be naturally dark-colored, sometimes distinctly black. Sherbro and Sulima are both somewhat pale at harvest but





4. Selecting and cleaning the fiber. 5. Bass prepared for transport to Buying Center. 6. Final grading by length, uniformity and cleanliness. 7. "Bundling" the bass prior to shipment.

develop shades of brown on retting. The nature of the water involved affects this coloration: material retted in fresh running water tends to be pale brown but that placed in stagnant swamp pools, a common practice in the Sherbro area, develops an attractive reddish-brown tinge. A good sample of Prime Sherbro with this coloration commands excellent prices. It is of interest to note that the soil/water relationships of these swamps have been the subject of detailed study, with an eye to their employment for rice production. They are particularly intractable in this respect because of the intense acid-sulphate conditions that prevail, and it must be assumed that it is these chemical conditions that impart the desired color to the fibers.

When first extracted, both types of fiber still retain a coating of adherent, decomposing background tissue. The common practice with Calabar is to strip this by drawing the fiber by hand through a cleft cut into a green stick or a length of the palm petiole (Fig. 4). With Sherbro/Sulima, the retted splints are usually flogged over, and drawn through, a comb of pointed sticks. The same or very similar techniques are used in all the producing areas along the Coast. The care that is taken with these processes and the consequent cleanliness of the fiber, has a major impact on quality and potential market value.

Length of fiber also bears significantly on fiber quality, there being a distinct market preference for a longer conformation, giving a greater degree of flexibility in pre-processing and dressing by the trade. Shorter lengths are acceptable within reasonable limits, say no less than 25–30 cm, but, whatever the size, it is essential that the fiber be bundled in units of uniform length, with neatly trimmed extremities. Where Sherbro/Sulima have been harvested correctly from mature leaves and the petioles cut to optimum length, then there is typically minimal variation in the length of the high quality fibers extracted, some plus or minus 1.5 m. The normal practice is to gather these into bundles of 56 lb (25 kg) weight. In Calabar, there is much greater variation in the length of the fibers stripped out of the leaf base. The task of separating these and sorting them into bundles of uniform length is, of necessity, tedious and time consuming. Traditionally, the harvester or a middleman

trader gathers the mixed fiber into an elongated, tapering bundle, some 2 m or more long, and in this form it is transported to the local market or trading post (Fig. 5). Here the bundles are weighed and priced, then cut open to join a vertically stacked agglomeration of fiber. The sorting process involves an experienced employee of the buyer standing above the massed fiber and sequentially plucking out individual strands in descending order of length. Following this initial classification, the selected classes are laid out horizontally and checked for size and the ends are uniformly trimmed (Fig. 6). All being well, they are tightly bound into cylindrical bundles, some 70–100 cm in diameter and weighed for shipment (Fig. 7). Quite why, in the trade, the shorter length bundles were associated with Opobo and the longer with Calabar is something of a mystery. Both ports are situated in southeastern Nigeria, the former being founded by the legendary King Jaja following the cannon battle at Bonney between the warring Trade Houses of Anna and Manila Pebble on the 13th September, 1869 (Hargreaves 1975). As the prime motive for establishing the new settlement was to seal the Imo River and cut off the hinterland and down-river trade in palm oil and kernels to Bonney on the coast, it follows that Calabar, sited on the estuary of the much larger Cross River, had greater ease of access to the ever larger vessels that were involved in trade with the Coast. It may be that more difficult lighterage problems at Opobo favored the smaller and more compact bundle.

The water content of the fiber has always created problems. The humid conditions of the high rainfall areas of the Coast make air drying difficult for most of the year. Also, as the fiber was sold by weight, there were obvious temptations to maximize returns by the more unscrupulous trader. At the very beginnings of the trade, we find Holland, then Curator of the Botanic Garden, Calabar, complaining of malpractice in his annual report of 1895 to Kew. The most common device was to bind a wet bundle with an outer layer of dry fiber. Apart from the fraud, this practice resulted in total loss of quality from discoloration by fungal/bacterial fermentation and weakening of the fiber. It also created a not inconsiderable fire hazard in warehouses and ships' holds and there are stories, perhaps apocryphal, of serious fires at sea from bass cargos, the effect of the wet fiber being similar to that occurring in damp hay and straw stacks.

To summarize, an ideal consignment of bass for export should comprise neatly trimmed bundles with selected fiber of the correct type, of uniform length and within acceptable thickness criteria. It should be suitably cleaned, thoroughly dried and free of "straw" and other undesirable fibrous material. In reality this is extremely difficult to achieve. Even with the best practice and rigorous grading procedures, the nature of the vascular fibers within the tissues invariably means that a commercial sample will embrace a range of dimensions and some adulteration. Within the Sulima/Sherbro Group, all but the very top of the range will be a mix of fiber from the two species involved. Providing however this variation falls within reasonable limits, it is usually acceptable to the trade.

Epilogue

This account has attempted to give a brief overview of this particular palm product, from the origins of the trade until the rise of plastic broom in the 1950–60's. Even in the heyday of the trade, there were major problems and many producers dropped out of the market in times of economic depression or by failing to maintain quality standards. In more recent times, many of the West Coast producing countries have had to face critical social, economic and political problems and the breakdown of essential services. Active warfare has occurred, and still continues, in some of the main producing areas. Increased labor costs and the attractions of more remunerative activity, diamonds, oil and the like, have wiped out many of the traditional agricultural exports. It says much for the entrepreneurial skills and traditional trading instincts of the population that African Bass still enters the market, albeit on a much reduced scale. The bass broom, either pure or in admixture with other fibers, both natural and man-made, is still to be purchased in industrialized countries and, as intimated at the beginning of this paper, with the growing pressures for a "greener" world, there may yet again be a significant place for this extremely environmentally friendly fiber.

Acknowledgments

Sincere thanks are due to Mr. T. S. Jones, OBE, and to Mr. P. Coward and his fellow Directors of the Hill Brush Company, Mere, Wiltshire, for valuable background information. The Pitman Publishing Company have kindly given permission to quote from W. Kiddier, "The Brushmaker and his Craft."

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BOOKSTORE (*Continued from page 12*)

* New arrivals

The palm books listed above may be ordered at the prices indicated plus $2.50 extra per book to cover packaging and postage. (California residents please add 7.25% sales tax.) Foreign checks must be in U.S. dollars and payable on a USA bank. In some countries it is possible to send U.S. International Money Orders through the Post Office. No credit cards. Please include your International Palm Society membership number. ALL SALES FINAL. Send check payable to: The International Palm Society, Pauleen Sullivan, 3616 Mound Avenue, Ventura, CA 93003, U.S.A.

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The Registration Fee and Optional Sunday Day-Trip Fee were mis-stated in one location on the Biennial Registration Form recently mailed to all IPS members. The correct prices are given inside the box on the lower part of the form and are **US$260** per person for the Registration Fee and **US$40** for the optional Mt. Avila tour. Please register as soon as possible so that an accurate head count can be obtained for planning purposes.

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The Seed Bank will resume its operations on a pay-as-you-go basis (credit limited to $30), offering only seeds available from Lyon Arboretum in Hawaii or from Southern California. A new seed list will soon be forthcoming.

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