

PLANT UTILIZATION OF THE MBUTI PYGMIES— with Special Reference to Their Material Culture and Use of Wild Vegetable Foods—

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INTRODUCTION

The Mbuti pygmies are hunter-gatherers who inhabit the Ituri Forest in the northeast corner of the Republic of Zaire. They can be divided into Archers and Net-hunters according to their principal hunting methods (Turnbull 1965a, b). The former occupies the northeastern part of the Ituri Forest and the latter ranges from the heart of the Ituri to the southwest. Not only the Mbuti, but also agricultural people such as the Lese of the Central Sudanic, the Bila of the Equatorial Bantu, etc. inhabit the Ituri Forest. Since these peoples intruded into the Ituri Forest and came into contact with the Mbuti some hundreds of years ago, a symbiotic relationship has been formed between the agriculturalists and the Mbuti. As a result, the Mbuti have lost their own language, and now speak the languages of the agricultural tribes with whom they have contacts.

I conducted an investigation of the Mbuti net-hunters who inhabit the heart of the Ituri and speak KiBila as their mother tongue, from the viewpoint of ecological anthropology during the six-month period from August, 1973 to February, 1974; and I reported on their hunting activities and their band composition in an earlier paper (Tanno 1976). In this paper, I would like to report and analyze my finding focusing on the Mbuti's utilization of plants for food and for their material culture, which forms another important aspect of the Mbuti's relationship with their natural environment. The data for this paper were obtained during the original survey and in the second survey for about one month in January and February, 1977. Kibila words and vernacular names of plants are indicated as "...", and Kingwana words as, "...": NG. Kingwana is a dialect of Swahili, which is used as the lingua franca in eastern Zaire.

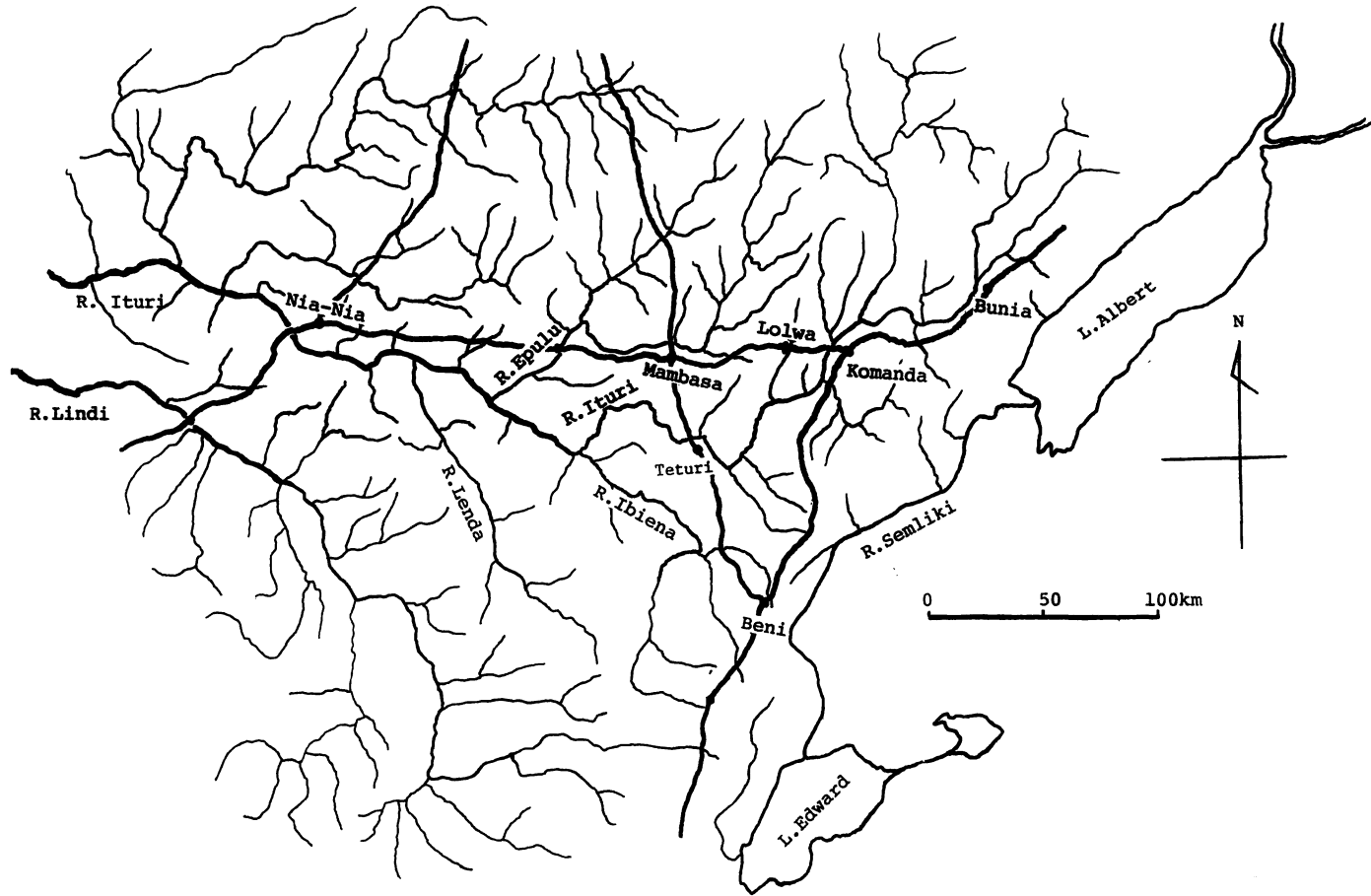
I. NATURAL ENVIRONMENT

The Ituri Forest spreads over the drainage basin of the Ituri River that runs to the west from the western plateau of Lake Albert in the Great Rift Valley (Figure 1). The river continues to run further to the west, changing its name to the Aruwimi River, and empties into the middle reaches of the Zaire River.

The Ituri Forest is included in the tropical rain forest. However, the Ituri region is situated in the northeastern part of the Congo Basin where the altitude reaches about 1000 m, and the environment is no way uncomfortable as a human habitat, different from the lowland forest. The savanna spreads out to the northeast of the Ituri Forest, and the montane forest borders the Ituri on the southeast.

The Ituri Forest, whose topography is gently undulating, can be divided into the following types of vegetation (Itani 1974a, Harako 1976):

Fig. 1. Map of the Ituri Forest



- 1) Primary forest
 - a) *Cynometra* forest
 - b) *Brachystegia* forest
 - c) *Gilbertiodendron* forest
- 2) Swamp forest
- 3) Secondary forest

In the Ituri region, the swamp forest is limited to partial localities along rivers and in patches of marsh. There *Ancistrophyllum* spp. woody vines and others twine among the trees, and the floor is covered densely by *Renealmia africana*, *Trachyphrinium braunianum*, etc.

The secondary forest stands around shifting cultivators' villages. Today, most villages are distributed along main roads running through the Ituri Forest east and west, and north and south. Consequently, both sides of the road have changed to secondary forest for a breadth of 2 to 4 km. Patches of the secondary forest can also be seen at the ruins of old villages or at large fallen trees. It is easy to distinguish the secondary forest, for Parasol-trees (*Musaga cecropioides*) are dominant there.

More than 80 percent of the Ituri Forest's approximately 100,000 km² is covered by primary forest (Ichikawa 1978). The primary forest, reaching to a height of 30 to 40 m, can be divided further into three types according to the dominant trees which form the forest canopy. *Cynometra alexandri* ("tembu") dominates the northeast of the Ituri, *Gilbertiodendron dewevrei* ("mbau") is dominant in the southwest, and *Brachystegia laurentii* ("eko") forms the canopy in the intermediate zone. All of these three species are big evergreen trees belonging to the Caesalpinioideae subfamily of Leguminosae. The Mbuti themselves also refer to the forest types in the following expressions: 'forest of "tembu"', 'forest of "mbau"', and 'forest of "eko"'. Only the *Brachystegia* forest is relatively narrow and in its interior it resembles the *Cynometra* forest.

Comparing the *Cynometra-Brachystegia* forest and the *Gilbertiodendron* forest, certain characteristics can be seen: the former consists of various tree species and comprises several layers from the canopy to the forest floor; the interior of the forest receives a relatively high amount of light; and Marantaceae herbs grow thickly on the floor. The latter, on the other hand, presents an appearance of a pure stand of *G. dewevrei*; both the middle layer and the undergrowth are relatively sparse; the interior is dark, (so the Mbuti call the "mbau" forest the dark forest); and Marantaceae herbs are rarely seen on the floor.

The *Cynometra-Brachystegia* forest spreads in the northeast and is the home of the Mbuti archers, and the *Gilbertiodendron* forest covers the southwest and is the principal home of net-hunters. Among the agriculturalist, the Lese inhabit the archers' area; the Bila (and the Ndaka to the west) the net-hunters' area.

The Teturi region, my area of research, is on the margin of the *Cynometra-Brachystegia* forest zone, and just to the west spreads the *Gilbertiodendron* forest. Bands of net-hunters who were the subject of the research had their territories mainly in the *Cynometra-Brachystegia* forest. Common plants found in the Ituri Forest are listed in Table 1.

The dryseason in the Ituri Forest lasts from December to March, the rainy season begins in April, and the heavy rainy season begins in July or August lasting until November (Harako 1976). Such seasonal change is reflected on the seasonality of the flowering and fruiting of the plants in the region and of the activity of the bees. The Mbuti's life of hunting and gathering also shifts with the seasonal cycle (Harako 1976, Tanno 1976, Ichikawa 1977a, 1978).

Itani (1974a, b) compared the vegetation and mammal fauna of the Ituri Forest with those of other African equatorial areas, and he pointed out that the Ituri Forest, which is a climax forest of evergreen Caesalpinioideae, should be distinguished from what is called a tropical

Table 1. List of Common Plants of the Ituri Forest (by T. Tanno, J. Bokdam, H. Breyne)

No.	Scientific Name	(Specimen No. *1)	Vernacular Name	Food*2	Use Material Culture*3	Other*4
Lomariopsidaceae						
1	<i>Lomariopsis guineensis</i> (Undrew) Alston	(77-54)	mbali			M
Polypodiaceae						
2	<i>Platyserium angolense</i> Welw. ex Hook.	(77-82)	apafufya			S
Piperaceae						
3	<i>Piper guineense</i> Schum. & Thonn.	(74-27)	abeka	F		
4	<i>P. umbellatum</i> L.	(74-42)	budokomu			S
Ulmaceae						
5	<i>Celtis adolphi-friderici</i> Engl.	(77-71)	kene	S		F
6	<i>C. brownii</i> Rendle	(74-85)	etukumbe			
7	<i>C. mildbraedii</i> Engl.	(77-5)	engia			F
Moraceae						
8	<i>Antiaris welwitschii</i> Engl.	(74-36)	supa		2, 60	
9	<i>Bosqueia angolensis</i> Ficalho	(74-83)	bumbu			M
10	<i>Chlorophora excelsa</i> (Welw.) Benth.	(77-16)	epunga		61	M
11	<i>Ficus exaspermata</i> Vahl	(77-6)	masawa or kawa		80	
12	<i>F. lepreuri</i> Miq.	(77-15)	tembu		60	
13	<i>F. lukanda</i> Welw. ex Ficalho	(77-25)	bambembe		60	
14	<i>F. lukanda</i> Welw. ex Ficalho	(77-18)	malukionji		60	
15	<i>F. mukoso</i> Welw. ex Ficalho	(77-116)	chenje			F
16	<i>F. ottoniifolia</i> Miq.	(77-27)	sisombo		60	
17	<i>F. preussii</i> Warb.	(74-43)	bumbau		60	
18	<i>F. rubropunctata</i> De Wild.	(77-13)	sebia		60	
19	<i>F. rupicola</i> Lebrun & Toussaint	(77-43)	tiba or tibatiba		60	
20	<i>F. rupicola</i> Lebrun & Toussaint	(77-26)	esele		60	
21	<i>F. sub-acuminata</i> (De Wild.) Lebrun	(74-119)	üse		60	
22	<i>F. vallis-choudae</i> Del.	(74-59)	bungulu		60	
23	<i>F. sp.</i>	(obs.)	akoko or akuko		60	
24	<i>F. sp.</i>	(obs.)	amaswakumu or amatalimbo		60	
25	<i>F. sp.</i>	(obs.)	eko		60	
26	<i>F. sp.</i>	(obs.)	epō		60	
27	<i>Musanga cecropioides</i> R. Br.	(73-Kis.)	kombo		35	
28	<i>Myrianthus holstii</i> Engl.	(74-28)	bembekenye	F		
29	<i>M. prousii</i> Engl.	(77-53)	akpekpe or embwembwe	F		
30	<i>M. sp.</i>	(obs.)	mbombo	F		
31	<i>Treculia africana</i> Dacne	(74-22)	pushia	S		
Balanophoraceae						
32	<i>Thonningia sanguinea</i> Vahl.	(73-Kis)	?			Mm
Amaranthaceae						
33	<i>Amaranthus dubius</i> Mart. ex Thell.	(74-115)	atete	L		
34	<i>A. tricolor</i> L.	(74-114)	kpdekpede	L		
Menispermaceae						
35	<i>Penianthus longifolius</i> Miers	(74-98)	apalutu		15, 16, 17	
Annonaceae						
36	<i>Annonidium mannii</i> (Oliv.) Engl. & Diels	(74-48)	ebambu	F		
37	<i>Cleistopholis glauca</i> Pierre ex Engl. & Diels	(77-60)	ekpokombi		24	
38	<i>Isolona congolana</i> (D. Wildie Th. Dur.) Engl.	(77-12)	boanga or simbie		61	M
39	<i>Monodora tenuifolia</i> Benth.	(74-30)	bunjahukumu		62	
40	<i>Polyalthia suaveolens</i> Engl. & Diels	(74-21)	eta		44	
41	<i>Richella grandiflora</i> (Bout.) R. E. Fr.	(74-81)	amapapasia			Mm
42	<i>Uvariopsis congolana</i> (De Wild.) R. E. Fr.	(74-68)	akobisi			Mm

43	<i>Xylopia chrysophylla</i> Louis & Boutiq.	(77-55)	aleke		H
Myristicaceae					
44	<i>Pycnanthus angolensis</i> (Welw.) Warb.	(77-3)	kpangbalu or kolu		F
Connaraceae					
45	<i>Agelaea lescrauwaetii</i> De Wild.	(77-46)	ekundyakoda	61	
46	<i>Roureopsis liquifoliata</i> (Gilg.) Schnellenb.	(74-18)	ndindimyo		M
Leguminosae (Caesalpinioideae)					
47	<i>Brachystegia laurentii</i> (De Wild.) J. Louis	(74-19)	eko	30	F
48	<i>Cynometra alexandri</i> C. H. Wright	(74-14)	tembu	30	F
49	<i>Erythrophleum guineense</i> G. Don	(74-60)	tafa	24	M, P
50	<i>Gilbertiodendron dewevrei</i> (De Wild.) J. Leonard	(74-15)	mbau	30, 33	M, F
(Mimosoideae)					
51	<i>Albizia zygia</i> (DC.) McBride	(74-16)	kamgba		F
52	<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	(77-48)	ekanya		M
53	<i>Entada gigas</i> (L.) Fawcett & Rendle	(74-122)	njamba		P
54	<i>Piptadeniastrum africanum</i> (Hook. f.) Brenan	(77-111)	yako	24	M
55	<i>Tetrapleura tetraptera</i> (Schum. & Thonn.) Taub.	(74-17)	sekeseke or checheche	25	S
(Papilionoideae)					
56	<i>Angylocalyx boutiqueanus</i> Toussaint	(77-39)	balwa		Mm
57	<i>Desmodium adscendens</i> (SW.) DC.	(77-70)	amakalangakalanga		M
58	<i>Millettia drastica</i> Welw. ex Benth	(77-76)	amalusia		
59	<i>M. letveldeana</i> (Micheli) Hauman	(77-68)	kileme		P
60	<i>Mucuna flagellipes</i> T. Vogel ex Hook. f.	(77-73)	efufe	61	
61	<i>Pterocarpus soyauxii</i> Taub.	(73-Kis.)	ndo	61, 68	
62	<i>Tephrosia vogelii</i> Hook. f.	(74-23)	bappi	25	
Pandaceae					
63	<i>Panda oleosa</i> Pierre	(74-70)	ekanjo		
Balanitaceae					
64	<i>Balanites wilsoniana</i> Dawe & Sprague	(74-94)	ekele		S
Ixonanthaceae					
65	<i>Irvingia gabonensis</i> (Aubry Lecomte ex O'Rorke) Baill.	(74-105)	esele		S
66	<i>I. robur</i> Mildbr.	(74-106)	ebute		S
67	<i>Ochthocosmus africanus</i> Hook. f.	(74-31)	masse		
Rutaceae					
68	<i>Citropsis articulata</i> (Willd. ex Spreng.) Swingle & Kellermann	(74-99)	amesalosalo		M
69	<i>Clausena anisata</i> (Willd.) Hook. f. ex Benth.	(77-56)	sis		S
70	<i>Fagara dinklagei</i> Engl.	(74-45)	siya	67	
71	<i>F. lemairei</i> De Wild.	(77-23)	sikili		
72	<i>Vepris louisii</i> G. Gilbert	(74-40)	mutuluka	14, 20	
Burseraceae					
73	<i>Canarium schweinfurthii</i> Engl.	(74-56)	mbe	45	F
Meliaceae					
74	<i>Khaya anthotheca</i> (Welw.) C. DC.	(73-Kis.)	ngina		
75	<i>Trichilia rubescens</i> Oliv.	(74-97)	ehamba or mbombo	71, 75	Mm
76	<i>Turraea vogelioides</i> Bagn. & Bak. f.	(77-14)	myablengo or amelengolengo		M
Euphorbiaceae					
77	<i>Acalypha neptunica</i> Müll. Arg.	(74-29)	bembu	15, 17	
78	<i>Alchornea floribunda</i> Müll. Arg.	(74-46)	epese		
79	<i>Bridelia micrantha</i> (Hochst.) Baill.	(74-118)	enjeku		F
80	<i>Drypites dinklagei</i> (Pax) Hutch.	(74-92)	etalala		

113	<i>Bequaertiodendron longipedicellata</i> De Wild.	(74-49)	ekukunbengi		15, 16, 17	
114	<i>Chrysophyllum delevoiyi</i> De Wild.	(77-52)	mbalambala	S		
115	<i>Pachystela bequaertii</i> De Wild.	(74-69)	apengenge			F
Ebenaceae						
116	<i>Diospyros alboflabescens</i> (Gurke) F. White	(77-77)	mbene			
117	<i>D. boala</i> De Wild.	(74-102)	amelili		4, 36	
118	<i>D. deltoidea</i> F. White	(74-103)	mambilikichocho		4, 36	
119	<i>D. sp.</i>	(74-26)	tumbo		14, 20	
Oleaceae						
120	<i>Jasminum pauciflorum</i> Benth.	(74-54)	pamema		1, 2	
Loganiaceae						
121	<i>Mostuea batesii</i> Bak.	(77-59)	?			M
122	<i>Strychnos longicaudata</i> Gilg	(77-47)	koha		1, 2, 15, 17	
Apocynaceae						
123	<i>Alafia grandis</i> Stapf	(77-36)	paputa		24	
124	<i>Alstonia boonei</i> De Wild.	(74-76)	ekimo		23, 33, 35, 70	M
125	<i>Baissea axillaris</i> (Benth.) Hua	(77-62)	abiesulu or biesuli			S
126	<i>Dictyophleba lucida</i> (K. Schum.) Pierre	(74-120)	malondo	F		
127	<i>Landolphia owariensis</i> P. Beauv.	(74-93)	buma or abuma	F		P
128	<i>Landolphia owariensis</i> P. Beauv.	(74-39)	amedede	F		
129	<i>L. jumellei</i> (Pierre ex Jum.) M. Pichon	(77-9)	akuko		61	
130	<i>Malouetia bequaertiana</i> Wodd.	(74-107)	lungu or alungu			P
131	<i>Oncinotis hirta</i> Oliv.	(77-38)	salanyama			M
132	<i>Orthopichonia lacourtiana</i> (De Wild.) Pichon	(74-121)	akale	F		
133	<i>Rauvolfia vomitoria</i> Afzel.	(74-52)	bakatiyobamiki		24	M
Periplocaceae						
134	<i>Parquetina nigrescens</i> (Afzel.) Bullock	(74-35)	mutali		24	
Convolvulaceae						
135	<i>Ipomoea chrisochaeta</i> Hall.	(74-13)	kisombi	T		
Solanaceae						
136	<i>Solanum indicum</i> subsp. <i>distichum</i> (thonn.) Bitter	(74-51)	mgbako	F		
137	<i>S. nigrum</i> L.	(74-113)	ngoua	L		
Bignoniaceae						
138	<i>Kigelia africana</i> (Lam.) Benth.	(74-88)	etaba or makambakamba			F
139	<i>Spathodea campanulata</i> P. Beauv.	(74-73)	njolo			M
Acanthaceae						
140	<i>Lankesteria elegans</i> T. And.	(77-66)	masili			M
141	<i>Pseuderanthemum ludovicianum</i> (Büttner) Lindau	(74-34)	pepepe			
Rubiaceae						
142	<i>Aidia micrantha</i> (K. Sch.) F. White	(74-63)	tiba		14, 20	
143	<i>Coffea afzelii</i> Hiern.	(74-37)	tulua		61	
144	<i>Ixora odorata</i> Hook. f.	(74-25)	ekeke		13, 24, 56, 66	M
145	<i>Rothmannia lateriflora</i> (K. Schum.) Keay	(77-42)	kauba			F
146	<i>R. urcelliformis</i> (Hiern) Bullock & Robins	(77-32)	gbeletu			S
147	<i>R. whitfieldii</i> (Lindl.) Dandy	(74-65)	ebembe or ebimbele		61, 68	
148	<i>Rytigynia lebrunii</i> Robyns	(77-57)	mbangalabakali			M
149	<i>Tricalysia cf. coriacea</i> Hiern	(74-82)	kawa			
Cucurbitaceae						
150	<i>Momordica foetida</i> Schum. & Thonn.	(77-81)	njombo	L		

Gramineae				
151	<i>Leptaspis cochleata</i> Thwaites	(77-45)	sanesane	
152	<i>Olyra latifolia</i> L.	(77-40)	bangbile	59, 72, 82
153	<i>Pennisetum purpureum</i> Schumach.	(73-Kis.)	ngala	72
154	<i>Setaria megaphylla</i> (Steud.) Dur & Schinz	(77-41)	ngangalu	M
Cyperaceae				
155	<i>Cyperus papyrus</i> L.	(77-20)	amabasielesiele	83
Palmae				
156	<i>Ancistrophyllum secundiflorum</i> (P. Beauv.) Wendl.	(74-80)	koko	9, 14
157	<i>A. sp.</i>	(77-33)	leckwe or akpekpe	9, 14 P
158	<i>Eremospatha haullevilleana</i> De Wild.	(74-79)	mboppi	4, 8, 9, 21, etc. P
159	<i>E. yangambiensis</i> Louis & Mull.	(74-78)	asuku	8, 9 P
160	<i>Phoenix reclinata</i> Tacq.	(obs.)	lukindu	(39)
161	<i>Raphia sp.</i>	(obs.)	tundu	15, 16, 17
162	<i>Sclerosperma mannii</i> Wendl.	(73-Kis.)	ngubo or ngobo	37
Araceae				
163	<i>Anchomanes difformis</i> Engl.	(77-8)	sikili or asikpi	24
164	<i>A. giganteus</i> Engl.	(74-41)	palipambua	M, Mm
165	<i>Cercestis congensis</i> Engl.	(77-24)	tawa	S
Commelinaceae				
166	<i>Coleotrype laurentii</i> K. Schum.	(77-21)	pepepe	
167	<i>Pollia condensata</i> C. B. CL.	(77-58)	pepepe	
Liliaceae				
168	<i>Scilla sp.</i>	(77-17)	elianga	S
Agavaceae				
169	<i>Dracaena reflexa</i> Lam.	(74-100)	efufe or bukukume	S
Dioscoreaceae				
170	<i>Dioscorea baya</i> De Wild.	(74-11)	tumba	T
171	<i>D. bulbifera</i> L.	(74-12)	konjo	T
172	<i>D. cf. sagittifolia</i> Pax	(74-10)	aduaka	T
173	<i>D. smilacifolia</i> De Wild.	(74-7)	amekiki	T
174	<i>D. smilacifolia</i> De Wild.	(74-8)	ekoko	T
175	<i>D. smilacifolia</i> De Wild.	(74-9)	etaba	T
176	<i>D. sp.</i>	(obs.)	amakalukpe	T
Zingiberaceae				
177	<i>Aframomum stipulatum</i> (Gagnep.) K. Schum.	(77-63)	ngemoa	F
178	<i>Renealmia africana</i> (K. Schum.) Benth.	(74-67)	ekoko	F
179	<i>Costus afer</i> Ker-Gawl.	(77-49)	mbimbitu	M
Marantaceae				
180	<i>Ataenidia conferta</i> (Benth.) Milne-Redh.	(74-5)	bulu	27, 32, 38, 45, etc.
181	<i>Marantochloa congensis</i> (K. Schum.) J. Leon, & Mull.	(74-2)	toto	8, 11, 29, 30, etc.
182	<i>M. purpurea</i> (Ridl.) Milne-Redh.	(74-6)	mbaya	
183	<i>Sarcophrynium prionogonium</i> (K. Schum.) K. Schum.	(74-3)	tuna	
184	<i>S. schweinfurthianum</i> (O. Kuntze) Milne-Redh.	(74-4)	amekongakonga	
185	<i>Thaumatococcus daniellii</i> (Benn.) Benth.	(74-1)	ngongo	F 8, 30, 32, 37, etc.
186	<i>Trachypodium braunianum</i> (K. Schum.) Bak.	(74-32)	apehihiango or padudu	
Orchidaceae				
187	<i>Corymborkis corymbosa</i> Thou.	(77-61)	yongai	24 M

Unidentified Plants

188 (woody vinne)	aboigitade		24	
189 (vine)	amanjiapi	T		
190 (vine)	amapayeie	T		
191 (woody vine)	apeleonjo		24	
192 (herb)	asede or alaka	L		
193 (woody vine)	autu			M
194 (tree)	basapi		22	
195 (vine)	bekuku	T		
196	boloso		24	
197	bukanbanda	F		
198 (tree)	bukutu		25	
199 (high tree)	ebala or ebaka		6, 45	M, F
200 (high tree)	ekakwagbolya			F
201 (high tree)	elinda	F		
202 (tree)	esenge or esengeli	S		
203 (high tree)	hou	S		
204 (tree)	jele		67	
205 (tree)	kakaseke		24	
206 (high tree)	kei			
207	kulu		24	
208 (shrub)	kutu		62	
209 (tree)	kalu		14	
210 (tree)	lengbe		60	
211 (shrub)	lokobasoli			M
212 (woody vine)	makobakoba			M
213 (woody vine)	malombo		25	
214 (shrub)	mangbedungbedu			M, P
215 (shrub)	masisi		24	
216 (woody vine)	mbado		9	
217 (tree)	mbi		25	
218 (high tree)	mombo			
219 (vine)	ndeti		(8)	
220	ngamo	F		
221 (high tree)	ngele		60	
222 (high tree)	ngibo		60	
223 (high tree)	ngilangila		60	
224 (tree)	ngilesu or bangelesu	S		
225	njee	S		
226	njele		24	
227 (woody vine)	njima			M
228 (tree)	pango			S
229 (tree)	patuba or patubo		60	
230 (tree)	pida		25	
231 (high tree)	pokopoko			
232 (tree)	pumbu or kpumkbu	S		
233 (high tree)	sakba or sakpa		25	
234 (herb)	sasane			M
235	tengwe			M
236	toby	S		
237 (woody vine)	tou, tubi, or eholo	S		
238	bukebukakulu		4	

Notes

*1: The plant specimens were collected by T. Tanno.

The specimens numbered 74-1-74-122 were identified by Dr. J. Bokdam (Laboratory for plant taxonomy and plant geography, University for Agriculture, Wageningen-Netherlands). The specimens numbered 77-1-77-83 were identified by Dr. H. Breyné (Institut National pour l'Etude et la Recherche Agronomiques, Kinshasa).

The species marked as 73-Kis. were identified by Dr. J. Bokdam at UNAZA Kisangani in November 1973 when T. Tanno brought the specimens in the course of his survey period.

The species marked as Obs. were identified by observation by T. Tanno.

The books cited below were referred to by T. Tanno.

A Dictionary of the Flowering Plants and Ferns (7th ed.): J. C. Willis 1966.

Flora of West Tropical Africa (2nd ed.): Hutchinson & Dalziel 1954–1972.

Woody Plants of Ghana: F. R. Irvine 1961.

Kenya Trees and Shrubs: Dale & Greenway 1961.

*2: S = seed or nut, F = fruit, T = tuber or root, L = leaf: see Table 2.

*3: See the same number column of Table 3.

*4: M = medicine (see IV-C of the text), S = hunting magic “sisa” (see IV-A of the text),
F = the plant which has some ‘profit’ (“faida”: NG) to the Mbuti (see IV-D of the text),
Mm = the plant which has some magical meaning (see IV-A of the text),
H = a substitute for hemp, P = used in the play (see IV-B of the text).

Appendix of Table 1. Cultivated Plants of the Bila and Imported Plants seen in the Ituri Forest.

No.	Scientific Name	Vernacular Name	English	Remark
Cannabidaceae				
A-1	<i>Cannabis satiba</i>	bangi	hemp	
Leguminosae (Papilionoideae)				
A-2	<i>Arachis hypogaea</i>	kalanga	peanut	
A-3	<i>Phaseolus vulgaris</i>	mahalagi	bean	
Rutaceae				
A-4	<i>Citrus medica</i>	limun	lemon	Juice is a dye for barkcloth.
A-5	<i>C. aurantium</i>	oranj	orange	
Euphorbiaceae				
A-6	<i>Manihot</i> sp.	muhoko	cassava	
Anacardiaceae				
A-7	<i>Mangifera indica</i>	miembe	mango	
Caricaceae				
A-8	<i>Carica papaya</i>	paipai	papaya	
Convolvulaceae				
A-9	<i>Ipomoea batatas</i>	viasi	sweet potato	
Solanaceae				
A-10	<i>Capsicum annuum</i>	kaya	paprika	
A-11	<i>Lycopersicon lycopersicum</i>	tomate	tomato	
A-12	<i>Nicotiana tabacum</i>	taba	tobacco	
Rubiaceae				
A-13	<i>Coffea</i> sp.	kahawa	coffee	
Cucurbitaceae				
A-14	<i>Lagenaria siceria</i>	kibe	calabash	Pericarp is used as cup.
A-15	<i>Cucurbita maxima</i>	eboko	pumpkin	Pericarp is used as cup and bowl.
Gramineae				
A-16	<i>Coix lacrima-jobi</i>	manganga	Job's tears	Seeds are beads of necklace.
A-17	<i>Oryza sativa</i>	mucheke	rice	
A-18	<i>Saccharum officinale</i>	miwa	sugar cane	
A-19	<i>Sorghum caudatum</i>	hone or buimba	sorghum	
A-20	unidentified	luma	bamboo	Material of “luma” pipe.
A-21	<i>Zea mays</i>	mihindi	corn	
Palmae				
A-22	<i>Elaeis guineensis</i>	ngasi	oil palm	
A-23	<i>Raphia</i> sp.	mabondo	wine palm	Leaflet midribs are used as arrow shafts.
Araceae				
A-24	<i>Colocasia antiquorum</i>	ekuna, mambou	taro	
Bromeliaceae				
A-25	<i>Ananas comosus</i>	nanasi	pineapple	
Dioscoreaceae				
A-26	<i>Dioscorea</i> ? <i>bulbifera</i>	etoko	yam	
A-27	<i>D. dumetorum</i>	endika	yam	
A-28	<i>D. smilacifolia</i>	emiki	yam	
Musaceae				
A-29	<i>Musa</i> spp.	?(ndizi)	banana	Leaf is used for wrapping foods.

rain forest. It should be grasped as a large transitional region from the lowland swamp forest zone to the dry woodland zone of deciduous Caesalpinioideae. A forest of this type, as well as the dry woodland, might have been one of the places where Hominoidea had evolved and radiated.

The Mbuti carry on their hunting-gathering life in such environment. They live in bands comprising of about 60 persons on the average with each band having a territory about 150–300 km² wide (Harako 1976, Tanno 1976, Ichikawa 1978). The Mbuti often represent themselves as the ‘people of the forest’, in which the forest in their context means the world contrasted with the villages cleared in the cultivators’ sphere.

II. UTILIZATION OF PLANTS FOR FOODS

A. Dependence upon cultivated plants

Each Mbuti band holds symbiotic, socio-economic relationships with agriculturalist villages. The Mbuti depend upon the villagers’ farm products for the bulk of their vegetable foods, which the Mbuti acquire in exchange for game meat, by offering their labour to the villagers or by providing forest products the villagers need*. Today, there is no band which carries on an independent life without making contacts with villagers.

Especially in the case of net-hunters, more game can be caught more constantly by means of an effective net hunt, so they can get farm products through exchange, even when they are staying in hunting camps far from villages. In other words, they (men and women alike) invest in net hunt at the cost of cutting down in the gathering that was formerly the women’s subsistence activity, and therefore they obtain vegetable food through the exchange of surplus meat for farm products (Tanno 1976). Moreover, their diet largely depends on vegetable foods gained in such a manner. The plant foods were estimated to occupy about 70 percent of their total diet in weight (Ichikawa 1976).

The appendix of Table 1 shows the kinds of the villagers’ crops and plants imported into the Ituri Forest. From villagers the Mbuti constantly get cassavas and bananas, which are the staple food for the Mbuti too throughout the year. The villagers cultivate such other crops as rice, maize, beans, and peanuts. The Mbuti get these through helping in their harvest. These products are minor in the Mbuti diet. Taro, sweet potatoes and pumpkins are cultivated on a small scale in the gardens in back of the villagers’ houses. According to Bila informants, 3 kinds of yams as “etoko” (*Dioscorea? bulbifera*), “endika” (*D. dumetorum*) and “emiki” (*D. smilacifolia*) were also cultivated originally. Remnants of these yam gardens still remain and grow at the ruins of abandoned villages, and such places are utilized for gathering by the Mbuti.

Fruit-trees such as lemon, orange, papaya, oil palm, and mango, although rare, do grow in villages as well as in old village sites in the forest. The Mbuti prefer these fruits. Also, a lemon or orange tree, and a capsicum, can often be seen at any forest campsite which has been used for many years by the Mbuti.

B. Wild plant foods

At present, wild plant foods have come to occupy only a small part of the total diet of the

*Mbuti men help the village men clear the new field, bring down timber, build houses, and so on. The women help the village women’s work weeding field, harvesting the crops, housekeeping, and others. Furthermore, the Mbuti provide the villagers with the big *Thaumatococcus daniellii* leaves for roofing, woody *Eremospatha haullevilleana*, *Ancistrophyllum secundiflorum* vines for basketwork, new *Phoenix reclinata* palm leaves for weaving mats, and many other forest products, as the villagers’ needs arise.

Mbuti. However, they often say, "We are the forest people, and we can live without farm products because there are abundant foods in the forest." From the viewpoint of the Mbuti, as they can get farm foods easily, they need not trouble themselves to spend time gathering forest foods.

Although the Mbuti's utilization of forest foods has been reduced in quantity, they still gather many kinds of wild plant foods. It was ascertained from observation and inquiry that they use 55 indigenous species of wild trees and herbs as food resources, as well as 23 species of fungi. The used plants includes 11 species of tubers, 19 species of seeds (or kernels) and nuts, 20 species of fruits (pulp or arils) and berries, and 5 species of leaves (Table 2).

1. Tubers

Of the 11 species of edible tubers, 7 species are yams (*Dioscorea* spp.). "Amekiki", "etaba", and "ekoko", as well as "emiki" which was originally an agricultural species, were all identified as *D. smilacifolia*. But the Mbuti distinguish these respectively according to the shape of the vines and the tubers. "Kisombi" (*Ipomoea chrisochaeta*) belongs to the same genus as the sweet potato, and 3 other species are not yet identified.

Generally in hunter-gatherer societies, such division of labour is managed so that men hunt and women gather. But in the case of the Mbuti net-hunters, women have little time allotted to gathering on hunting days, because they also take part in the net hunt as beaters and game carriers. Nevertheless, they seek to collect tubers in the intervals between net hunts or on the days off from hunting. Such tubers as *D. cf. sagittifolia* and *D. smilacifolia* ("etaba" and "ekoko") are especially favoured.

According to Coursey (1975), the tuber of *Dioscorea* is the organ to lie dormant in the dry season in the tropics (the winter in the temperate region), and sprouts again at the beginning of the rainy season. He further states all the edible yams renew the tuber every year. I observed the Mbuti gathering in the latter half of the rainy season as well as in the dry season. Ichikawa (1977) observed it also in June, when they dug *D. cf. sagittifolia* and *I. chrisochaeta*.

All the tubers except *D. bulbifera* can be eaten after being roasted in the fire. *D. bulbifera* bears not only a tuber but also bulbils as large as a child's fist, and these taste so bitter that they must be sliced and boiled with ashes and soaked in a stream to remove their bitterness. The *D. baya* tuber is so fibrous that the Mbuti chew the roasted pieces and spit out the fibers.

2. Seeds and nuts

Gilbertiodendron dewevrei ("mbau") abundantly bears large pods from the end of September to October. Thereafter, 4 cm diameter discoid seeds are scattered innumerable on the whole floor of the "mbau" forest. These are eaten after being grilled in the hot ashes of the fire, or they are softened first by boiling and then ground into a stiff porridge, which is eaten.

"Mbau" seeds are large and can be gathered in large quantities, though their season is limited. Today, however, even the Mbuti, with their territory in the "mbau" forest, have reduced their use of the "mbau" seeds. Although *C. alexandri* and *B. laurentii* of the same Caesalpinoideae subfamily as *G. dewevrei* are also dominant trees in the *Cynometra-Brachystegia* forest, their smaller seeds are not used as food.

The egg-shaped *Balanites wilsoniana* nuts, as long as 6 cm, must be processed to remove their bitterness. The nuts are removed from the shells and boiled, cut thin and soaked in a stream. Then they are ground in a mortar into stiff porridge, which is eaten.

In October, 1973, when I visited a hunting camp of one band, there were also staying three villager youths, with a large volume of cassava flour. Their purpose was to exchange the flour for Mbuti game, make lumps of dry meat, and then they carry them to a small town for sale at a high price. However, the net hunt carried out by an insufficient number of Mbuti was successful in bagging only a little game, and the Mbuti could not get the cassava flour. The next

morning, Mbuti women went out of the camp with empty baskets on their backs, and they came back with a lot of *B. wilsoniana* nuts, which they cooked in the previously mentioned manner and gave to their husbands and children.

The kernels of *Irvingia robur* and *I. gabonensis* are two of the favourites of the Mbuti. The fruits are as large as flattened tennisballs, but the size of the edible kernel is no more than the size of a broad bean. Nevertheless, the fruit is gathered and carried back to the camp. There they crack the core shells of the fruit with machetes and take out the kernels, which are toasted on the fire slightly and eaten. These are rich in fat, so they are metaphorically called the peanuts of the forest. As days go by, the pulp of the fruits turn to a spongy rubber-like substance, but the kernel inside the hard core shell can be eaten for a long period from the latter half of the rainy season to the dry season.

Treculia africana bears large fruit from the end of the rainy season to the dry season. The Mbuti eat the numerous seeds buried in the fruit pulp. The *Ricinodendron heudelotii*, *Pancovia laurentii* and *Celtis adolphi-friderici* seeds are also among their favourite dishes.

The *Cola acuminata* nuts are very often used for a drink. Both the Mbuti and villagers squash the nut, together with small *Solanum indicum* fruits and capsicum, in a mortar and they brew them to drink like tea. Otherwise, they nibble the nut and keep it in their mouths to enjoy its stimulus. This nut contains such stimulants as caffeine and theobromine, and is habitually used by the people of various parts of west Africa (Irvine 1961). When the nut is unobtainable, the Mbuti strip pieces of *C. acuminata* tree bark which is brewed in place of the nut.

3. Fruits

The Mbuti use 20 kinds of wild fruits and berries for food (Table 2). The number of species will probably increase further, for example in the number of kinds of figs (*Ficus*), as the survey continues.

The *Annonidium mannii* tree bears giant fruit as large as pineapples in the heavy rainy season. The Mbuti like to eat the sour pulp covering its seeds. Since this pulp is also a favourite for chimpanzees too, it is said that the Mbuti enter into competition with chimpanzees over the fruit. When the Mbuti find a fruit, they share it with one another and all of them eat it together.

The big *Canarium schweinfurthii* tree yields innumerable 4 cm long discoid fruit from September to October. The fruit consists of a thin pulp and a large seed. The fruit is boiled to soften the pulp which is eaten. The seeds are used for food in west Africa (Irvine 1961), and the Mbuti also say that the seeds are edible though they usually do not use them.

The Mbuti like the fruits of the *Landolphia owariensis* * which ripen around October. Also they mention the following fruits as their favourites: *Dictyophleba lucida* and *Orthopichonia lacourtiana* of Apocynaceae, *Myrianthus horstii*, *M. prousii* and *M. sp.* ("mbombo") of Moraceae, and *Pseudospondias microcarpa*.

Piper guineense is a wild pepper whose small fruit is sometimes used in cooking as a spice. The fruit of *Thaumatococcus daniellii* is a luxury rather than a staple food for the Mbuti. This is one of the Marantaceae herbs which cover the floor of the *Cynometra-Brachystegia* forest, and at the beginning of dry season it bears several angular fruits at its root, whose aril, the gelatinous part around the seed, tastes surprisingly sweet and is as good as artificial sweetening. So, if we drink water after licking this aril, the water tastes like sugared water. When this fruit is found (which is relatively rare), children and adults alike enjoy the taste by keeping the aril of the fruit in their mouths.

*"Buma" (or "abuma") and "ameddede" were both identified as *Landolphia owariensis*, however, these require further examination.

Table 2. Wild plant foods of the Mbuti in the Ituri Forest

Vernacular name	Scientific name
a) Tuber & Root	
tumba	<i>Dioscorea baya</i> (Dioscoreaceae)
konjo	<i>D. bulbifera</i> (Dioscoreaceae)
aduaka	<i>D. cf. sagittifolia</i> (Dioscoreaceae)
amekiki	<i>D. smilacifolia</i> (Dioscoreaceae)
ekoko	<i>D. smilacifolia</i> (Dioscoreaceae)
etaba	<i>D. smilacifolia</i> (Dioscoreaceae)
amakalukpe	<i>D. sp.</i> (Dioscoreaceae)
kisombi	<i>Ipomoea chrisochaeta</i> (Convolvulaceae)
amanjiapi*	?
amapayeie*	?
bekuku*	?
b) Seed & Nut	
ekele	<i>Balanites wilsoniana</i> (Balanitaceae)
kene	<i>Celtis adolphi-friderici</i> (Ulmaceae)
mbalambala	<i>Chrysophyllum delevoiyi</i> (Sapotaceae)
liko	<i>Cola acuminata</i> (Sterculiaceae)
esuli	<i>Desplatzia dewevrei</i> (Tiliaceae)
mbau	<i>Gilbertiodendron dewevrei</i> (Leguminosae, Caesalpinioideae)
esele	<i>Irvingia gabonensis</i> (Ixonanthaceae)
ebute	<i>I. robur</i> (Ixonanthaceae)
engango*	<i>Pancovia harmusiana</i> (Sapindaceae)
sesemu	<i>P. laurentii</i> (Sapindaceae)
songo	<i>Ricinodendron heudelotii</i> (Euphorbiaceae)
pusia	<i>Treculia africana</i> (Moraceae)
esenge or esengeli	?
hou	?
ngilesu or bangelesu	?
njee	?
pumbu	?
toby*	?
tou, eholo, or tubi	?
c) Fruit & Berry	
ngemoa	<i>Aframomum stipulatum</i> (Zingiberaceae)
ebambu	<i>Annonidium mannii</i> (Annonaceae)
mbe	<i>Canarium schweinfurthii</i> (Burseraceae)
toko	<i>Cola lateritia</i> (Sterculiaceae)
malondo	<i>Dictyophleba lucida</i> (Apocynaceae)
buma or abuma	<i>Landolphia owariensis</i> (Apocynaceae)
amedede	<i>L. owariensis</i> (Apocynaceae)
bembekenye	<i>Myrianthus holstii</i> (Moraceae)
akpekpe	<i>M. prousii</i> (Moraceae)
mbombo	<i>M. sp.</i> (Moraceae)
akale	<i>Orthopichonia lacourtiana</i> (Apocynaceae)
abeka	<i>Piper guineense</i> (Piperaceae)
sana	<i>Pseudospondias microcarpa</i> (Anacardiaceae)
ekoko	<i>Renalmia africana</i> (Zingiberaceae)
amanbunonbuno	<i>Salacia pyriformoides</i> (Celastraceae)
mgbako	<i>Solanum indicum</i> (Solanaceae)
ngongo	<i>Thaumatococcus daniellii</i> (Marantaceae)
bukanbanda*	?
elinda	?
ngamo*	?
d) Leaf	
atete	<i>Amaranthus dubius</i> (Amaranthaceae)
kpedekpede	<i>A. tricolor</i> (Amaranthaceae)
njombo	<i>Momordica foetida</i> (Cucurbitaceae)
ngoua	<i>Solanum nigrum</i> (Solanaceae)
asede or alaka	?

- e) Fungi (vernacular names only)
- amangbama; mamkbama*
 - amasoso
 - amatana
 - buttiandonge; mbutiandonge*
 - buttianmane
 - isamba
 - kandokaka
 - makusakusa; amakusakusa*
 - malenge
 - mbutelepa or kangelepa
 - amakakacha*
 - kbungama*
 - matama*
 - mbutiangongo*
 - mbutiyonahele*
 - mbutioeta*
 - mouku*
 - pasese*
 - pelekwe*
 - sengereb*; singelebe**
 - sikpolo*
 - amasadasada**
 - bputubputu**

Note: —* = by M. Ichikawa (1977)

—** = by R. Harako (personal communication)

4. leaves

The villagers often cook young cassava leaves with palm oil and salt, and this plays an important role as a side dish. Occasionally they also use young taro, sweet potato, and pumpkin leaves for side dishes. On the other hand, the Mbuti seldom cook these leaves even when they stay at the base camp near the village, for they usually use neither palm oil nor salt. There were 5 species of herbs which were said to be used for food (Table 2), but I never observed them actually cooking these leaves. These herbs are weeds which are not seen on the forest floor but are found growing around the field or in the open ground. It may be considered that leaf eating habit is of villagers and that the Mbuti did not originally have such a habit.

5. Fungi

In contrast with leaf eating, the Mbuti often use 23 kinds of fungi for food (all are not yet identified; Table 2), including the data of Ichikawa (1977) and Harako (personal communication). Many of these grow during the rainy season, while some fungi such as “amatana” and “kandokaka” appear in the dry season. “Buttianmane” (or “mbuttianmane”) whose big cap is brown also appears at the beginning of dry season as the name means*, it is edible only during its young stage of growth, and as days go by it becomes tougher to eat. “Amangbama” were seen from the end of the rainy season to the start of the dry season, orange-coloured “isamba” fungi which grow during the rainy season appear exclusively on fallen *B. laurentii* tree, and “malenge” grows on termite mounds during the rainy season.

When Mbuti women find and gather fungi on the way to or from net hunting, etc., they wrap them with the large Marantaceae leaves cut on the spot, and bring them back to the camp. They roast the fungus in the fire together with the leaf-wrapper, or they boil them with meat in a pot. However, there is a prohibition against children and youths eating the fungus called “mbutelepa” (or “kangelepa”). Ichikawa (1977) reported some other kinds of fungi from the subjects of the food restriction as follows. Three kinds of fungi, “isamba”, “matama”

*“Butti” or “mbutti” of “buttianmane” (“mbuttianmae”) are the words for fungus, and “mane” means the sun.

and “sikpolo”, must not be eaten at hunting camps in the forest, though they may be eaten while at the base camp near the village. But even in this case they must not be cooked together with meat. Youths who should be active sexually must not eat “amangbama” (“mamkbama”); parents who have a baby must not eat “amakakacha”; and further, pregnant women and their husbands are forbidden to eat “sikpolo”.

The fungi are desirable side dishes for the villagers too, therefore, they form one of the agencies through which reciprocal relationship are kept between Mbuti women and villager women. While the band stays at the base camp, Mbuti women visit the village occasionally carrying a pile of fungi which they have gathered, and they provide them to the villager women with whom they have a close relation.

III. THE MBUTI'S MATERIAL CULTURE AND THEIR PLANT UTILIZATION

The daily life of the Mbuti consists of two phases, one is the hunting and gathering in the forest and the other is the living in the camp. The latter can be divided into such activities as the arrangement and maintenance of dwelling facilities, cooking and dining, tool manufacture and body care, play, ritual, and so on. In these activities they make and use various items of their material culture, and they utilize numerous kinds of plants as raw materials in this field. Therefore, it may be said that Mbuti's material culture is a ‘plant’ culture (cf. Table 3).

A. Primary tools for manufacturing

The primary tools with which the Mbuti make up their material culture are three kinds of iron tools: the knife, the machete and the axe. Further, the arrow point and spear blade are used for knives. Most of these iron blades are the products of the villager blacksmiths. The Mbuti obtain used ones from the villagers with whom they have close contacts.

1. Knives (“ngoa”)

Knife blades are of lengths between 10 and 20 cm (Figure 2). The haft of the knife is usually made of a branch of *Strychnos longicaudata* or *Jasminum pauciflorum*. The knife, which tapers to a sharp point, is also used to bore holes. As the knife is used frequently for many purposes, most of the Mbuti (except children) possess knives.

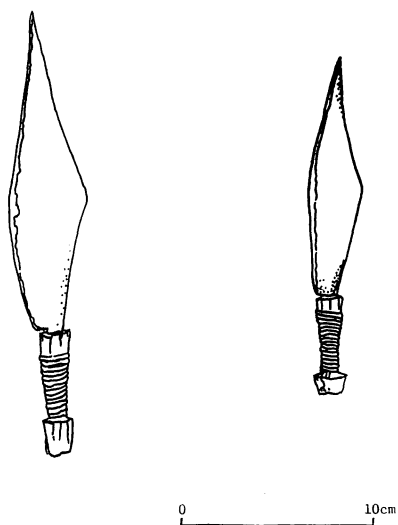
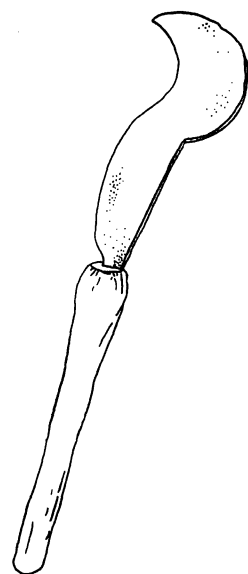
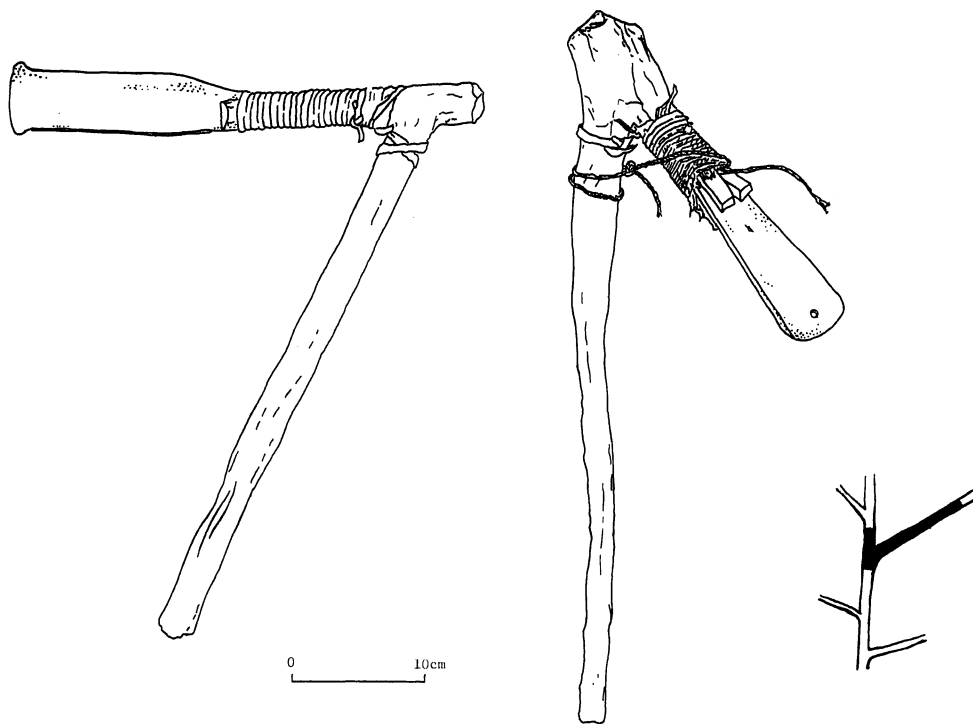


Fig. 2. Knife: “ngoa”



0 10cm

Fig. 3. Machete: "koso"



0 10cm

Fig. 4. Axe: "lobo" (left), and Adze: "topa" (right)

2. Machetes (“koso”)

There are two types of machetes. One is the traditional machete whose blade is made by villager blacksmiths (Figure 3). A wooden haft as long as some 20 cm is attached to it. The haft is made of *S. longicaudata*, *J. pauciflorum* or a branch of *Antiaris welwitschii*. They fasten the haft and the tail of the blade driven into the haft with the resin of the large “ebala” tree (“ebaka”: NG, unidentified). This resin is very hard at normal temperatures; it is heated and melted on the fire, daubed to the blade tail, and driven into the haft. The other type is a steel machete which is a trade good only recently brought into the Ituri area.

Most of the machete blades the Mbuti possess are ones worn-out already by villagers. Each family usually has a machete, since the machete has various uses such as: manufacturing tools, clearing bush, dissecting the game, and chopping long bones to eat marrow, etc.

3. Axes (“lobo”) and Adzes (“topa”)

While the villager’s axe is a large one handled with both hands to cut down trees, the Mbuti’s axe is small and is handled with one hand (Figure 4). The forked stock of such slender trees as *Diospyros deltoidea*, *D. boala*, *Cola sciaphila*, and “bukebukakulu” (unidentified) is used for the haft of the axe. The axe blade is inserted into an end of the haft, and these are bound with a cord made of *Manniophyton fulvum* or of *Eremospatha haullevilleana* which will be further described later. The main use of the axe is to bore holes in wood, especially for honey collecting, and it is an essential tool for men to ream the hole of the hollow wherein the bees nest. When the same blade is attached to the haft horizontally, it acts as an adze (Figure 4), which is of rather little use for the Mbuti (compared with the machete and the axe), except when they occasionally make a canoe.

B. Strings and Ropes (“ngoli”)

The Mbuti frequently use many kinds of strings and ropes for many purposes in their life. Most of them are made of plant materials. The Mbuti never work the sinew of game into strings, and they seldom use fur strings. There are many kinds of plants fit for making strings or ropes. Many of the vines serve as cords without processing. Here, I will treat four species of plants which are very often used in the various scenes of Mbuti activities.

1. *Thaumatococcus daniellii* (“ngongo”)

This, belonging to Marantaceae, is a tall herb whose slender stalk is some 1.5 m long and is very flexible but strong. The Mbuti draw and squeeze the stalk by rubbing it against the machete or a stick to make a flat cord. This is used to bind various things such as timber, firewood, etc. It is also used for headbands to carry baskets, game, and other things.

2. *Marantochloa congensis* (“toto”)

This is also a Marantaceae herb whose stalk is about 1.5 m long and some 2 cm thick at the base. The Mbuti strip the cortex from the stalk, and they use such strips as strings or cords. The cortex of the “toto” is so flexible and strong in the green that the Mbuti bind everything with this cord. When the stalk is slit and squeezed, it acts as a headband broader than that of *T. daniellii*. Also the Mbuti prepare plenty of “toto” strings and weave baskets or mats with them. This kind of baskets and mats do not endure long-term use because the “toto” cortex loses its flexibility and tends to break readily as it dries.

3. *Eremospatha haullevilleana* (“mboppi”; “jelani”: NG)

This is a woody palm vine some 1.5 cm thick, which has various uses. This flexible vine itself makes a rope which is used for footholds and body support to climb trees to collect honey, and in children’s play such as for swings and the skipping rope. As this vine has such a nature that it tends to tear into strips while keeping even longitudinal thickness, it can be made into strings or cords as thin as desired. Since these strings keep their flexibility even after drying as

well as when green, they are frequently used, especially for binding timber, and are important material for basketry.

4. *Manniophyton fulvum* ("kusa")

"Kusa" (*M. fulvum*) is a woody Euphorbiaceae vine, and only the bark of newly growing vines is used. While the strings and ropes made of the above-mentioned three plants and of other vines can be prepared on the spot, the strings of "kusa" is made through complicated processes such as making it into fibers first and twisting these fibers together. The Mbuti collect the bark, strip off its cortex and gather only the bast. Next, they make the bast into fibers by means of drawing it through a hand-gripped knife, and then twist the fibers into two threads, which they twist again into a string on their thighs. This string is the material of the hunting net, and is used for manufacturing various tools and implements described later.

C. Big leaves of Marantaceae herbs

The big leaves of Marantaceae herbs, especially of *Thaumatococcus daniellii* ("ngongo") and *Ataendidia conferta* ("bulu"), are used very often and for various purposes in the daily life of the Mbuti. The egg-shaped "bulu" leaves are about 25–30 cm long. "Ngongo" leaves are as long as 35–40 cm and as wide as 25–30 cm. Both leaves are glossy and so flexible that they can be bent and folded. These are, for the Mbuti, equivalent to our tough, wax paper. "Ngongo" leaves are the primary material for the roofing on the Mbuti's huts (also for the villager's houses). Also both kinds of leaves serve as mats and are used for wrapping, carrying, and cooking food. These can be used as various vessels, too. The uses of these leaves will be mentioned one by one in each section below.

Leaves of the same Marantaceae herbs such as *Marantochloa purpurea*, *Sarcophrynium prionogonium* and *S. schweinfurthianum* are as big as *A. conferta*. But, since these are apt to tear and become fragile as they dry, they are not used as often as *A. conferta* or *T. daniellii*.

D. Hunting tools and implements

The Mbuti's basic hunting tools are the bow and arrow, spear, and hunting net (the archers lack the net). When villager men actually do hunt, they catch the game chiefly by means of snaring. But the Mbuti, both archers and net-hunters, do not practise snare hunting at all.

1. Bows ("mange")

The bow is some 80–90 cm long, and the shaft is made of a straight branch of *Vepris louisii*, *Aidia micrantha*, *Diospyros* sp. ("tumbo") or "kalu" (unidentified), the former two are especially preferred. The stick is shaved thin towards both ends. For the bow-string ("moka"), the Mbuti use one of two palm vines: *Ancistrophyllum secundiflorum* ("koko") or *A. sp.* ("leckwe" or "akpekpe"). They tear off the hard cortex of the vine, and shave it into a flat cord about 0.5 cm wide, which acts as the bow-string. In my study area, "leckwe" vines were comparatively rare than "koko", which the Mbuti men generally used. It is said that "leckwe" grows in the swampy places. According to Harako (1976), "koko" vines are rarely seen in the northeastern part of the Ituri Forest, where the Mbuti regard "leckwe" vines as the primary material for the bow-string. In any cases, it is not hard to get the material for making bows, and they can make it easily as the need demands.

When the Mbuti catch monkeys (*Cercopithecus* spp.), they use the tail skin for bow decoration, inserting one end of the bow shaft into the skin sheath of the tail.

2. Arrows

The Mbuti have three kinds of arrows: "sua", "mutali", and "appi", any of which is about 45–50 cm long. The "sua" is the simplest arrow with the shaft itself shaved into a sharp point. When poison is applied to the point of the "sua", it makes a poisoned arrow "mutali". Both

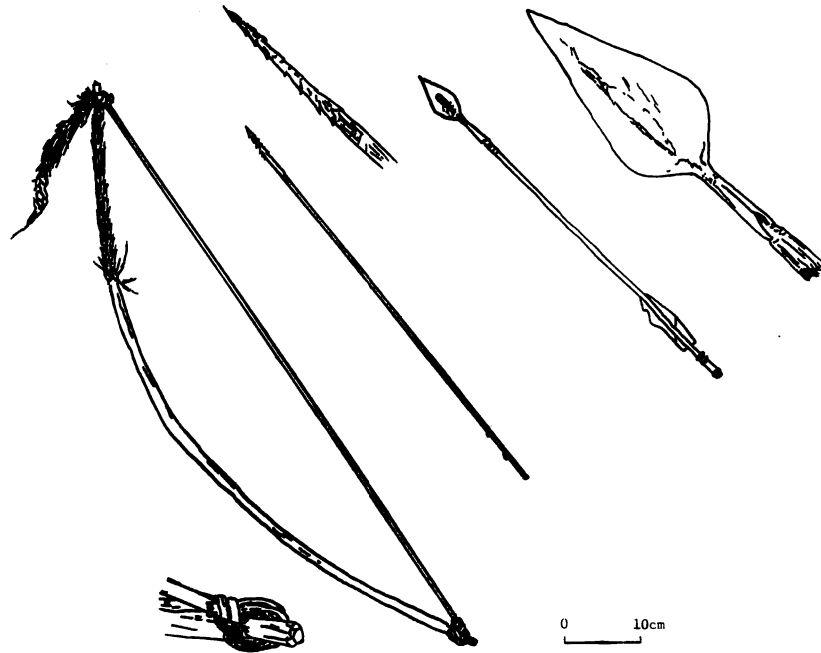


Fig. 5. Bow: “mange”, and Arrows: “sua” (left) and “appi” (right)

the arrow poison and poison-producing woody vine itself are called “mutali” (details will be given in the next section). The “appi” is an iron-tipped arrow (Figure 5).

Materials for the shafts of the “sua” and “mutali” are obtained from two species of palms (*Raphia* spp.): “tundu” (“bambu”: NG) and “mabondo”. The midribs of their leaflets serve as arrow shafts. “Tundu” is a wild *Raphia* palm growing in the *Cynometra* forest. “Mabondo” is a palm cultivated by villagers for making palm wine, and can not be seen in the midst of the forest but around villages and along the road. Fronds of these palms which consist of numerous leaflets provide innumerable materials for arrow shafts to the Mbuti. The “sua” is used mainly for shooting birds and small animals, and the “mutali” is for shooting monkeys in trees. Both arrows are not recovered once shot.

The iron-tipped “appi” is the arrow used for terrestrial mammals especially duikers (*Cephalophus* spp.), and is always recovered. For the shaft of the “appi” rather tough branches of *Strychnos longicaudata* or *Acalypha neptunica* are used, though the midrib shaft of *Raphia* palms is also used. The point is fixed to the shaft with the previously mentioned “ebala” resin binding agent.

The feather (“efofo”) of the arrow is simple, made of a leaf inset into a slit prepared in the rear of the shaft. The leaf is cut into a triangle round the midrib and used for a feather. The “efofo” shrubs are *Penianthus longifolius*, *Garcinia ovalifolia*, and *Bequaertiodendron logni-pedicellata*.

3. Arrow poison and Fishing poison

Materials for Mbuti’s arrow poison (“mutali”) are all plants. More than 10 species of trees, woody vines and herbs together are used. The chief element of the poison is the bark sap of a woody vine which is also called “mutali” (*Parquentina nigrescens*). They chip the bark of the vine first, grind it in a cavity carved in a log, and then they put it into the press basket made

Table 3. Material Culture of the Mbuti

No.	Item	Material*	A	Category**			Remarks
				P	C&S	M	
A) Implements for manufacturing							
1	knife	iron + branch of 122, 120		+		+	
2	machete I	iron + branch of 122, 120, 8		+		+	blade is used one of villagers
3	machete II	steel + wooden handle (ready made)				+	blade is used one of villagers
4	axe (or adze)	iron + branch of 97, 117, 118, 238 + vine of 158, fiber of 82		+		+	blade is used one of villagers
5	whetstone	simple stone			+		used and left on the spot
6	binding agent	resin of 199		+			to fix iron blades to shaft
7	string I (twisted)	bast fiber of 82		+			
8	string II	stalk of 181, 185; 158, 159, vines		+			taken and used on the spot
9	rope	156-159, other woody vines		+			taken and used on the spot; fig vines "kumo" too
10	mortar to prepare poison	trunk of trees		+			made on the spot, left after use
11	sap press basket	shredded stalk cortex of 181		+			made on the spot, left after use
12	bark beater I	ivory	+				
13	bark beater II	trunk of 144		+			
B) Hunting equipments							
	arc	branch of 72, 142, 119, 209		+			
14	bow string	cortex of palm vines 156, 157		+			
	decoration	tail skin of monkeys	+				not essential
15	arrow I ("sua")	leaflet midrib of 161, A-23; branch of 122, 77		+			
16	arrow II ("mutali")	leaflet midrib of 161, A-23 + poison		+			
17	arrow III ("appi") (arrow feather)	161, A-23, 122, 77 + iron point leaf of 35, 102, 113		+		+	
18	quiver	skin of duikers (<i>Cephalophus</i> spp.) + string I, II	+	+			ornamental, rarely used
19	wrist protector	monkeys' skin + string I, II	+	+			ornamental, rarely used
20	spear	iron + shaft of 91, 72, 142, 119, 97, + string I		+		+	
21	spear sheath	shredded vine of 158		+			ornamental, rarely made
22	net	string I (82), (+ seeds of 194)		+			archers have not this
23	dog bell	trunk of 99, 124 + branch of 111 + string I		+			
24	arrow poison	barks of 134 & 49, 54, etc.		+			

25	fishing poison	fruit of 55 or bark of 62, 81, etc.		+		
26	hunting medicine	duikers' horn + animals + plants	+	+		prepared by men of special knowledge
27	marker "ekombi"	leaves of 180		+		made on the spot
	C) Implements for gathering and carrying					
28	digging stick	stem of slender trees		+		taken and left on the spot
29	basket	vine of 158, stalk cortex of 181		+		
30	carrying head band	bark of 47, 48, 50, 94, 109; or stalk of 181, 185		+		prepared on the spot
31	hand basket	vine of 158 + string I		+		not essential
32	honey container I	string II + leaves of 185, 180		+		prepared on the spot
33	honey container II	bark of 50 + wood of 99, 124		+		not so common as I
34	baby sling	duikers' skin	+			substituted by the cloth, today
35	canoe	trunk of 27, 124, 84, 99		+		
36	pole	trunk of 97, 117, 118 etc.		+		
	D) Dwelling equipments					
37	hut	slender trees, shrubs + leaves of 185 or 162		+		
38	mat I	leaves of 180		+		this endures only for a few days
39	mat II	shredded stalk cortex of 181		+		
40	bed	slender trees + string II, vines		+		not essential
41	chair	same as above		+		made on the spot
42	bench	trees having spread branches		+		often seen in the base camp
43	broom	branches of shrubs		+		prepared on the spot
44	fire brand I	shredded wood of 40, or dried stalk of 181		+		
45	fire brand II	resin of 73, (199), + leaves 180, 185		+		
	E) Cooking implements					
46	pot I	clay			+	made by villagers
47	pot II	iron			+	used one of villagers
48	stirrer	trunk or branch of 105		+		
49	dish I	tortoise shell	+			rare
50	dish II	enameled ironware			+	
51	spoon I	shell of limnetic bivalves	+			rarely used
52	spoon II	stainless steel			+	
53	cup I	calabash (A-14), pampkin (A-15)		+		obtained from villagers
54	cup II	enameled ironware			+	
55	mortar	trunk of 90		+		
56	pestle	trunk of 91, 144		+		
57	food wrapper	leaves of 180, 185		+		for carrying and roasting foods

58	meat drying rack	slender trees + string II		+		Lumps of meat are covered with leaves of of 180, 185, etc.
59	pipe	clay pipe head + 152, A-20		+	+	pipe head is made by villagers
60	F) Cloth and ornaments					
60	loincloth	bark of 8, 12-26, 221-223		+		
61	dyes for barkcloth	sap of 10, 38, 45, 60, 61, 89, 129, 143, 147, A-4		+		prepared on the spot
62	waist string	bast fiber of 82, (109, 208)		+		
63	waist belt	leaf fiber of A-23 + stalk cortex of 181		+		
64	necklace I	seeds of A-16 + string I		+		
65	necklace II	shredded animal skin	+			
66	comb	wood of 144		+		
67	cosmetic oil	seeds of 70, 106, 203, 204, A-22,		+		prepared on the spot
68	cosmetic colour	seeds of 147, leaf sap of 89, pounded wood of 61		+		prepared on the spot
69	mirror (pieces)				+	
70	G) Musical instruments and dancing ornaments					
70	drum	duikers skin + trunk of 99, 124	+	+		made by villagers
71	split clappers	branch of 75		+		
72	"luma" pipes	branch of A-20, stalk of 152, 153		+		
73	finger piano	iron + wood of 99, 124		+	+	
74	horn	ivory, horn of Bongo	+			used in the "molimo" ritual
75	"makata" sticks	trunk of 75		+		made and played in the initiation
76	dancing rattle	iron + duikers skin	+		+	obtained from villagers
77	basketry cap	vine of 158, cortex of 181 + feathers	+	+		
78	fur cap	fur of genets	+			
79	grass skirt	leaf fiber of A-23 + string I		+		in the dance of girls' initiation
80	H) Miscellaneous					
80	sandpaper	leaf of 11		+		
81	scrubbing-brush	dried fruit of 94		+		
82	straw	culm of 152		+		
83	fly flap	tufty spike of papyrus (155)		+		

Notes *: The number represents the plant species of the same number in Table 1.
 **: A = Animal, P = Plant, C&S = Clay and Stone, M = Metal.

of the cortex cords of *Marantochloa congensis*, and squeeze the sap out. In the same way they collect the sap of the root bark of young trees such as *Erythrophleum guineense*, *Ixora odorata*, and *Piptadeniastrum africana*, and mix them with that of *P. nigrescens*. Also they add the white sap of *Elaeophorbia drupifera* and saps of many other plants*. They say that the combination of plants varies by areas and persons. Finally, they add the ground fruit of the “kaya” (red-pepper) in order to “strengthen the effect of the poison”.

They coat the tips of 2–3 hundred previously prepared “sua” with the mixture of poisonous saps and dry the arrows in the fire. They repeat this process several times until the arrow tips are covered with the black tar of the poison.

The Mbuti say that they catch fish in the dry season by means of dropping the poison into the diminished brooks, but I have not observed such a practice yet. For the fishing poison they use the *Tetrapleura tetraptera* legume, the “sakba” (unidentified) bark, or the leafy branches of *Tephrosia vogelii*, *Elaeophorbia drupifera*, “bukutu”, “malombo”, “mbi”, and “pida” (all unidentified). They smash up any of these and throw it into the stream.

4. Quivers (“baba” or “bolobolo”) and Wrist protectors (“asuba”)

The quiver is made of duiker skin, and the wrist protector, which guards against the snap of the bow-string, is made of monkey skin (Figure 6). To sew the hides, a string made of *Manniphyton fulvum* or *Marantochloa congensis* is used. The use of such quivers and wrist protectors can only rarely be seen during actual hunting, so they can be regarded as ornaments for men. Usually they carry arrows binding with *Ataenidia conferta* or *Thaumatococcus daniellii* leaves, or with *M. congensis* cord.

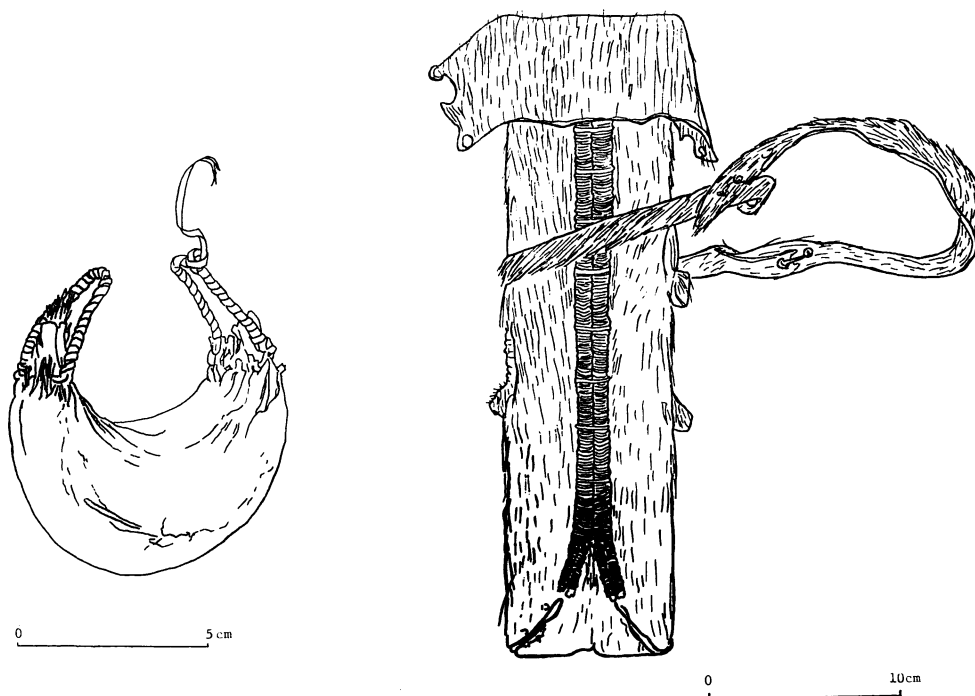


Fig. 6. Wrist protector: “asuba”, and Quiver: “baba” or “bolobolo”

**Alafia grandis*, *Cleistopholis glauca*, *Ouratea elongata*, *Rauvolfia vomitoria*, *Anchomanes difformis*, *Corymborkis corymbosa*, “aboigitade”, “boloso”, “kakaseke”, “kulu”, “masisi”, “njele” (all unidentified).

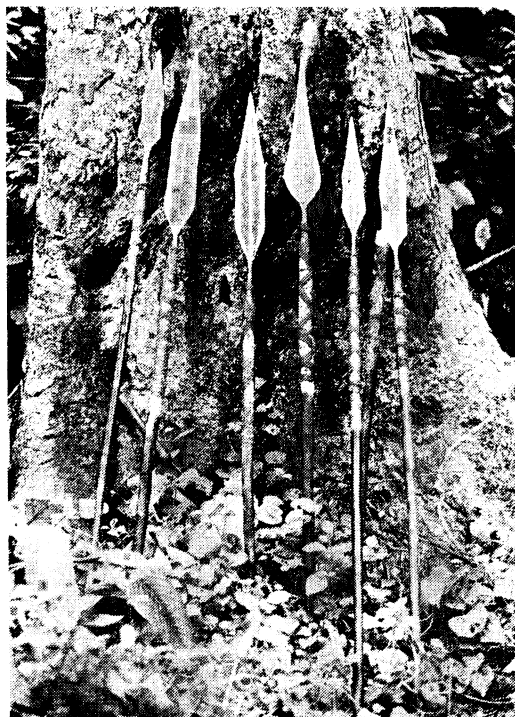


Fig. 7. Spear: “ekonga”

5. Spears (“ekonga”)

The spear is about 130–160 cm long and it consists of a wooden shaft and an iron head, the largest of which is some 50 cm long and 15 cm wide. The lower end of the spearhead is of cylindrical form, into which the shaft is placed and bound with a string made of *Manniophyton fulvum* (Figure 7). The shaft is made of such slender tree stem as *Pancovia harmsiana*, *Diospyros* sp., *Aidia micrantha*, *Vepris louisii*, or *Cola sciaphila*.

Occasionally a spear sheath is woven from the strips of *Eremospatha haullevilleana*, but this is also no more than a type of ornament. Spears are usually carried with their heads bare.

6. Hunting nets (“kuya”)

The length of a net employed by one man varies from about 40 to 100 m and its height is about 1.2 m. The square mesh of the net is 5–7 cm long on one side. This net is wound up in a coil which is 2 m in circumference and carried across the shoulders (Figure 8).

The material of the net is the above-mentioned string made from the *Manniophyton fulvum* (“kusa”) bast fiber. Both men and women engage in the entire range of work from gathering the “kusa” bark to making the fiber into string. When the string reaches a length of 200–300 m, it is woven into a section of net. Only men do weave the net. The net is made longer by repeating these processes. On the other hand, the net is often torn by game, and timeworn parts of the net become weak. Therefore, the total length and durability of the net is maintained by frequently removing weakened and torn portions and supplying them with newly woven portions.

Some men suspend several “basapi” (unidentified) nuts in the net at intervals as clappers, the flat nuts being so hard that they clatter when they hit against each other.

7. Dogs and Wooden bells (“lele”)

The dog is the Mbuti’s only domestic animal, and it performs the important role of driving



Fig. 8. Hunting net: "kuya"

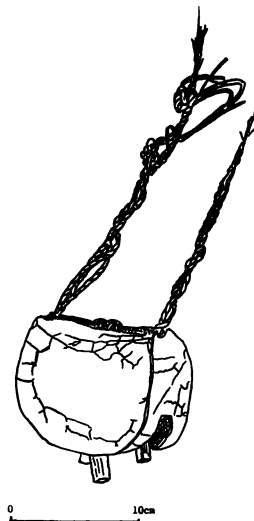


Fig. 9. Wooden bell: "lele"

out and tracking the game for the bow and arrow hunting of the archers (Harako 1976). In net hunting, on the other hand, dogs are not indispensable because women also take part as beaters. Therefore, net-hunters bands do not always keep dogs.

When hunting, wooden bells are tied to the dogs around the neck. The wood used for the bells is of *Pterygota bequaertii* or *Alstonia boonei*, which is hollowed out. Then a few small sticks are hung in the hollow (Figure 9). The cord of the bell is of *Manniophyton fulvum*.

8. Landmarks and "Ekombi"

The forest is crisscrossed in every direction with the tracks of the Mbuti themselves and of

animals such as elephants and buffaloes. The Mbuti, of course, often leave the footpath and walk around in the forest freely. In the forest, however, visibility is very poor and the focal range is limited. All around are similar clumps of trees and there are few indications of direction. When the Mbuti move around in the forest, therefore, they break off nearby twigs at short intervals on their way, or they advance while plucking the leaves of *Ataenidia conferta* and dropping them piece by piece at their feet as landmarks. Especially when moving about in unfamiliar territory, they leave such markers behind at frequent intervals. When changing net hunting areas, leading men mark their tracks by bending or trampling down Marantaceae herbs forward to show the route to the men and women following them.

A unique mark called the “ekombi” is also used, particularly in the case that the marker serves to clarify one’s identity to anyone who finds it. The “ekombi” is a piece of *A. conferta* leaf in which the totemic animal (“inginiso”) of his own clan is represented symbolically (Figure 10). Those who chance upon this mark can understand at a glance what clan the man who left the marker and when he passed there. If they find an “ekombi” at the foot of a tree upon which bees nest, it tells that this honey has been already claimed by some person who found it before.

E. Implements for gathering and carrying

1. Digging sticks

To gather root crops a digging stick is used. This is a simple stick 3–4 cm thick cut from shrubs. No particular species of shrub is used. Since Mbuti women always carry machetes, they can get digging sticks anywhere, so they need not carry them.

2. Carrying baskets (“so”)

The material of the basket is the long strips of *Eremospatha haullevilleana* or *Marantochloa congesta* mentioned previously. The basket woven by Mbuti women is of open-mesh (Figure 11). This is made of crude strips and hemmed roughly with the same strips. The basket made of the *E. haullevilleana* strips is more durable than that of the *M. congesta*, because the strip



Fig. 10. “Ekombi” markers 1: a kind of monitor (“ambai”), 2: leopard (“moli”), 3: squirrel (“akoda”), 4: chimpanzee (“siko”), 5: snake (“njoka”), 6: great blue turako (“kulukoko”).

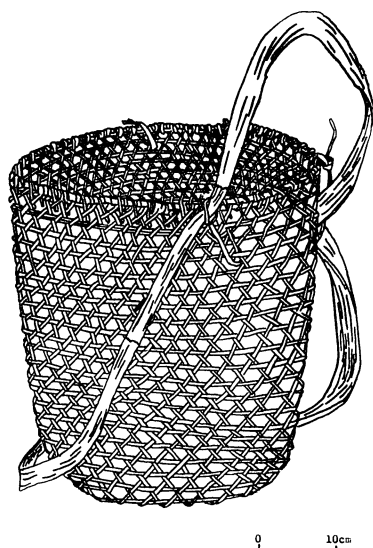


Fig. 11. Basket: “so”, and Headband

of *M. congensis* becomes brittle as it dries. When small things are put in the basket, they cover the inside of the basket with *Thaumatococcus daniellii* or *Ataenidia conferta* leaves to keep the things from falling through the mesh.

Villagers' baskets, on the other hand, are made by semi-professional village men who prepare the strips of *E. haullevilleana* by shaving them into similar widths and thicknesses, and weaving them into elaborate closed-mesh baskets. The upper rim of the basket is further hemmed and reinforced with a stiff hoop made of the *Ancistrophyllum secundiflorum* palm vine.

3. Headbands

The headband to carry baskets on the back is made on the spot for immediate use. The Mbuti strip young trees 15–20 cm in diameter of such as *Cynometra alexandri*, *Brachystegia laurentii*, *Gilbertiodendron dewevrei*, *Desplatia dewevrei*, and *Dicranolepis disticha* of their bark in strips 5–10 cm wide and about 2 m long, and remove the cortex. They use a strip of the bast for the headband. Cruder headbands are made of the stalks of the *Thaumatococcus daniellii* and *Marantochloa congensis*. When Mbuti women carry captured game or firewood, they cut these stalks and prepare headbands on the spot.

4. Honey containers

There are two kinds of honey containers, “amboi” and “ebimba”. The former is very roughly made and consists of a crude framework made of the strips of *Marantochloa congensis* or other vines and the leaves of *Thaumatococcus daniellii* or *Ataenidia conferta* (Figure 12.) This is made at the spot of honey collecting and is discarded once used. “Ebimba” consists of a bark cylinder of *Gilbertiodendron dewevrei* and a bottom and lid made of the wood of *Alstonia boonei* (Figure 12). This is elaborately worked and can be used for a long time. But the Mbuti rarely make this kind of honey container, which is rather a villager-like handiwork.

5. Baby slings

While Mbuti mothers are out of the camp, children above about three years old remain there and they play together watched by a few adult caretakers. But babies less than two years old, on the other hand, always accompany mothers being carried in their arms. A baby sling is hung from the right shoulder down to the left side and the baby rides on the sling and being

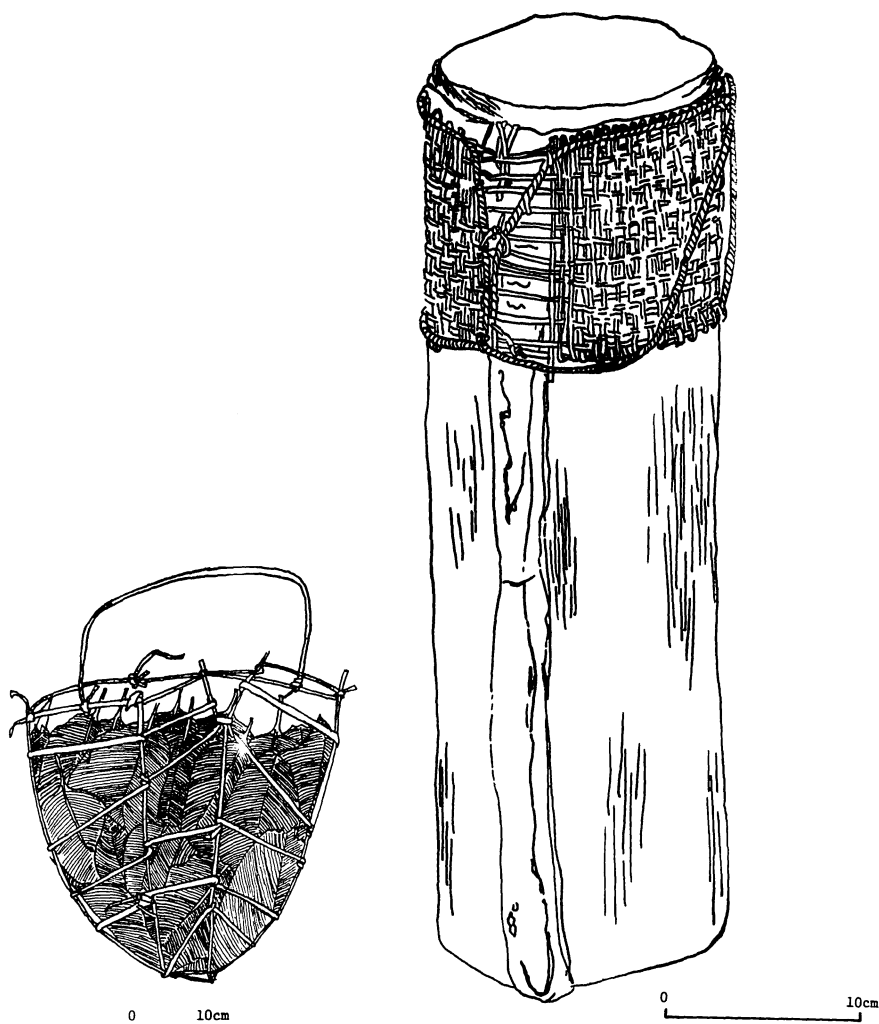


Fig. 12. Honey container: “amboi” (left) and “ebimba”) (right)

held in the left arm. The baby sling was formerly made of duiker skin, but today, it has been replaced by cloth.

6. Canoes

The band whose territory expands across the Ituri River or its major branches uses one or two canoes to cross the steram. A canoe is made of the trunk of a big tree such as *Alstonia boonei*, *Musanga cecropioides*, *Ricinodendron heudelotii*, or *Pterygota bequaertii*, which is soft and easy to hollow out. Large axes and adzes to cut down and hollow the tree are borrowed from villagers. The canoe is an introduction from the villagers.

F. Dwelling equipment

1. Huts (“endu”)

The Mbuti's hut is semispherical about 2–3 m in diameter and 1.5 m in height, and is built by the woman. They first collect slender shrub stalks 2–3 m long and 2–3 cm thick at the lower



Fig. 13. Hut: "endu"

end. Then they fix them in the ground in a circle and make a framework by bending them and intertwining them to each other. Materials for the framework grow thick on the forest floor, and they do not much care about the species of the stalks used. Next, they gather the big leaves of *Thaumatococcus daniellii* around the campsite and pile them in twos and then thatch the framework with them from the bottom to the top (Figure 13). Then they fix the thatched leaves by putting hoops made of *T. daniellii* or *Marantochloa congenensis* stalks on the thatched framework. Big Marantaceae leaves are piled roughly on the top of the hut to prevent leaks. It takes one woman less than half a day to build a hut.

As there are very few Marantaceae herbs in the *Gilbertiodendron* forest, the Mbuti in this forest thatch huts with *Sclerosperma mannii* palm fronds or with *Gilbertiodendron dewevrei* leafed twigs or other leaves. The former *S. mannii* is found only in the *Gilbertiodendron* forest, and huts thatched with its large fronds look good, while huts thatched with *G. dewevrei* look shabby.

2. Mats

A fire is burnt at the center of the hut at night, and family members sleep lying around the fire. Mbuti women inhabiting the *Cynometra-Brachystegia* forest gather *Thaumatococcus daniellii* or *Ataenidia conferta* leaves and lay them on the floor as temporary mats, which they sweep out every a few days and pile up on top of the hut, laying fresh leaves again. Occasionally, they make simple mats with *A. conferta* leaves by doubling them along the midrib and pricking them each other in succession. This type of mat is called "amatobetobe" (Figure 14). Also they can weave mats with the *Marantochloa congenensis* stalk strips, but it is rare to make such mats in the hunting camp.

On the other hand, village women make very durable mats ("kilako") of elaborate workmanship with young leaflets of undeveloped fronds of the *Phoenix reclinata* ("lukindu") palm. The "lukindu" leaflet is one of the forest products brought to the villagers by the Mbuti, but the Mbuti themselves do not make this kind of mat.

3. Beds and Chairs

Men occasionally construct simple beds in the hut. They fix forked stakes on the ground in



Fig. 14. "Amatobetobe" mat

two lines, lay short sticks across them, and then they put long and straight sticks side by side on the short sticks, and finally they bind the sticks with cord made of *Eremospatha haullevilleana*, *Marantochloa congensis* or with thin woody vines. Bachelor youths sleep at night around the fire at the center of the camp lying on *Thaumatococcus daniellii* and *Ataenidia conferta* leaves, or on coiled hunting nets.

The Mbuti (except the children) do not sit on the bare ground but sit on logs or Marantaceae leaves. The Mbutis' simplest chair is made of 4–5 sticks 60–70 cm long and a coil of any woody vine (Figure 15). This is called "mbanga", whose general meaning is short trees or sticks cut from trees or shrubs. They also make chairs with backs, by jointing two V-shaped poles (Figure 15). Further, they cut a multi-forked tree and lay it near the fire, and use it as a bench called "bakati" (Figure 15).

4. Fire and Firebrands

In the camp, men gather around the central fire and spend their time talking cheerfully or working with their hands. This men's place is called "tele". Women make fires in front of each hut and they cook with that fire. Wood for the "tele" fire is supplied by the men themselves, and that for women's fire is gathered by each woman. Fallen trees and branches for fuel can be gathered easily anywhere in the forest.

When the Mbuti move, they always carry smoking brands with which they make fires. Whenever a man goes spear hunting by himself, he takes a smoking piece of wood in one hand. In such a situation it is impossible for all the fires within the camp to go out; therefore, the building of a fire from scratch cannot be seen. Some Mbuti told me that they could make a fire with firesticks such as *Desplatzia dewevrei* for the vertical stick and *Scaphopetalum thonneri* for the horizontal stick, but this is no more than mere knowledge of firemaking technique.

The fire is kept lit at night. When brightness is particularly needed, they burn a firebrand ("emole"). The simplest "emole" is a dried stalk of *Marantochloa congensis*. Another type of

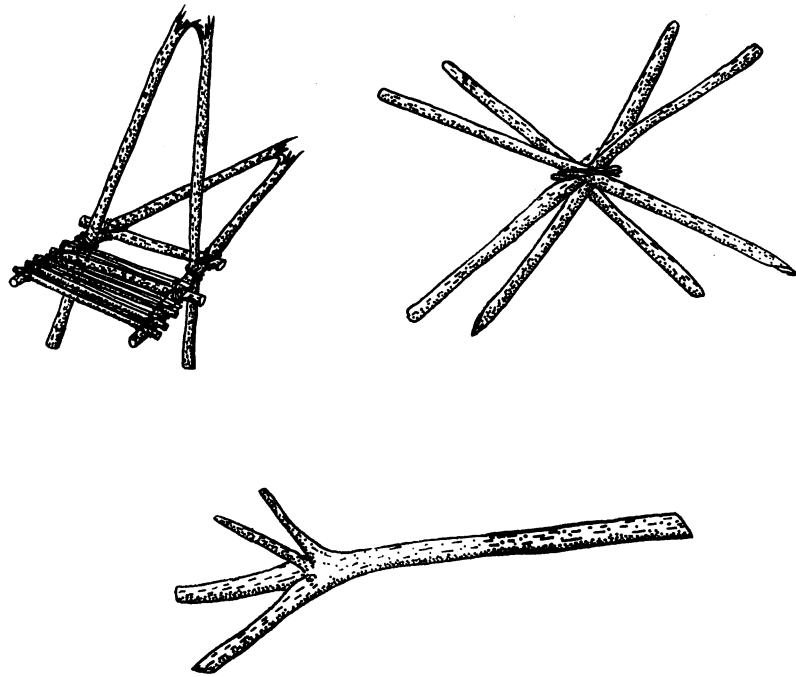


Fig. 15. Chairs and Bench

“emole” is a strip of the *Polyalthia suaveolens* trunk wood which contains oil and burns brightly. The brightest firebrand that also keeps burning for a long time is made from the resin of *Canarium schweinfurthii*. They collect the resin (“kasuku”) oozing out of scars of the trunk, and wrap it with *Thaumatococcus daniellii* or *Ataenidia conferta* leaves into the shape of a big cigar about 30 to 60 cm long, and bind the bundle with a cord of *M. congensis*. They can also use the hard resin of “ebala” (unidentified) for a firebrand by heating to soften it like that of *C. schweinfurthii*. When they amuse themselves with singing and dancing at night, they light up the camp with these “emole”.

“Emole” act also as an essential implement for collecting termites. At night in October (when the termites emerge), Mbuti couples dig holes beside termite mounds and hold fire (“emole”) above the holes. Winged termites fly out of the nest and plunge into the fire in droves and fall into the hole under the fire. Although termites can be caught only temporarily during a certain season, this is one of the favourites of the Mbuti. They cook winged termites by wrapping them with leaves and roasting them or by grinding them with a mortar at first and then wrapping and roasting the paste. The Mbuti give a part of the catch to their familiar villagers.

G. Cooking implements

1. Pots

Today, Mbuti families use metal pots for cooking and for carrying water. They obtain them second hand from villagers. Some families have clay pots made by villagers. They seldom take them into the hunting camp but use them only when they are in the base camp near the village. They use *Thaumatococcus daniellii* leaves for pot lids when cooking.

According to old villagers, the Mbuti, in the old days, had no cooking vessels, and their cooking methods were limited to roasting directly in the fire and roasting food which was

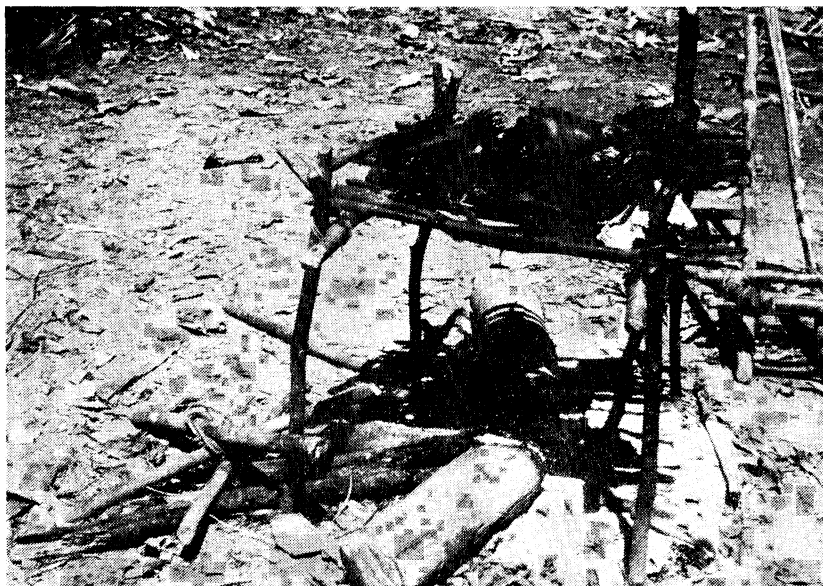


Fig. 16. Meat drying rack: “mgbamgba”

wrapped with leaves. The latter is still a major cooking method for the Mbuti and they wrap food with several layers of *T. daniellii* or *Ataenidia conferta* leaves, binding the top of the wrap with leaf stalks, and putting them in the fire. The contents of the wrap get roasted just at the time the outer layers of the wrappage have scorched.

2. Cups and Plates

Some families have cups of calabash or pumpkin rind from villagers, and others have enameled cups and plates. Occasionally they use limnetic bivalve shells for spoons. They lend and borrow these utensils among each other very frequently, but these are not always indispensable to them. The leaves of *Thaumatococcus daniellii* and *Ataenidia conferta* serve for plates, and they act as cups too, if they are bent to a funnel shape.

3. Mortars (“ekingi”) and Pestles (“mandiekingi”)

While the villager’s mortar is big for threshing and milling, the Mbuti’s mortar is small, about 15–20 cm in diameter and 30–35 cm in height. Both mortars are made by hollowing out the trunk of *Deinbollia laurentii*. As the mortar is shared by all members, one mortar is enough per camp. The pestle is made of the hard stem of such as *Ixora odorata* or *Pancovia laurentii*. They take the mortar when changing camps, but the pestle is prepared on the spot.

4. Meat drying racks (“mgbamgba”)

In the hunting camp, the Mbuti dry surplus catch in smoke to preserve it, and they take lumps of dried meat to the village every several days to barter them for farm products. The structure of the meat drying racks is basically similar to that of their beds, but it is four-legged and high (Figure 16).

They first pile lumps of meat on the rack after burning off the fur of the game and cover the meat with big Marantaceae herb leaves. This rack cover is called an “amangubele”. The fire is kept burning beneath the rack, and the meat dries in two days or so.

H. Clothes and Ornaments

1. Barkcloth (“pongo”)

The Mbuti’s only traditional cloth is the barkcloth which both men and women alike use as

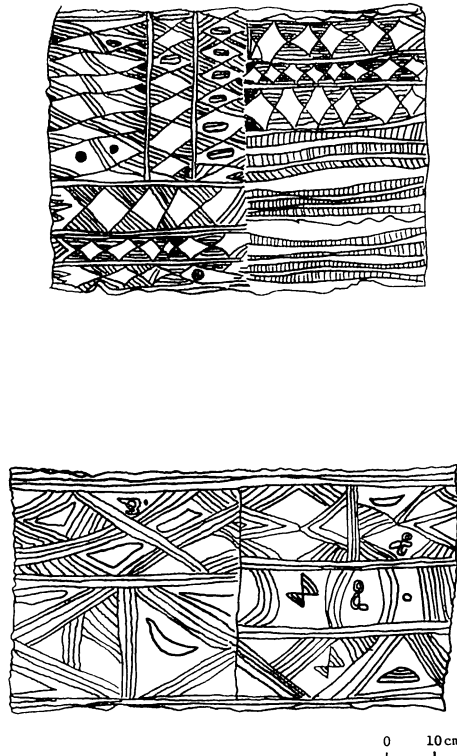


Fig. 17. Barkcloth: “pongo”

loincloths (“pongo”). Those who wear cotton cloth or old clothes obtained as trade goods have been increasing recently, particularly when the Mbuti are near villages. But many of the Mbuti still wear “pongo”, especially in the hunting camp.

There are as many as 20 kinds of plants whose barks can be made into barkcloth (“pongo”), the majority of them being figs (*Ficus* spp.). Among these are four species* whose bark is taken from young trees. Sixteen other species** (in vernacular names) are plants of such peculiar lifeforms as follows. These are, while young, woody vines which twine round big tree trunks, hanging long aerial roots down to the ground. These vines in this growing stage are generically called “kumo”. As they grow, the vines of the “kumo” twine round the trunk and conglutinate enveloping the big tree trunk, and the “kumo” itself turns into a big tree which is now not vines any more but which stretches big branches, killing the big tree which had supported the “kumo”. The figs which have developed up to this stage are now called “pongo-pongo”***. The Mbuti use the bark of the “pongo-pongo’s” young branches at about 7–8 cm

* *Antiaris welwitschii*, *Ficus preussii*, “lengbe”, “paputa” (both unidentified).

** *Ficus lepreuri*, “bambembe” and “malukinoji” (both were identified to *F. lucanda*), *F. ottoniifolia*, *F. rubropunctata*, “tiba” and “esele” (both *F. rupicola*), *F. sub-acuminata*, *F. vallis-choudae*. And “akoko”, “amaswakumu”, “eko”, and “epo” are all *F. spp.*, also “ngilangila”, “ngele”, and “ngibo” are not identified yet.

*** Usual trees are called “mme” in singular and “hamme” in plural generically in Kibila. The above-mentioned *Ficus* big trees themselves are called generically “pongo-pongo”, which are distinguished from other usual big trees. Furthermore, while “vines” both woody and herbaceous are called “ngoli” and the kind of strings and ropes are also “ngoli”, the *Ficus* vines which grow up to be “pongo-pongo” in the future and make the material for barkcloth are called not “ngoli” but “kumo” generically.

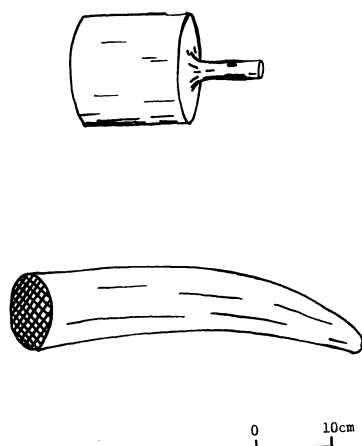


Fig. 18. Mallet : “moanjo”, and Ivory bark-beater: “kolya”

in diameter. They strip the bark from the branch in a span of about 60 cm, and hammer its inner bark to make the soft “pongo”. Before wearing it, they dye it or draw various patterns on it with mud or dyestuffs (Figure 17).

The mallet to beat “pongo” is called the “moanjo”, which is made of hard *Ixora odorata* wood. Another type of beater is made of ivory (“kolya”), and this beater is also called a “kolya” (Figure 18). As these are shared among the people, one or two bark-beaters suffice per camp.

2. Waiststrings and Waistbands

The string to fasten the loincloth is made of the “kusa” (*Manniophyton fulvum*) mentioned above, or they twine the bast fiber of *Dicranolepis disticha* or “kutu” (unidentified) into the waiststrings. Besides this, women wear belts of very elaborate workmanship called “bakutu” (Figure 19). This belt comprises 50–60 or much more pieces of thin laces which are tied together at three points. Each of the laces consists of a core and very fine tapes coiled round the core. The core is a fine bundle of long fibers taken from young leaflets of the “mabondo” palm (*Raphia* sp.), and the tape is made of the “toto” cortex (*Marantochloa congensis*). This waistband, worked by women, is manufactured so elaborately through so many various processes that it appears to be one of the exceptional articles among the Mbuti’s material culture.

3. Dyestuffs and Cosmetics

The Mbuti sometimes wear plain “pongo” (barkcloth). But they usually dye them or draw some pattern on them with any of the following vegetable dyes: (1) *Chlorophora excelsa* bark sap = yellow, (2) *Isolona congolona* bark sap = tan, (3) *Agelaea lescrauwaettii* bark sap = red, (4) *Mukuna flagellipes* leaf sap = black, (5) *Pterocarpus soyauxii* powdered wood = red, (6) *Simirestis welwitschii* leaf sap = black, (7) *Landolphia jumellei* bark sap = red, (8) *Coffea afzelii* = black, (9) *Rothmannia whitfieldii* seed sap = black. Also they use lemon juice (*Citrus medica*) as a dye changing the color of the part of the barkcloth patterned with this juice into a grayish blue. Generally, they use only one colour for one piece of “pongo”.

The Mbuti like to bathe in streams, and afterwards they occasionally rub their bodies with vegetable oil. The oil is squeezed from *Fagara dinklagei* seeds, *Caloncoba glauca*, “hou”, “jele” (both unidentified), or oil palm (*Elaeis guineensis*).

Usually women make up their faces in the following manner: they draw some pattern on their faces with the above-mentioned *Rothmannia whitfieldii* or *Simirestis welwitschii* (Figure

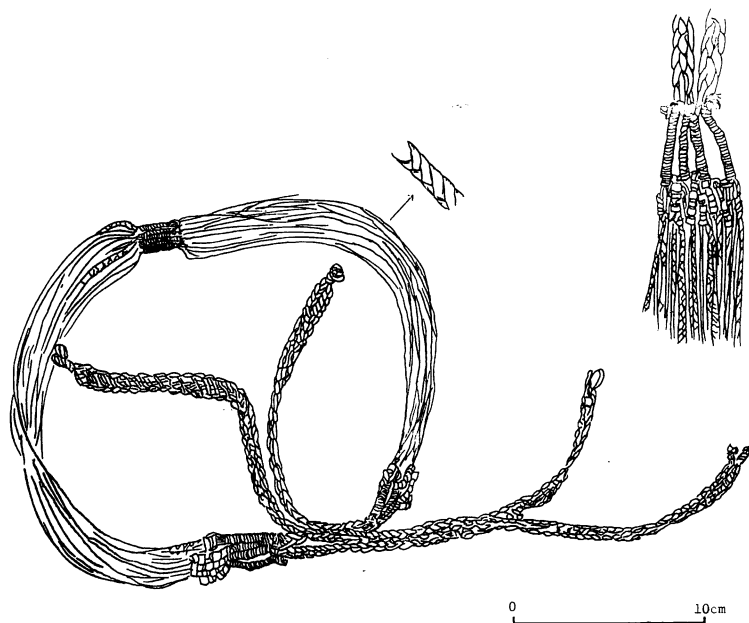


Fig. 19. Waistband: "bakutu"



Fig. 20. Woman's face painting

20). Some women make up themselves using a broken-piece of mirror, while others draw patterns on each others' faces. On leisure days, they adorn not only their faces, but also their whole bodies with various patterns drawn at their pleasure. Some may draw geometrical patterns of various sorts and others may draw spots or waves of various sizes.

Red cosmetics, on the other hand, are used only for rituals. This colour is prepared in the following manner: they grind a piece of *Pterocarpus soyauxii* wood into powder by rubbing it against a stone, and mix it with palm oil. As the *P. soyauxii* tree is not found in the northern or eastern Ituri Forest, the Mbuti and villagers in this region get the wood from the south-western region through trade.

4. Other ornaments

The Mbuti are very poor in habitually used ornaments. Men, especially, wear few ornaments. When staying at base camps near villages, some women and girls collect *Coix lacrimajobi* seeds growing in open spaces, and make necklaces by joining them on strings. Sometimes girls wear small flowers in the holes which have been pierced in their upper lips, and, occasionally, men and women wear extemporaneous bracelets or necklaces of fur strips or plant-made cords, or they wear Francolin or Turaco feathers on their heads when available.

When dancing, both men and women adorn their waists with leaves, and some men wear genet furcaps or basket caps made of *Eremospathe haullevilleana* or *Marantochloa congensis* decorated with feathers. In the "elima" ritual dance (girls' initiation), girls wear grass-skirts made of "mabondo" fibers (*Raphia* sp.).

1. Musical instruments

The Mbuti have been famous from ancient times as geniuses at singing and dancing (Gusinde 1956). They often enjoy singing and dancing in the hunting camp as well as in the base camp, and occasionally they visit the village to show the villagers their dancing. Their main musical instruments used frequently in daily life are split clappers ("banja"), drums ("alende"), "luma" pipes, and finger pianos ("likembe": NG).

1. Split clappers ("banja")

The "banja" are sets of two sticks 30–35 cm long with the upper half split into thin pieces (Figure 21). The preferred material are *Trichilia rubescens* branches. This percussion instrument is always used to lead the rhythm whenever songs are sung.

2. Drums ("alende")

The drumhead is made of duiker skin and the body is made of *Pterygota bequaertii* or *Alstonia boonei* wood which is the material for the above-mentioned wooden bell ("lele"). Straps to strain the drumhead are also of duiker skin. In the base camp near villages, the Mbuti always use a drum or two for dancing and singing, but they rarely take them to hunting camps in the midst of the forest. There, they beat on a log or the buttress root of a big tree in place of the drum. According to Bila elders, the Mbuti had no drums in the old days, and they originally belong to the villagers.

3. "Luma" pipes

The "luma" is a set of 12–15 pipes of differing lengths (Figure 21), with each pipe producing only one tone correspondent to its length. So, each man takes charge of one pipe and they perform melodies and harmonies together while they make various pitches by turns or together. Near the village they make "luma" pipes out of bamboo (also called "luma", unidentified) or *Pennisetum purpureum*. At the forest camp they use stalks of *Olyra latifolia*. The music played with "luma" pipes and the dance performed with this sort of music are also called "luma". Village elders say that the "luma" was a villagers' musical instrument and that they themselves played it when young. But at present, this wonderful music has come completely into



Fig. 21. Split clapper: “banja”, and “Luma” pipes

the Mbuti's possession, and the villagers have become spectators of the “luma” performance and dance show.

4. Other instruments

The finger piano (“likembe”: NG) is a very popular musical instrument in various parts of Africa and the Mbuti have also imported it. In the evening men play it by turns. And youths, who sleep around the “tele” fire, continue to perform on the “likembe” softly till midnight, after all others have gone to their huts.

When they dance at the base camp, some of dancers wear rattles (“kengele”) made of small iron bells on both ankles and lead the rhythm while keeping step with respective music. “Kengele” were also introduced from villagers.

Mbuti men occasionally use the bow as a musical instrument. They put one end of the bow to their mouths and make sounds by beating the string with a stick.

There are two other instruments which are played during rituals. One is a horn made of ivory or a horn of Bongo (*Boocercus euryceros*), and it is played for the “molimo” ritual (Ichikawa 1978). Another is a percussion instrument called the “makata”, which is played only for the circumcision ritual. This is a set of 7 sticks about 70–115 cm long, with lengths and thicknesses prepared so that each stick produces one sound of particular pitch different from the others when beaten with a short stick. Men play these sticks in the same manner as the “luma”, and they combine the various sounds into a single rhythm and harmony while dancing together. “Makata” sticks are made of *Trichilia rubescens* stems 4–6 cm in diameter. Originally this instrument was also villagers’.

J. Other miscellaneous items

1) Sandpaper: After Mbuti men shaved bows or spear shafts, they occasionally polish them with sandpaper. The sandpaper is the stiff leaf of *Ficus exaspermata* whose surface feels very rough.

2) Scrubbing-brush: *Desplatzia dewevrei* fruit changes into a stiff sponge-like ball as days go by. The Mbuti wash their bodies by rubbing them with this dry fruit when they bathe in streams.

3) Fly flaps: *Cyperus papyrus* grow thick by the sides of rivers. The Mbuti may cut its tufty spike with stalk and use it as a fly flap, but this is not necessary, since there are few flies in the forest.

4) Straw: The Mbuti mother often applies clysters to her baby when it is costive. She keeps an enema (mentioned later) in her mouth and blows it into baby's anus through a straw which is commonly a piece of *Olyra latifolia* stalk.

IV. OTHER USES OF PLANTS

A. Hunting magic

1. "Sisa"

A day of net hunting begins as follows: In the morning, a man leaves the camp and goes near the first netting place of the day. After gathering dead trees, he builds a hunting fire ("kungya"). Then, one by one, the rest of the men with their nets on their shoulders gather and sit around the "kungya". They burn twigs snapped off of nearby shrubs or *Ataenidia conferta* leaves, the charcoal of which they smear around their eyes, on their foreheads and their noses as they like, and they rub the rest of charcoal into their nets. This ritual is believed to aid in procuring a large catch, and the magic of this sort and the 'medicines' used in hunting magic are called "sisas". The women who act as beaters gather too after a while, and then they start the net hunting (Tanno 1976).

In this case of "sisas", the kinds of plants they use are not so strictly limited, but the following plants are regarded as effective "sisas":

a) *Platynerium angolense* They burn dead pieces of this big epiphytic fern, and then slap it on their coiled nets while uttering loudly that the game should run against the net and the net should catch them.

b) *Tetrapleura tetraptera* They burn the dried legumes of this tree and fumigate the net in its smoke. In this way it is believed that the net will become able to catch game well.

c) *Rothmannia urcelliformis* The hunter rubs the chopped fruit of this plant on his net, or he drills a hole in the fruit, through which he runs a string and fastens the fruit to his waist-string.

d) *Dracaena reflexa* They twine this plant's thin leaves together with the threads of *Mannio-phyton fulvum* ("kusa") and weave them into the net.

e) *Scilla* sp. ("elianga") They rub this Liliaceae herb on their nets in order to insure a good catch.

Besides the above, such plants as *Afrardisia staudtii*, *Cercestis congensis* and *Clausena anisata* are also "net (and/or net hunt) medicine". Strong "sisas" is made by people of specialized knowledge. This is a black powder packed in a duiker's horn, and they say that it is prepared in a special manner with the ashes and charcoal of fur or a part of the game's body and some kinds of plants. Hunters buy it or get a little of it from acquaintances and they rub a bit of the 'medicine' in their nets and into their hands or into some parts of their bodies.

2. Medicine for hunting dogs

'Medicine' is applied to dogs too in the belief that the dogs will become tough and brave hunting dogs. They cut the dog on its muzzle with a sharp knife tip. Then they smash the fruits of *Rothmannia urcelliformis*, the root of *Baissea axillaris*, or the leaves of "pango" (unidenti-

fied), fill a *Ataenidia conferta* leaf funnel with the sap, and pour the sap into the dog's nostrils. The *B. axillaris* root give off an especially strong smell. Although the dogs suffer severe pain from the application of the medicine, thereafter the dog is said to become a brave hunting dog of keen nose who is unafraid of any wild animals.

3. "Akobisi" and others

"Akobisi" (*Uvariopsis congolana*) is a short tree without any particular feature growing wild in the forest, but it is taboo ("mba") to cut down the tree. If someone cuts this tree, they say the forest will become as still as death and they will gain no catch in spite of all their hunting efforts.

At the unfortunate camp mentioned formerly which suffered consecutive catches of little game (in II-B-2), the following occurrence happened: Their net hunting resulted in no catch on a particular day and the Mbuti came back to the camp in the evening. When they arrived at a gateway of the camp, they suddenly flared up in anger. A short tree was cut down there and that was an "akobisi". The criminal was one of the village youths who were staying there in order to trade in meat. He had unknowingly cut the tree for fun during the daytime. Mbuti men and women reproved him fiercely: "It was entirely due to this man and his act that we could catch nothing despite our repeated net hunts. And they forced him to: "Sing a song and dance to restore the forest dead to the former state. If you can't practise them, give us money or food as we perform them in place of you." The young villager paid money, for he did not know any such song or dance. Then the Mbuti put their coiled nets side by side at the center of the camp and began to sing a song, and women danced round the nets while beating the nets and each hut with twigs held in one hand. In this way, the forest was restored to life and the incident was settled.

I have mentioned already the drink made from *Cola acuminata* nuts. They say that while a hunter is ranging the forest after drinking it or gnawing the nut, and if his belly makes certain sounds, there is a game animal or a beehive nearby.

Besides the above, there are some plants which have magical or ritual meanings which are not related to hunting. If the branches of *Angylocalyx boutiqueanus* are burned, or if the big *Anchomanes gigantes* herb is cut and soaked in water, it is believed to cause rain. The Mbuti say that they do not do such things because they dislike rain, and villagers, on the other hand, say that they practise these when they pray for rain. *Trichilia rubescens* wood is not used as fuel because it is used for making such percussion instruments as the "banja" and the "makata", and quarrels might arise to the point of becoming violent if this wood is burned*.

B. Plants used in play

Harako (1980) reported the various play taken part in by the Mbuti from children to adults. Of the various kinds of plants used in their play, I only mention some representative ones here.

During a tug of war ("kanga") which is contested between two adult parties of men one side and women the other, they use the big and supple *Entada gigas* woody vine as a rope. In children's play such as rope pulling contests, rope skipping, swing riding, and tree climbing, they use *Elemospatha haullevilleana* palm vines, *E. yangambiensis*, *Ancistrophyllum* sp. ("leckwe"), and the above-mentioned "kumo" (woody vines of young *Ficus* spp.).

*Furthermore, they offer the flower head of the parasitic herb, *Thonningia sanguinea*, on the miniature hut "endekele" which is dedicated to the forest spirit and it is standing at a corner of the camp. When twins ("baleu") are born, they conduct a ritual, in which they dance holding the *Richella grandiflora* branches in their hands. The *Xylopia chrysophylla* leaves are used as a substitute for hemp, when habitual hemp-smokers miss it.

Men play a game called “maale” with black *Erythrophleum guineense* seeds. A man snatches off an arbitrary number of the seeds from a pile of them, and the other men guess the number of the seeds in his hand (0–3) after they are counted by fours.

White “buma” (“mupila”: NG, *Landolphia owariensis*) and *Malouetia bequaertiana* sap set quickly and change into an elastic gum. Boys make rubber balls from it to play with. Girls play at cat’s cradle (“mangelengele”) with *Manniophyton fulvum* string.

C. Medicine

Plants used as physical ‘medicine’ (“dawa”: NG) by the Mbuti (and the Bila) number 37 species. Most of the data were gained in the process of inquiring about the use of each plant at time and again, and the data are insufficient both in quantity and quality.

1) *Lomariopsis guineensis* When they feel pains in the chest or belly, they make little incisions at the painful area and rub the ashes of these leaves into the incisions.

2) *Bosqueia angolensis* The sap changes its colour quickly from white to black. At circumcision, they apply the sap to their wounds.

3) *Chlorophora excelsa* The sap is the ointment for eczema.

4) *Isolona congolona* The tauny inner bark is the medicine for eye diseases. They soak the chipped bark in water and then they rinse their eyes with the water.

5) *Roureopsis liquifoliata* The root bark is a medicine for wounds; they crush it and apply it to wounds.

6) *Dichrostachys cinerea* The bark is the medicine for bellyaches, for venereal disease, and for abortion. They chip it and decoct to liquid.

7) *Piptadeniastrum africanum* They decoct the bark and use the liquid as an enema. They also gnaw the root of the young tree as an aphrodisiac.

8) *Erythrophleum guineense* The decocted root bark is the medicine to divine whether a person is a socerer or not. When a man died from someone’s curse, they make the suspect drink the decoction, while crying, “Catch him if he is a sorcerer”. They say that he should die if he is the criminal, and if not, he will be well. According to Verdcourt & Trump (1969), the bark of this tree is very poisonous and was formerly widely employed throughout Africa by witchdoctors in trials by ordeal.

9) *Gilbertiodendron dewevrei* When they feel pains in the knees, they make little incisions on the knees into which they rub the charcoal of the burnt leaf.

10) *Desmodium adscendens* The sap of the crushed leaves is the medicine for chestaches and bellyaches. It is applied to the incisions made at the painful area. Further, this is a child’s cough medicine and is a medicine for venereal disease, too.

11) *Citropsis articulata* The root is a male invigorator, and the leaf sap is a medicine for baby’s abdominal diseases.

12) *Turreaea vogelioides* They crush the fruit with their fingers and sprinkle its inside liquid over a baby so he or she grows big-bodied and healthy.

13) *Tetrorchidium didymostemon* This is used as a purgative (details unknown).

14) *Gouania longispicata* They cut this thick woody vine and make young children drink the sap dripping from the cut end so that they grow strong.

15) *Ouatea elongata* This is the medicine for guarding against leopard (“moli”) attack. They attach a piece of the branch wood to their waiststring.

16) *Harungana madagascariensis* The bark is a medicine for abdominal disease and for eczema or rash.

17) *Barteria fistulosa* The bark sap is a vulnerary and the powdered root is taken as a male invigorator.

18) *Begonia eminii* The small red fruit is a medicine for eczema. They wrap the fruit with a leaf of *Ataenidia conferta* to heat on the fire, and then they apply it to the affected area.

19) *Combretum smeathmannii* The leaf sap is a vulnerary and its solution is an enema for children.

20) *Mostuea batesii* They say it is an invigorator (details unknown).

21) *Alstonia boonei* The white sap is a vulnerary.

22) *Oncinotis hirta* This is used as a medicine for babies (details unknown).

23) *Rauvolfia vomitoria* The decoction of the root bark is a medicine for bellyaches. They say that white men formerly came to buy and collect the root barks for the sake of making some medicine.

24) *Spathodea campanulata* When they feel pains in the waist, they take the decoction of this bark.

25) *Lankesteria elegans* They say that this is the medicine to make a stranger walk off (details unknown).

26) *Ixora odorata* The decoction of the chipped bark is a medicine for bellyaches.

27) *Rytigynia lebrunii* ("mbangalabakali") The meaning of the vernacular name is a slender tree ("mbanga") of women ("bakali"), and if a man roasts the chipped bark and rubs its charcoal into small incisions cut at the inside of both thighs, he wins women's affections quickly.

28) *Setaria megaphylla* and 29) "sasane" (unidentified) These are the medicines for snake bite. They chop the former's root and the latter's leaves together and roast them into charcoal. Then they cut many incisions at the infected area to bleed the snake poison out, and then they apply the charcoal to the incisions.

30) *Anchomanes giganteus* This is a medicine to make a mother have plenty of milk. She boils bananas or cassavas together with its root and eats them with the soup.

31) *Costus afer* A medicine for babies. They give a baby a bath with the tepid water in which this is soaked.

32) "autu" (a vine, unidentified) They apply the smashed leaves to a wound as a vulnerary.

33) "ebala" (unidentified) The resin, which, as previously stated, is a binding agent, is also used as a medicine for bellyaches. They grind the resin into powder and mix it with "ugali" (stiff porridge) to eat.

34) "lokobasoli" (a shrub, unidentified) The "soli" of "lokobasoli" means Bongo (*Boocercus euryceros*), and the parents who have a baby are forbidden to eat the meat of "soli". If they eat it, their baby or they themselves will be taken ill. This inhibition can be included in the category "kuweri" among the Mbuti's food restrictions which have been revealed by Ichikawa (1977). If a man or woman has eaten the "soli" meat committing the inhibition, the offender chips the bark of the "lokobasoli" and applies it to the nose in order to prevent or cure the illness*.

35) "makobakoba" (a vine, unidentified) The sap of the crushed root is a medicine for bellyaches. They say if a sick person takes two spoons of the sap, he gets well after two-days laxity.

*According to Ichikawa (1977), the "lokobasuli" (his spelling) is the medicine against the "kuweri" of "moimbo" (a duiker, *Cephalophus sylvicultor*), and he reported such an occurrence as follows. A Mbuti man was attacked with a high fever as well as a serious bellyache after eating the meat of "moimbo", which was the agent of "kuweri" inhibition for him, and so an old man fetched the "lokobasuli" leaves from the forest and he made the sick man sniff the nasty smell of the crumpled leaves. Then, he recovered quite well on the next day. Moreover, Ichikawa (1977) mentions that such plants as *Pseudospondias microcarpa*, *Erythrophleum guineense*, *Corymborkis corymbosa*, "tengwe" (unidentified) are used as medicins corresponding with the animal species which act as "kuweri".

36) “mangbedungbedu” (a shrub, unidentified) When a baby will not stop crying, the mother makes the baby take the sap of the smashed leaves.

37) “njima” (a vine, unidentified) This is used as a vulnerary (details unknown).

D. Tall trees and “pepepe” shrub

The foregoing are the descriptions of plants which have some uses or magical meanings to the Mbuti. On the other hand, there also exist the plants which have no direct utility to them, and within such plants can be found many kinds of tall trees. Trees which the Mbuti use as materials for tools and artifacts are, in the most cases, slender trees or young trees up to 4–5 m in length and 4–5 cm in diameter. They seldom cut nor utilize big trees, (though there are a few exceptions such as for mortars, wooden bells, drums and canoes). It may safely be said in general that many tall trees are of no use to the Mbuti since they do not produce either edible fruits, seeds, or useful barks or resins. When I made inquiries about the use of each plant, they replied “useless” for at least about 20 species of tall trees.

Nevertheless, those tall trees have still some ‘profit’ (“faida”: NG) from the Mbuti’s view of plants, and that is expressed in the remarks:

“Bees prefer the flower of this tree,” or “Flowers of the this turn into honey,”—*Celtis mildibraedii*, *Brachystegia laurentii*, *Cynometra alexandri*, *Gilbertiodendron dewevrei*, *Albizia zygia*, “ekakwagbolya” (unidentified), etc.

“Bees often make hives on this tree,”—*Pachystela bequaertii*.

“Not the man but beasts and birds prefer the fruit (or seeds) of this tree, and we catch them, —*Ficus mukuso*, “tiya” (unidentified), etc.

“Elephants like to feed on the leaves and fruit of this tree,”—*Pycnanthus angolensis*, *Kigelia africana*.

“A sort of caterpillar grows abundantly on the tree (*Bridelia micrantha*: “enjeku”), and the caterpillar also “enjeku” serves as our food.”

“There are many “bapele” (grubs of some kind of coleopteron) in the dead *Celtis adolphi-friderici* tree, and we collect them to eat”.

In this way, the Mbuti view various plants in connection with the ecology of game animals and insects, too, and it may be said that such views of plants become hunter-gatherers.

Another interesting plant is the shrub called “pepepe”. This shrub is shorter than one meter and is commonly seen on the forest floor, but it is of no use to the Mbuti. They say that game animals feed on its leaves. This “pepepe” contains at least three species* of shrubs which differ from one another in Families or Genera. These differ somewhat on their appearances and are clearly different in the colour of their flowers. Nevertheless, the Mbuti did not distinguish them, but called them all “pepepe”. In general, they clearly distinguish plants which are different in species, giving different names to each species, but the “pepepe” was the rare exception**.

V. DISCUSSION

A. Wild Plant Foods: A comparison with other African hunter-gatherers

The recent progress concerning ecological studies of hunter-gatherers has clarified the following facts: about half the number of groups that were hitherto called hunters make their

* *Pseuderanthemum ludovicianum*, *Coleotrype laurentii*, and *Pollia condensata*.

**Some of *Ficus* plants which are generically called “kumo” or “pongopongo” share same vernacular names with trees belonging to other families, and there are some more plants which share same names (cf. Table 1). But the Mbuti, of course, distinguish those plants as different kinds each other.

subsistence based on the gathering of plant foods, and the hunter-gatherers of the tropics and the temperate regions depend on gathering in general for 60–80 percent of their total diet, while the groups depending on hunting or fishing, on the other hand, are limited to high latitudes where it is cold and poor in plant food resources (Lee 1968, Tanaka 1976).

The Mbuti have been living in economic symbiosis together with the agricultural people, and consequently they are concentrating their subsistence efforts in hunting and lowering their gathering activity remarkably (Harako 1976, Tanno 1976). However, meat comprises only about 30 percent of their total diet, the larger part being occupied by vegetable foods (Ichikawa 1976). Namely, they are constantly getting villagers' farm products primarily in return for their offering surplus meat, and for offering their labour or various forest products to villagers.

The Mbuti often say that there are abundant plant foods in the forest, and the menu of wild plant foods is actually plentiful, as previously stated (Table 2). At present, however, they prefer farm products as food to satisfy their appetites. The plant food of the forest has come to make up only a small part of their diet.

But the gathering of wild plant foods had doubtlessly been one of major subsistence activities for the Mbuti before they entered into the reciprocal relationship with the agricultural people who intruded into the Ituri Forest. The Mbuti of the past would have depended largely on plant foods rather than meat just as much as other hunter-gatherers. They would not have invested their effort so largely in the hunting as today's Mbuti do, but they would have kept the balance between hunting and gathering activities (Harako 1976, Tanno 1976).

Among the edible wild plants listed in Table 2, the following are what the Mbuti now still gather and evaluate highly as food resources: *Dioscorea baya*, *D. smilacifolia*, *D. cf. sagittifolia*, and *Ipomoea chrisochaeta* tubers; *Gilbertiodendron dewevrei*, *Balanites wilsoniana*, *Irvingia gabonensis*, *I. robur*, *Ricinodendron heudelotii* and *Treulia africana* seeds or nuts; *Annonidium mannii* and *Canarium schweinfurthii* fruits. These can as well be assumed to have been major food resources to the Mbuti of those days when they depended for their vegetable foods solely on gathering. The nutritive composition of some of these foods is shown in Table 4, which indicates that these are all fine food stuffs. Only the above-cited *B. wilsoniana* nut and the *Dioscorea bulbifera* tuber and bulbil need the harshness removal processing as previously stated. The Mbuti had not possessed the utensils for boiling until they came into contact with the agricultural people, therefore it cannot be said whether they had exploited these already in those days, and, if so, how they removed harshness without boiling.

Table 4. Nutritive Compositions of Some Major Vegetable Foods of the Mbuti

	Food energy Cal.	Moisture %	Protein gram	Fat gram	Carbo- hydrate gram	Fiber gram	Ash gram
* <i>Dioscorea</i> spp. (tuber, raw)	119	69.0	1.9	0.2	27.8	0.8	1.1
** <i>Gilbertiodendron dewevrei</i> (seed)	353	9.4	4.8	0.6	82.3	1.5	1.5
* <i>Irvingia gabonensis</i> (kernel)	670	5.1	7.5	68.9	16.6	2.2	1.9
* <i>Ricinodendron heudelotii</i> (seed, dried)	530	5.5	21.2	43.1	23.4	1.7	6.8
* <i>Treulia africana</i> (seed, dried)	377	9.2	12.6	5.6	70.4	1.6	2.2
* <i>Canarium schweinfurthii</i>							
Fruit	239	49.3	1.5	13.5	33.5	—	2.2
Nut	546	6.0	18.3	45.8	24.4	3.4	5.5
* <i>Balanites aegyptica</i> *** (kernel)	547	5.0	23.0	43.5	25.3	5.4	3.2

*: Woot-Tsuen Wu Leung 1968, **: Ichikawa 1980.

***: As the data on *Balanites wilsoniana* is missing, *B. aegyptica* of the same genus is cited as a reference example.

Table 5. Vegetation types and habitats of African hunter-gatherers.

Vegetation type Hunter-gatherers	Caesalpinioideae zone		Non-Caesalpinioideae zone		
	Evergreen forest	Deciduous woodland	Mimosoideae wooded savanna	Montane forest Dry	Swamp forest Wet
Mbuti	+				
Mbote		+			
Bushmen		+	+		
Hadza			+		
Dorobo			+	+	
Twa					+

(by J. Itani 1974a, and M. Ichikawa 1980.)

Itani (1974a, b) reexamined the classification of African vegetation zones from such the viewpoint as the habitat of Hominoidea, and he reclassified them into the Caesalpinioideae zone and Non-Caesalpinioideae zone. The former is further subdivided into evergreen Caesalpinioideae forest and deciduous Caesalpinioideae woodland, and the latter is subdivided into Mimosoideae wooded savanna, montane forest, and swamp forest. Table 5 shows the correspondence of such vegetation zones to the habitats of African hunter-gatherers (Itani 1974a, Ichikawa 1980). They inhabit various vegetation zones except swamp forest, and the species composition of edible plants which respective groups are exploiting vary according to the floral composition of their habitats. The Mbuti exploit 78 vernacular species of edible plants including fungi, and such peoples as the !Kung Bushmen (Lee 1968), the Central Kalahari Bushmen (Tanaka 1976), and the Suiei Dorobo (Ichikawa 1980) exploit 85, 79, and 122 species of edible plants respectively.

The compositions of African hunter-gatherers' plant foods are shown in Table 6, in which foods are classified into the following six categories: 1) seeds and nuts, 2) fruits, 3) subterranean organs (roots, tubers, bulbs), 4) fibrous foods (leaves, stalks, piths, shoots, etc.), 5) resins, 6) fungi. Lee (1968) divided 85 species of !Kung Bushmen's edible plants into 6 food classes in accordance with the degree of their contribution to the diet (cf. Table 6). According to him, they depend on the nuts of *Ricinodendron rautanenii* (so-called Mongongo nuts) in all seasons (its fruit pulp is also an important food in some seasons), and, consequently, this single species contributes to about 50 percent of their total diet. But generally such a case is exceptional and other respective groups manage their gathering life on the basis of about 10 species of plants (Tanaka 1976, Ichikawa 1980, Woodburn 1968: cf. Table 6). In Table 6, I classified the Mbuti's plant foods into two classes. The first one comprises the above-cited 12 species which are estimated to have been as important in the part as other groups' major foods*, and the rest are included in the second class. Woodburn (1968) cited only 10 species as major foods out of the much greater number of plants used by the Hadza as foods.

Table 6 indicates that while the Mbuti of the forest environment have many kinds (19) of seed and nut stuffs from woody plants, the groups in dry regions (such as two Bushmen groups and the Dorobo), on the other hand, have only a few species (3–6) of edible seeds or nuts, though such few kinds of seed and nuts are still important to the latter groups. Mongongo nuts (*R. rautanenii*) and *Bauhinia* spp. beans, *Craibia laurentii* and *Mucuna gigantea* contribute largely to the diets of the latter groups (Lee 1968, Tanaka 1976, Ichikawa 1980).

Table 6 indicates further that each group exploits plenty of species of fruits as well as tubers (or roots), though their contributions to the diets differ with the species and only some

*Tanaka (1976) defines the major food as the plant that occupies the major part of a diet in a certain season.

Table 6. Plant foods of African hunter-gatherers

A) !Kung Bushmen (Lee, 1968)

Food class	No. of species	Part eaten*		R,T	L,St	Rs	Contribution**
		S,N	F,B				
Primary	1	1	1				c. 50
Major	8	2	6	2	1		c. 25
Minor	14		3	7	2	2	c. 15
Supplementary	32		12	9	1	10	c. 7
Rare	13		4	9			c. 3
Problematic	17	2	6	4	1	4	nil
total	85	5	32	31	5	16	100%

B) Central Kalahari Bushmen (Tanaka, 1976)

Food class	No. of species	Part eaten		R,T	L,St	Rs	Fg
		S,N	F,B				
Major	13	2	5	4	2		1***
Minor	7		3	1	3		
Supplementary	15	1	3	5	7		
Rare	28		4	12	3	9	
Probable	16		2	11	3		?1
total	79	3	17	33	18	9	1 ?1

C) Suiei Dorobo (Ichikawa, 1980)

Food class	No. of species	Part eaten		R,T	L,St	Rs	Other
		S,N	F,B				
Major	10	2	5	3			
Minor	26	1	16	5	6		
Complementary	86	3	50	10	17	7	6
total	122	6	71	18	23	7	6

D) Mbuti

Food class	No. of species	Part eaten		R,T	L,St	Fg
		S,N	F,B			
Major	12	6	2	4		
Other	66	13	18	7	5	23
total	78	19	20	11	5	23

E) Hadza (Woodburn, 1968)

		Part eaten		R,T
		S,N	F,B	
Major foods: 10 species		1	6	4

Notes.

*1) S,N = seed & nut, F,B = fruit (pulp) & berry

R,T = root & tuber, L,St = leaf, stalk, stem, & shoot

Rs = resin, Fg = fungus.

2) There are some species of plants which have two edible parts.

**: Estimated contribution by weight to vegetable diet (Lee, 1968)

***: truffle

selected ones are gathered, usually. But such groups as the Bushmen, the Hadza and the Dorobo share the fruits of the same genera as *Grewia*, *Citrullus*, *Cordia*, as well as tubers of the same genera, *Coccinia*, *Bauhinia* and *Vigna* as their major foods (Table 7). Especially to the Central Kalahari Bushmen whose habitat is so arid that it lacks surface water through most of the year, the fruits and tubers of 4 species of plants belonging to Cucurbitaceae serve as their major water resources as well as major food resources (Table 7).

Table 7. Major plant foods of African hunter-gatherers

A)	!Kung Bushmen (Lee, 1965)		*
	<i>Adansonia digitata</i>	Bombacaceae	F
	<i>Bauhinia esculenta</i>	Leguminosae	S & R
		(Caesalpinioideae)	
	<i>Citrullus lanatus</i>	Cucurbitaceae	F
	<i>Fockea monroi</i>	Asclepiadaceae	R
	<i>Grewia flava</i>	Tiliaceae	F
	<i>Hyphaena ventricosa</i>	Palmae	F & St
	<i>Ricinodendron rautanenii</i>	Euphorbiaceae	S & F
	<i>Sclerocarya caffra</i>	Anacardiaceae	F & S
	<i>Ximenia caffra</i>	Olcaceae	F
B)	Central Kalahari Bushmen (Tanaka, 1976)		
	<i>Bauhinia esculenta</i>	Leguminosae	S & R
		(Caesalpinioideae)	
	<i>B. macrantha</i>	Leguminosae	S
		(Caesalpinioideae)	
	<i>Citrullus lanatus</i>	Cucurbitaceae	F (W)
	<i>C. naudinianum</i>	Cucurbitaceae	F (W)
	<i>Coccinia rehmannii</i>	Cucurbitaceae	R (W)
	<i>Cucumis kalahariensis</i>	Cucurbitaceae	R (W)
	<i>Grewia flava</i>	Tiliaceae	F
	<i>Ochna pulchra</i>	Ochnaceae	F
	<i>Scilla</i> sp.	Liliaceae	R
	<i>Terfezia</i> sp.	Tuberaceae	truffle
	<i>Aloe zebrina</i>	Liliaceae	St (W)
	<i>Grewia retinervis</i>	Tiliaceae	F
	<i>Rhaphionacme burkei</i>	Asclepiadaceae	R (W)
C)	Suie Dorobo (Ichikawa, 1980)		
	<i>Coccinia</i> sp. nr. <i>grandiflora</i>	Cucurbitaceae	R
	<i>Cordia ovalis</i>	Boraginaceae	F
	<i>Craibia laurentii</i>	Leguminosae	S
		(Papilionoideae)	
	<i>Mucuna gigantea</i>	Leguminosae	S
		(Papilionoideae)	
	<i>Vatovaea pseudolablab</i>	Leguminosae	R
		(Papilionoideae)	
	<i>Vigna frutescens</i>	Leguminosae	R
		(Papilionoideae)	
	<i>Ficus</i> sp.	Moraceae	F
	<i>Grewia bicolor</i>	Tiliaceae	F
	<i>Manilkara discolor</i>	Sapotaceae	F
	<i>Vangueria acutiloba</i>	Rubiaceae	F
D)	Mbuti		
	<i>Annonidium mannii</i>	Annonaceae	F
	<i>Balanites wilsoniana</i>	Balanitaceae	S
	<i>Canarium Schweinfurthii</i>	Burseraceae	F
	<i>Dioscorea baya</i>	Dioscoreaceae	R
	<i>D. cf. sagittifolia</i>	Dioscoreaceae	R
	<i>D. smilacifolia</i>	Dioscoreaceae	R
	<i>Gilbertiodendron dewevrei</i>	Leguminosae	S
		(Caesalpinioideae)	
	<i>Ipomoea chrisochaeta</i>	Convolvulaceae	R
	<i>Iringia gabonensis</i>	Ixonanthaceae	S
	<i>I. robur</i>	Ixonanthaceae	S
	<i>Ricinodendron heudelotii</i>	Euphorbiaceae	S
	<i>Treculia africana</i>	Moraceae	S
E)	Hadza (Woodburn, 1968)		
	<i>Adansonia digitata</i>	Bombacaceae	F & S
	<i>Coccinia aurantiaca</i>	Cucurbitaceae	R
	<i>Cordia ghara</i>	Boraginaceae	F

<i>Grewia bicolor</i>	Tiliaceae	F
<i>G. pachycalyx</i>	Tiliaceae	F
<i>G. similis</i>	Tiliaceae	F
<i>Ipomoea transvaalensis</i>	Convolvulaceae	R
<i>Salvadora persica</i>	Salvadoraceae	F
<i>Vigna esculenta</i>	Leguminosae	R
	(Papilionoideae)	
<i>V. macrorhyncha</i>	Leguminosae	R
	(Papilionoideae)	

*: F = fruit & berry, S = seed & nut, R = root & tuber St = stalk, (W) = water resource

The Mbuti in the evergreen Caesalpinioideae forest zone, on the other hand, exploit yams (*Dioscorea* spp.) as major tubers, and, according to Terashima (personal communication), the Mbote in the deciduous Caesalpinioideae woodland (the west side of Lake Tanganyica) also use 4 species of *Dioscorea* as their major foods*. Moreover, while the Mbuti seldom use fibrous foods such as leaves, stalks, or shoots, but frequently gather many kinds of fungi, the Bushmen and the Dorobo in the dry region, on the other hand, exploit many kinds of fibrous foods and resins also (Table 6, 7).

Next, I would like to compare three such groups of edible plants of the Mbuti, the Suiei Dorobo, and the Central Kalahari Bushmen with one another on the family level and on the genus level (Figure 22). Out of the total of 122 species of the Dorobo's edible plants, I took up 36 species here which were classified into the upper two food classes by Ichikawa (1980). On the Central Kalahari Bushmen, I chose 35 species out of total 79 species which Tanaka (1976) ranked in the upper three classes. These may safely be regarded as actually useful food resources to them (cf. Table 6). On the Mbuti, I took up 34 species which have been identified, except 4 species whose leaves they said edible, because these were actually seldom used (cf. Table 2).

The edible plants of these three groups taken up in this way comprise the following number of families and genera respectively: 20 families: 26 genera for the Dorobo, 15 families: 23 genera for the Bushmen, and 21 families: 25 genera for the Mbuti**. Among them, on the family level, there was only one family (Tiliaceae) that is shared by all three groups. Besides this, the number of families which are common between any two groups is: 8 between the Mbuti and the Dorobo, 4 between the Dorobo and the Bushmen, and only 2 between the Bushmen and the Mbuti (Figure 22). The remaining 25 families are not shared by any two groups but are exploited by only one group respectively. Further, on the grain of wild Gramineae plants, no group exploits even one species. Moreover, on the genus level, the three groups share no one genus in common. The Mbuti and the Dorobo have merely 2 genera (*Balanites* and *Ipomoea*) in common, the common genera between the Dorobo and the Bushmen number only 4 (*Coccinia*, *Grewia*, *Vigna*, *Ximenia*), and none exist between the Bushmen and the Mbuti. Namely, as many as 62 genera of a total of 68 genera are not common between the groups, but are exploited by any single group of the three, and that in the species

*Besides these, Terashima ranked the following four species of fruits as the Mbote's major foods: *Anisophylla pomifera* (Rhizophoraceae), *Strychnos* sp. (Strychnaceae), *Uapaca* sp. (Uapacaceae), and *Ximenia caffra* (Olacaceae). But this list is based on his six-month period survey, not covering the full seasonal cycle of the year (Terashima, personal communication).

**Here, I treated three sub-families of Leguminosae (Caesalpinioideae, Papilionoideae, and Mimosoideae) as being equivalent to independent families because this family is exceedingly big and many botanists also divide it into three independent families, and because African vegetation zones are dealt with in this paper as focusing the sub-family level of Leguminosae (cf. Table 5).

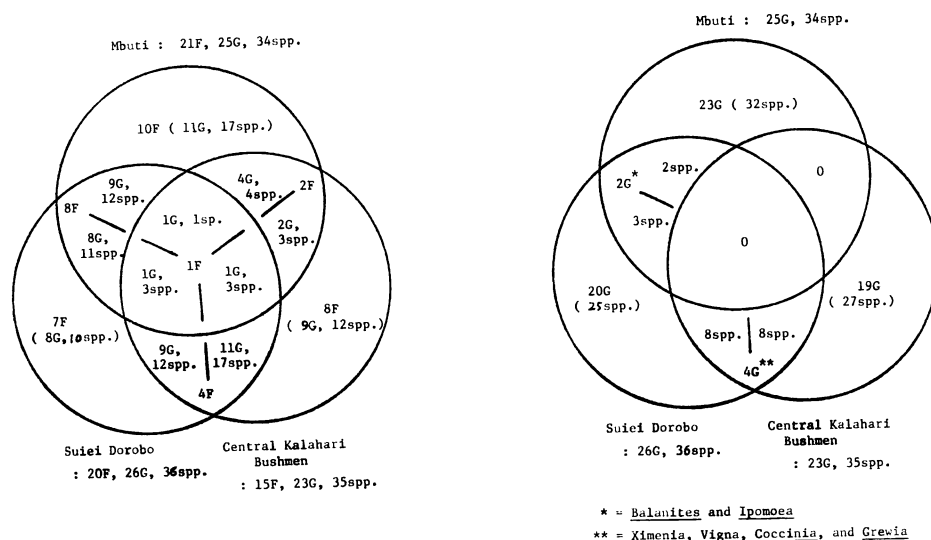


Fig. 22. Comparison of Edible Plants on Family Level and Genus Level among Three African Hunter-gatherer Groups

level, only 2 species of *Ximenia americana* and *X. caffra* are common between the Dorobo and the Bushmen.

The above result may certainly be interpreted as follows: such result is the vivid reflection and indication of the fact that the floral environments of these three groups themselves are considerably different with one another. They are exploiting their own menu of plant foods in accordance with their respective environments, which are regarded as three extremities of wideranging varieties of African hunter-gatherers' environments, and the habitats of the !Kung Bushmen, the Hadza, and the Mbote are regarded as lying midway between these extremes.

B. Characteristics of the Mbuti's Material Culture

On the material culture of hunter-gatherer societies, Service (1966) cited its general characteristic being that it is simple and poor as well. In general, hunting-gathering societies live economically at the hand-to-mouth level of existence which depends entirely on nature itself, and they must move the camp frequently in order to maintain their subsistence. On the other hand, apart from the Eskimo who have developed boats and sleighs, nomadic hunter-gatherers ordinarily rely on manpower as the means sole of transportation, with the result that their household goods are limited to the amount which can be carried on the back and can be conveyed in one trip (Service 1966, Tanaka 1978).

The material culture of the Mbuti, which has been detailed previously, possesses all of the above-mentioned characteristics. When they move the camp, men carry no more than their hunting equipment and machetes or axes; all other household implements of the family are put in a basket and carried by the woman. All items of their material culture, shown in Table 3, add up to a mere 83, and of those everyone or every family does not have all of them nor do they carry every thing in cases of movement. Such things as mortars, musical instruments, combs, mirror fragments, etc. are commonly used by the residential group as a whole, and are owned by only a few. Moreover, there are many items which are rather ornamental and

are rarely made nor used normally (such as quivers, spear sheaths, wrist protectors, or the like). All the dwelling furniture as well as pestles and digging sticks, whose materials are obtainable anywhere and which need little processing, are prepared on the spot as needed. Consequently, the Mbuti's necessities in their daily life come to a small number of goods such as some tools for manufacturing, hunting implements, and pots, and even these they frequently lend and borrow among one another.

Another remarkable feature of the Mbuti's material culture is that most of the artifacts they manufacture are made out of plant materials. Of the 83 items listed in Table 3, two kinds of earthenware (pot and pipe head) and 12 kinds of ironware as well as the mirror are either goods brought by villagers or trade goods recently brought into the Ituri region. Their only stone implement used at present is the whetstone, and that is just a simple stone found anywhere. Out of the remaining 67 articles, the tools and implements which (or whose parts) are made of animal products account for only 14 items (Table 3), and many of them are either ornamental or that which can be replaced by plant-made things. On the other hand, as many as 57 items are solely made out of plant materials. Furthermore, if we add such artifacts with some parts being made of plant materials, the number comes up to 69 out of total 83 items (Table 3, 8).

On the material culture of the Central Kalahari Bushmen, on the other hand, who live in the arid savanna, Tanaka (1978) pointed out that about half of their artifacts (totaling 78 items*) are wholly or partly made of animal products. It is especially remarkable that they utilize tanned antelope skins to work various articles such as clothing, bedding, and carrying implements, and that they make many kinds of tools and ornaments out of game's bones, teeth, and horns, as well as ostrich egg shells. By contrast, the Mbuti rarely process animal hides, but they, in most cases, eat up the game's skins after roasting or boiling.

The Bushmen's material culture is as simple and poor as that of the Mbuti, but it may be said that the former's tools and artifacts, once made, are valuable goods to them. By contrast, it is characteristic to the Mbuti's material culture that there are many goods which are made on the spot as needed and discarded soon after used. Such a feature results from the following facts: most items of their material culture are made out of plant materials as previously stated, and the materials fit for the respective items are generally obtainable everywhere. Especially such plants as Marantaceae herbs, palms, and *Manniophyton fulvum* ("kusa") are utilized for many various purposes. The bow-string is also made of plants, and so even such tools as bows and arrows that are essential to the hunter-gatherer can be prepared easily at any place in the forest. Without flintheads nor iron tips, they can hunt game with the above-mentioned arrows of "sua" and "mutali", and according to Turnbull (1965a), sometimes

Table 8. Composition of Raw Materials of the Mbuti's Material Culture and the Central Kalahari Bushmen's Material Culture

		Mbuti	Central Kalahari Bushmen (Tanaka 1978)
Total Number of Items		83	78
Number of Items Comprising	Plant Materials	69 (69.7%)	33 (35.5%)
	Animal Products	14 (14.1%)	39 (41.9%)
	Metal	12 (12.2%)	18 (19.4%)
	Stone or Clay	4 (4.0%)	3 (3.2%)
total		99 (100%)	93 (100%)

*Tanaka (1978) included the dog, too, in the list of their material culture, but it is excluded from this number. According to him, animal products are utilized in 39 items as their raw materials; plant materials, on the other hand, are used in 33 items; the ironware accounts for 18 items; stone implements only 3 (Table 2 of Tanaka 1978).

spearheads were also previously untipped with their wooden points being fire-hardened. More directly, if the Mbuti only have some manufacturing tools such as knives, machetes, and axes, they can prepare all the items of their material culture they need.

These three kinds of tools, as well as arrowtips and spearheads as substitutes of them, are all presently ironware. It is now unknown what kind of manufacturing tools they had made and used before they knew ironware through contact with agricultural people. As possible ones, we can guess they were either stone implements or tools made of animal bones, teeth, or horns. There exist hard stones in the Ituri Forest. Also, as long as they have been hunters, they were surely familiar with animal bones and teeth. Today, they do not remember the tradition of stone implement making nor do they process latter materials except ivory barkcloth beater. However, as for the sharp-edged tool to cut and shave plant materials, the Mbuti of those days certainly utilized stones and/or animal products as raw materials.

The hunting net is the exception of the Mbuti's artifacts which have the above-mentioned characteristic. The net is often torn by game and the worn-out parts become brittle. Therefore net-hunters cut off such parts from their nets and frequently supply newly woven pieces of net in order to maintain the total length and durability of the net. While they stay at the hunting camp, they gather the bark of "kusa" (*Manniophyton fulvum*) in the morning or on the way to or from hunting almost everyday, and they twine strings morning and evening while talking cheerfully. Then they weave and supply new parts of net once or twice a week. The time they spend for such work is estimated to be about one to two hours per day, while they engage themselves in net hunting for about 8 hours a day on the average (Tanno 1976).

We suppose that the Mbuti adopted net manufacturing from the agricultural Bantu such as the Bila. Further, it has been ascertained that the net hunting is much more effective than the bow-and-arrow hunting (Harako 1976, Tanno 1976). Why haven't archers adopted the net until today?

Vines of "kusa" can be abundantly seen in the *Gibbertiendendron* forest, and those also grow in the *Cynometra-Brachystegia* forest but not so rich as in the former forest. Net-hunters explained to me that although the "kusa" grows in archers' area too, they do not know how to make the net. But that such a barrier might have prevented the diffusion of net manufacturing knowledge can not be accepted because both archers and net-hunters have mutual relationships. One primary factor that has been controlling the Mbuti's adoption of the net is supposed to the difference in the "kusa's" density between both forests.

As previously stated, the net must be maintained through the constant gathering of "kusa", its processing into net pieces, and the frequent supplementing of new parts. Then, the "kusa" (*M. fulvum*) itself must be holding its density as well as its productivity high enough for the repair of the net through the constant and abundant gathering of its vines. It may be supposed that they cannot maintain their whole hunting nets as a group in the habitat of archers because the density and productivity of "kusa" is low there. In the bands of net-hunters whose territories were on the border of the *Cynometra-Brachystegia* forest adjacent to the *Gilbertiendendron* forest, I observed that some of them occasionally visited neighbouring band's camps in the latter forest to buy newly woven pieces of net. According to Harako (1976), furthermore, who studied the net-hunter band being adjacent to archers' territories, the "kusa" vines can be seen at rare intervals in their territory so that they regard the "kusa" as the plant not gained without having to look for it.

Acknowledgements

This study was financed by the Scientific Research Fund of the Ministry of Education, Japan.

I wish to express my gratitude to all the people who supported me in carrying out this study; to Directeur Général de Institut pour la Recherche Scientifique (I.R.S.), République du Zaïre, for the kindness to accept me as a research associate of I.R.S. during my twice study period; to Dr. J. Bokdam (University for Agriculture, Wageningen-Netherlands) and Dr. H. Breyne (Etude et la Recherche Agronomiques, Kinshasa) for their identification of my plant specimens; to Dr. J. Itani of Kyoto University, Director of the Expedition in 1973, who has encouraged and supported me at every stage of the study; to Dr. T. Yoneyama of Kyoto University, Director of the Expedition in 1976, for his kind support in carrying out the survey; to Dr. R. Harako of Meiji University, Dr. T. Nishida and Dr. S. Uehara of the University of Tokyo, for their useful suggestion and comment.

Lastly, I wish to thank my Mbuti and Bila friends in the Ituri Forest for their willing consent to my stay and for their kind help.

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