

Appendix A. Publications

1. General Publications

- 1951 A History of the Uganda Forest Department 1898–1929. *Forest Department Bulletin No. 3* (based on typescript document by N. V. Brasnett).
- The Forest Dedication Scheme in Buganda Province. R.G. Sangster. Paper prepared for Commonwealth Forestry Conference, 1952.
- Working Plan for Indigenous Forests, Buganda Dedication Scheme. R.G. Sangster.
- Uganda Statement prepared for Commonwealth Forestry Conference, 1952. I.R. Dale.
- Graphical Field Keys of Uganda Trees: I Forest Trees Mengo District. H.C. Dawkins. *East African Agricultural Journal*, October 1951.
- 1952 The Indigenous Trees of the Uganda Protectorate. W.J. Eggeling, revised and enlarged by I.R. Dale.
- Is East Africa Drying Up? I.R. Dale. *East African Agricultural Journal*, April 1952.
- Eucalyptus in the urban and rural economy of Uganda. G.J. Leggat. *East African Agricultural Journal*, April 1952.
- Experiments in low percentage enumerations of tropical high forest. H.C. Dawkins. *Empire Forestry Review*, June 1952.
- The Silviculture of Mvule. D.W.G. Bacon. Letter to *Empire Forestry Review*, September 1952.
- 1953 Kalinzu Forest fruitbats. H.A. Osmaston. *Journal of the East African Natural History Society* 22, 74–75.
- A descriptive list of the introduced trees of Uganda. I.R. Dale. Government of Uganda.
- The Uganda Timber Cess fund. .R. Dale. *Empire Forestry Review*, March 1953.
- Timu and the vanishing forests of north-east Karamoja. H.C. Dawkins. *East African Agricultural Journal*, December 1953
- Trials of non-toxic arboricides in tropical forest. H.C. Dawkins. *Empire Forestry Review*, September 1953
- 1954 The Construction of Commercial Volume Tables for Tropical Forest Trees. H.C. Dawkins. *Empire Forestry Review*.
- The Northern Province Mountains, Speculations on Climate and Vegetation History. H.C. Dawkins. *Uganda Journal*.
- A Uganda Softwood Scheme. G.J. Leggat. *Empire Forestry Review*.
- Timber Utilisation in Uganda. C.H. Tack. *Empire Forestry Review*.
- Forest Spread and Climatic Change in Uganda during the Christian Era. I.R. Dale. *Empire Forestry Review*.
- The Extensive Sampling of Closed High Forest as Developed in Uganda. H.C. Dawkins. Paper presented to the 4th World Forestry Congress.

- Contact Arborescences for Rapid Tree Weeding in Tropical Forest. H.C. Dawkins. Paper presented to the 4th World Forestry Congress.
- 1955 A History of the Uganda Forest Department 1930–50. N.V. Brasnett and I.R. Dale. *Forest Department Bulletin No. 4*.
- Regeneration of *Chlorophora excelsa* (Mvule) in Uganda in relation to soil-root conditions. G.H.S. Wood and E.M. Chenery (Agricultural Department, Uganda). *East African Agricultural Journal*.
- Tree Growth on a seasonally dry swamp in Eastern Uganda. J. E. M. Stephens. *East African Agricultural Journal*.
- The refining of mixed forest, a new objective for Tropical Silviculture. H.C. Dawkins. *Empire Forestry Review*.
- INEAC in the Forêt Dense, some impressions of high forest research in the Congo. H.C. Dawkins. *Empire Forestry Review*.
- The Indian origins of some African cultivated plants and African cattle. I.R. Dale. *Uganda Journal*.
- 1956 Statement by the Uganda Forest Department for the 7th British Commonwealth Forestry Conference 1957.
- Rapid detection of aberrant girth increment of rain-forest trees. H.C. Dawkins. *Empire Forestry Review*.
- Determination of age/girth and similar relationships in tropical forestry. H.A. Osmaston. *Empire Forestry Review*, 35, 193–197.
- 1957 Seven papers presented to the 7th British Commonwealth Forestry Conference:
- The management of tropical high forest; recent development in Uganda. H.C. Dawkins.
 - Some latin square and randomised block experiments in tropical high forest. H.C. Dawkins.
 - Some results of stratified random sampling of tropical high forest. H.C. Dawkins.
 - Forest mapping from aerial photographs in Uganda. A.B. Cahusac.
 - Selection and dedication of land for forestry in Uganda. C. Swabey.
 - The development of forestry training in Uganda. C. Swabey and D.W.G. Bacon.
 - Exotic forest trees in Uganda. D. Leuchars.
- The Strength Properties of Uganda Timbers. *Forest Department Bulletin*, No. 5.
- A fresh-water wood borer. H.A. Osmaston. *Empire Forestry Review*, 36.
- Papers for the Second Inter-African Forestry Conference (Pointe Noire, July 1958).
- The measurement of basal area increment in tropical high forest. H.C. Dawkins.
- Recent progress in extensive treatment of tropical high forest in Uganda. H.C. Dawkins.
- The relative merits of hormonal and arsenical arborescences. H.C. Dawkins.
- 1958 The management of natural tropical high-forest with special reference to Uganda. H.C. Dawkins. Inst. paper 34, Imperial Forestry Institute, Oxford. 154p.
- Sustained yield – our snare and delusion? H.A. Osmaston. *Empire Forestry Review*, 37.

PUBLICATIONS

- 1959/60 Present wood consumption and future requirements in Uganda. FAO, Rome. Report 1287, 1960. S.L. Pringle and J.E.M. Arnold.
- Nomenclature of Uganda Timbers. *Forest Department Bulletin*, No 6.
- New methods of stand improvement in tropical forest. Paper for 5th World Forestry Conference, Seattle, 1960. H.C. Dawkins.
- Eucalyptus in Uganda. Eucalyptus Conference, Brazil, 1961. D. Leuchars.
- The volume increment of natural tropical high forest and limitations on its improvement. H.C. Dawkins. *Empire Forestry Review* 38(2).
- The mechanical properties of *Eucalyptus saligna* transmission poles. C.H. Tack. *Journal of East African Institute of Engineers*, Vol. 9(1).
- 1960/61 Country Report to FAO Latin American Conifer Seminar, 1960. D. Leuchars.
- 1961/62 Timber supply, consumption and marketing in Uganda. *Forest Department Bulletin*, No.7. C.H. Tack.
- Eleven papers presented to the Eighth British Commonwealth Forestry Conference, 1962:
- A handbook on the Forests and Forest Administration of Uganda, 1961.
 - Progress report, 1955–60 by the Forest Department of Uganda.
 - The planning and practice of trials of exotic species. D. Leuchars.
 - Trials of species for timber planting in the savanna woodland zone of north Uganda. R.A. Butt.
 - Termite control research in Uganda. K.W. Brown.
 - The management of tropical high forest with special reference to the introduction of monocyclic felling in Uganda. M.S. Philip.
 - A long-term plan for conversion to monocyclic working in the Central Forest Reserves of South Mengo District, Buganda Province, Uganda. J.F. Hughes.
 - The planning and organisation of current silvicultural treatments in Central Forest Reserves of South Mengo District, Buganda Province, Uganda. J.F. Hughes and J.R. Lang Brown.
 - The reconciliation of forestry and game preservation in western Uganda. G.J. Leggat.
 - Lower Forestry Education. W. Finlayson.
 - The nomenclature of East African Timbers. East African Timber Advisory Board.
- 1962 The ecology and soils of the Kibale grasslands, Uganda. J.R. Lang-Brown., and J.F. Harrop. *East African Agriculture and Forestry Journal*, April 264–272.
- The ecology and soils of the Kibale grasslands, Uganda. J.R. Lang-Brown. Oxford Forestry Inst. Thesis. (Original also held by Empire & Commonwealth Museum Library, Bristol, UK.)
- Costs and efficiency of bush clearing by arboricides in Karamoja. *East African Agriculture and Forestry Journal* 27. (Special issue on hydrological effects of changes in land-use in some East African catchment areas.)
- 1962/63 The Uganda Timber Industry. *Forest Department Bulletin*, No. 8. C.H. Tack and Sohan Singh Lall.
- 1964/65 Uganda Timbers. C.H. Tack. Govt. Printer, Entebbe.

2. Uganda Forest Department Bulletins

1. The Mimosaceae of Uganda (W.J. Eggeling, 1934).
2. Native names of trees and shrubs of Uganda (W.J. Eggeling, 1934).
3. A history of the Uganda Forest Department, 1898–1929 (N.V. Brasnett, 1951).
4. A history of the Uganda Forest Department, 1930–1950 (N.V. Brasnett and I.R. Dale, 1955).
5. The strength properties of Uganda timbers (C.H. Tack, 1957).
6. Nomenclature of Uganda timbers (C.H. Tack, 1959/60).
7. Timber supply, consumption and marketing in Uganda (C.H. Tack, 1961/62).
8. The Uganda timber industry (C.H. Tack and Sohan Singh Lall, 1962/63)
9. Uganda timber users handbook (R.A. Plumtre, 1967) (superseded by a book with the same title but much expanded by P. Kityo and R. A. Plumtre, 1997, Commonwealth Secretariat).
10. The resistance of some Uganda timbers to vacuum-pressure impregnation with copper-chrome-arsenate wood preservatives (R. A. Plumtre and B. Kasirye, 1968).

Note: For convenience this covers the entire series up to 2002.

3. Uganda Forest Working Plans approved during the period 1950–1965

Type: F&P = Fuel & Pole Pln.; STP = Softwood Timber Pln.; HTP = Hardwood Timber Pln.; THF = Tropical High Forest; MMF = Moist Montane Forest, montane bamboo & moorland; Hill = Hill Protection Res. (savanna); Sav = Savanna or bush (for fuel), or lowland bamboo. UFD = number of copies held by UFD in 2000 (* = incomplete); OFI + = copy held by Oxford For. Inst. in 2000; Repr. R = reproduced 1999–2000 by Commonwealth Secretariat; Rev. = revision; ext. = extended.

District	Forest	Type	Period	Rev.	Author	Pages	UFD	OFI	Repr.
Acholi									
	Acholi ALG Reserves (Gulu)	F&P	1952–1961						
	Acholi Bamboo LFRs	Sav	1962–1972		Kingston	6	3		
	Acholi Bush Fuel LFRs	Sav	1962–1972		Kingston	32			
	Acholi Plantation LFRs	F&P	1963–1972		Kingston	10	1		
	Aringa River LFR	THF	1962–1972		Kingston	6			
	Okavu-Reru Reserves	Sav	1965–1971		Kingston	19	1		
	Gulu Plantations CFRs	F&P	1952–1961			37	2		
	Gulu Plantations CFRs	F&P	1955–1964		Leuchars & Tothill	13	*1		+
	Gulu Plantations	F&P	1963–1977	1st		15	2		
	Jaka & Pajimu LFRs	Sav	1962–1972		Kingston	23	1		
	North Acholi Hills CFRs	Hill	1952–1961						
	North & East Acholi Hills CFRs	Hill	1955–1965		Dale				+
	West Acholi LFRs & CFRs	Sav	1962–1972		Kingston	12	2		
Ankole									
	Bugamba & Rwoho CFRs	STP	1964–1973		Lang Brown	51	2		+
	Kalinzu CFR	THF	1960–1970		Osmaston	47	2		+
	Kasyoha-Kitomi CFR	THF	1957–1961		Leggat				+
	Kasyoha-Kitomi CFR	THF	1965–1977		Synnott (?)	9	*1		
	Mbarara Plantations CFR	F&P	1956–1963		Watson, R. B.		25	1	+
	Mbarara Plantations CFR	F&P	1964–1974	1st	Ball				
	North Block, S. Ankole CFR	STP	1957–1961		Watson, R. B.		26	1	+
Bugisu									
	Bugisu Plantations LFRs	F&P	1955–1959		Webster	18	1		
	Bugisu Plantations LFRs	F&P	1961–1971	1st	Bacon				+
	Mbale Plantations C&LFRs	F&P	1953–1960		Webster				
	Mbale Plantations C&LFRs	F&P	1961–1970	1st	Bacon	13	1		+
	Mount Elgon CFR	MMF	1954–1958		Webster				+
	Namatale LFR	THF	1959–1968		Kingston	13	6		
Bukedi									
	Bukedi Plantations LFRs	F&P	1955–1960		Webster				+
	Bukedi Plantations LFRs	F&P	1961–1971		Bacon	12	1		
	Nagongera Plns. CFR	F&P	1954–1958		Webster	28	1		+
	Nagongera Plns. CFR	F&P	1959–1970	1st	Kingston	39	1		+
	South Bukedi Industrial & Hill LFRs	Sav&Hill Sav&Hill	1954–1961 1962–1972		Webster Osmaston		8	9	
	Tororo Plantations CFR	F&P	1954–1960	1st	Webster & Swabey				+
	Tororo Plantations CFR	F&P	1961–1971	1st	Bacon	19	1		+
Bunyoro									
	Budongo, Siba & Kitigo CFRs	THF	1955–1964	2nd	Trenaman	22	3		+
	Budongo, Siba & Kitigo CFR	THF	1964–1974	3rd	Philip	74	1		+
	Bugoma CFR	THF	1948–1953		Dale				

District	Forest	Type	Period	Rev.	Author	Pages	UFD	OFI	Repr.
Bunyoro (<i>contin.</i>)									
	Bugoma CFR	THF	1960–1970	1st	Osmaston	55	1	+	R
	Bunyoro Hills LFRs	Hill	1959–1968		Beaton	12	*1	+	
	Bunyoro Kingdom N.G. Plns.	F&P	1957–1966	–	Beaton	17	1	+	
	Bunyoro Lowland LFRs & Public Land	Sav	1960–1970		Philip & Osmaston	12	1	+	
	Nyabyeya CFR (Forest School)	STP	1957–1966	–	Bacon	14	7	+	
Busoga									
	Busoga Plantations LFRs	F&P	1956–1965		Stephens			+	
	Busoga A.L.G. Bush Reserves	Sav	1956		Stephens			+	
	Mutai Industrial Fuel Res. CFR	F&P	1955–1961		Stephens			+	
	Mutai & Mile 20 Plantations CFR	F&P	1962–1972	1st	Plumptre	11	2		
	Mutai & Butamira LFRs	F&P	1962–1972	1st	Plumptre	24	2		
	Kimaka CFR	F&P	1952–1961	1st	Trenaman,	17	1	+	
	Kimaka CFR		1961–1975	ext.	Wood, Miller				
	South Busoga CFR	Sav	1955–1964		Leggat			+	
	Namasagali Plantation CFR	F&P	1955–1960		Stephens			+	
	Walulumbu, Msoli and Gulibi LFRs	Sav	1956–1960		Stephens			+	
	Walulumbu, Msoli and Gulibi LFRs		1960–1965	ext.					
Karamoja									
	Kadam CFR	Hill	1957–1966		Philip	12	2	+	
	Kamalinga (Napak) CFR	Hill	1955–1959		Philip			+	
	Kamalinga (Napak) CFR	Hill	1964–1968		Philip				
	Labwor Hills and Otukey CFRs	Hill	1958–1967		Philip			+	
	Moroto CFR	Hill	1955–1964		Philip			+	
	*North Karamoja CFRs	Hill	1964–1973		Philip				
Kenya (part admin. by Uganda)									
	Karasuk Hills	Hill	1964–1968		Philip	25	2		
Kigezi									
	Cheilima LFR	MMF	1961–1971		Tothill			+	
	Echuya CFR (bamboo)	MMF	1956–1960		Watt			+	
	Echuya CFR (bamboo)	MMF	1960–1965	1st.	Kingston				
	Ihimbo Forest	THF	1964–1974		Lang Brown	5	2		
	Impenetrable CFR (Bwindi NP)	THF	1962–1971		Leggat & Osmaston	45	3	+	R
	Kabale Plantations CFR	F&P	1957–1961		Tothill	14	*2		
	Kabale Plantations CFR	F&P	1961–1967						
	Mafuga CFR	STP	1954–1963		Lyon & St. C. Thompson				
	Mafuga CFR	STP	1964–1974	1st	Lang Brown	70	1	+	
	Mgahinga CFR (now Nat.Pk.)	MMF	1956–1960		Watt	12	1	+	
	Mgahinga CFR (now Nat.Pk.)	MMF	1960–1965	1st.	Kingston				
	Muko LFR	STP	1958–1967		Tothill	11	1	+	
	Rwensama Village Fuel Supplies	THF	1957–1966		Tothill	13	2	+	

PUBLICATIONS

District	Forest	Type	Period	Rev.	Author	Pages	UFD	OFI	Repr.
Kigezi & Ankole	Maramagambo CFR (QENP)	THF	1960–1970		Osmaston	15	2	+	R
Lango	Lango Bush Fuel LFRs	Sav	1962–1972			8	7		
	Lango Plantation LFRs	F&P	1962–1972		Kingston				
	Lira Plantations CFR	F&P	1955–1959		Leuchars & Tothill			+	
	Lira Plantations CFR	F&P	1961–1966	1st.	Kingston				
	Maruzi Hills CFR	Hill	1962–1972			6	4		
Lango & Acholi	Timber Plantation CFRs	HTP	1955–1964		Leuchars			+	
Madi	Madi CFRs	Sav&Hill	1955–1964						
	Zoka CFR	THF	1962–1972		Stuart-Smith	10	3		
	Masaka Lake Forests CFRs	THF	1956–1965		Stuart-Smith			+	
Masaka & West Mengo	Masaka Plantations CFR	F&P	1954–1963		Philip & Miller			+	
	Masaka Plantations CFR	F&P	1965–1974	1st.	Ball (?)	23	3		
	Mpanga Research Forest CFR	THF	1960–1965		Dawkins & Philip	29	2		
	Mpanga Research Forest CFR	THF	1965–1970			37	1		
	Sango Bay CFRs	THF	1955–1965					+	
Mengo	Buganda Dedication Scheme	THF	1951–		Sangster			+	
	Buganda Kingdom Plantns LFRs	F&P	1961–1963	1st.		36	1		
	Buganda Kingdom. Plantns LFRs	F&P	1957–1961		Butt			+	
	Entebbe Plantations CFR	F&P	1951–1957	1st	Trenaman	30	1		
	Entebbe Plantations CFR	F&P	1957–1964	2nd	Webster			+	
	Entebbe Plantations CFR	F&P	1965–1969	3rd	Butler	20	1		
	(not published; incorporated into Kampala & Entebbe Plns. 1966–1976)								
	Kampala Plantations CFR	F&P	1950–1954	1st	Webster			+	
	Kampala Plantations CFR	F&P	1955–1959	2nd.	Elliot			+	
	Kampala Plantations CFR	F&P	1960–1965	3rd	Hughes	30	3	+	
	Mengo High Forests, Buganda Kingdom LFRs	THF	1956–1966		Butt	21	1		
	Singo Hills CFRs	Hill	1956–1965		Lyon			+	
	South Mengo Forests CFRs	THF	1948–1957		Sangster (pub.1950)			+	R
	South Mengo Forests CFRs	THF	1961–1971	1st	Webster	58	2	+	R
Mubende	Mubende LFRs	THF	1959–1968		Webster	7	1	+	
Sebei	Sebei Plantations LFRs	STP	1962–1967		Osmaston	3	17		
	Sebei Natural Forests LFRs	MMF	1963–1967		Osmaston	4	5		
Teso	Soroti Plantations CFR	F&P	1954–1963	1st	Stephens & Miller			+	
	Soroti Plantations CFR	F&P	1964–1969	2nd.	Watt	12	1		

District	Forest	Type	Period	Rev.	Author	Pages	UFD	OFI	Repr.
Teso (contin.)									
	South Teso plantations LFRs	F&P	1954-1958		Webster				+
	Teso Bush LFRs	Sav	1954-1963		Webster				+
	Teso Bush Reserves LFRs	Sav	1964-1973	1st.	Stephens (?)	4	*1		
	West Teso Hills LFRs	Hill	1954-1963		Stephens				+
	West Teso Hills LFRs	Hill	1964-1973	ext.					
Toro									
	Bugoye & Maliba LFRs	THF	1963-1970		Beaton	10	1		
	East Toro LFRs	THF	1963-1972		Beaton	11	2		
	Fort Portal Plantations CFR	F&P	1965-1975	2nd	Kingston	42	1		
	Fort Portal Plantations CFR	F&P	1956-1960		Leggat	16	*1		+
	Fort Portal Plantations CFR	F&P	1961-1965	1st	Leggat				+
	Itwara CFR	THF	1949-		Dale				
	Kasenda LFR	THF	1964-1968		Beaton	16	1		
	Kibale CFR (now Nat.Pk.)	THF	1948-1953		Dale				
	Kibale & Itwara CFRs	THF	1959-1965	1st	Osmaston	206	1	+	R
	Kibale & Itwara CFRs	THF	1965-1970	2nd.	Kingston	231		+	
	Kihabule LFR	Sav	1952-1956		Osmaston				
	Kihabule LFR	Sav	1957-1966		Lang Brown	15	1	+	
	Kisangi CFR	THF	1960-1970		Osmaston	26	1	+	
	Kyehara and Kikumiro CFRs	STP	1952-1956		Osmaston				
	Kyehara and Kikumiro CFRs	STP	1956-1965	1st.	Lang Brown			+	
	Kyehara and Kikumiro CFRs	STP	1965-1975	2nd.	Kingston	85		+	
	Muhangi CFR	THF	1964-1968		Beaton	9	2		
	Oruha LFR	STP	1959-1968		Plumptre			+	
	Ruwenzori CFR (now Nat.Pk.)	MMF	1961-1971	1st	Leggat & Beaton	33	3	+	R
	Semliki CFR	THF	1958-1961	Ext.	Dale			+	
	Semliki CFR	THF	1961-1971	1st	Leggat	28	1	+	
	Toro Plantations LFRs	F&P	1965-1975			8	1		
	West Toro LFRs	THF	1963-1973		Beaton	9	2		
West Nile									
	Arua plantations CFR	F&P	1956-1961	1st	Osmaston			+	
	Arua Plantations CFR	F&P	1962-1973	2nd	Stuart Smith	10	2		
	Bush Fuel LFRs	Sav	1965-1975			19	2		
	Lendu Softwood Plantations CFRs	STP	1952-1956						
	Lendu Softwood Plantations CFRs	STP	1957-1961	1st	Osmaston	15	1		
	Lendu Softwood Plantations CFRs	STP	1962-1971	2nd	Stuart Smith	35	*1		
	Mt. Kei CFR	Hill	1955-1964					+	
	Mt. Kei CFR	Hill	1964-1974		Beaton	15	1		
	Northern Escarpment Hills LFRs	Hill	1963-1973		Stuart Smith				
	Northern Escarpment LFRs	Hill	1955-1961		Beaton	14	1		
	Nyio Bamboo Reserves LFRs	Sav	1962-1972		Stuart Smith	8	6		
	Southern Escarpt. Tracts LFRs	Hill	1952-1961						
	Tobacco Fuel Plantations LFRs	F&P	1954-1960			14	1		

West Nile (*contin.*)

Tobacco Fuel Plantations LFRs	F&P	1954–1960	Beaton	14	1
Tobacco Fuel Plantations LFRs	F&P	1962–1972	1st Stuart Smith	15	2

Note

By 1965 almost all the reserved forests in Uganda were under approved, current Working Plans, a 'sustained yield' being normally the primary object of management of all production reserves. This list of plans for about 100 reserves and groups of reserves was compiled mainly from lists of incomplete holdings at the Oxford Forestry Institute and the Uganda Forest Department, besides Annual Reports and various personal records and memories (particularly B. Kingston, WPO 1966–1974); some details are missing and the list is probably incomplete. Many of the UFD stocks of working plans were stolen during the Amin-Obote periods, probably to provide wrapping paper for peanuts in the local markets, as paper was desperately short, so some important ones were reprinted in 1999–2000. Some districts have since been subdivided.

4. Technical Notes

1953–58 numbered serially in each year; 1959 onwards serially from No. 72.

All are held on microfilm at the Oxford Forestry Institute library, now part of the Bodleian Library

RP = Research Plot

1953

- 1/53 A note on the mechanical properties of *Chrysophyllum albidum* and *Albizia zygia*. (C.H. Tack)
- 2/53 Logging in Switzerland. (C.H. Tack)
- 3/53 A note on the Forests (Pest Control) Rules. (C.H. Tack)
- 4/53 Forest operations at Kakamega, Kenya. (C.H. Tack)
- 5/53 Plywood and veneer species. (C.H. Tack)
- 6/53 Electrified fencing. (I.R. Dale, H.A. Osmaston, K. Trenaman and D. Leuchars)

1954

- 1/54 Wood borers in buildings. (C.H. Tack)
- 2/54 Natural regeneration of *Eucalyptus saligna* and *robusta*. (A. Stuart-Smith)
- 3/54 Productivity of Uganda high forest. (H.C. Dawkins)
- 4/54 High forest tree increment. (H.C. Dawkins)
- 6/54 Notes on a visit to the Imatong Mountains. (D. Leuchars, C. Swabey and H.C. Dawkins)
- 7/54 Death and coppicing of *Eucalyptus saligna* at Mbarara. (H.A. Osmaston)
- 8/54 Extracts from 'Records of Investigations' Agricultural Department, 1/4/50–31/3/52.
- 9/54 Forest productivity in Uganda. (C. Swabey)
- 10/54 Silviculture of Musizi. (C. Swabey)
- 11/54 Fence posts. (I.R. Dale)
- 12/54 Exotic bamboos. (I.R. Dale, R.G. Miller)
- 13/54 Bending timbers. (C.H. Tack)
- 14/54 A lens key to some Uganda timbers. (K.W. Trenaman)
- 15/54 Uses for sawdust and shavings. (C.H. Tack)

1955

- 1/55 Abstracts from colonial research. (C. Swabey)
 2/55 Extracts from South African Department of Forestry Report 1953. (I.R. Dale)
 3/55 Costs of arboricide. (H.C. Dawkins)
 4/55 First arboricide trials in Karamoja. (H.C. Dawkins)
 5/55 Investigation into the growth of *Chlorophora excelsa* in plantations. (C. Swabey)
 6/55 Technical liaison in Uganda Forest Department. (C. Swabey)
 8/55 Forestry notes on a trip from Uganda to the Cape. (I.R. Dale)
 9/55 The moisture content of timber in buildings in Uganda. (C.H. Tack)

1956

- 1/56 The relationship of solid to stack volume for *Eucalyptus saligna* fuel in Arua. (H.A. Osmaston)
 2/56 Natural regeneration of *Eucalyptus saligna*. (G. Elliott)
 3/56 Use of arboricide in forest tree weeding. (H.C. Dawkins)
 4/56 Preliminary graminicide tests at RP 5. (H.C. Dawkins)
 5/56 Arboricide concentration conclusion of RP10 Mpanga. (H.C. Dawkins)
 6/56 Phomopsis on *Cassia*, conclusion of plot. (H.C. Dawkins)
 7/56 Interim results RP 11 Mpanga, spray application. (H.C. Dawkins)
 8/56 Interim results RP 13 Mpanga, measurement accuracy. (H.C. Dawkins)
 9/56 Interim results RP 16 Mpanga, felling damage. (H.C. Dawkins)
 10/56 Interim results RP 32 Bunyoro, underplanting of partially felled forest with *Khaya* and *Chlorophora*. (H.C. Dawkins)
 11/56 Direct sowing of *Maesopsis* (as nurse for *Chlorophora*). (H.C. Dawkins)
 12/56 Underplanting *Khaya grandifoliola* in Budongo. (H.C. Dawkins)
 13/56 Underplanting of *Entandrophragma utile*. (RP 36 conclusion of plot). (H.C. Dawkins)
 14/56 *Broussonetia papyrifera* in felled forest. (H.C. Dawkins)
 15/56 Small plant establishment of *Khaya* and *Chlorophora* in felled forest RPs 42 & 43 Bunyoro. (H.C. Dawkins)
 17/56 Crown classification of natural forest trees. (H.C. Dawkins)
 18/56 *Chlorophora* plantation in grassland and elephant. (H.C. Dawkins)
 19/56 Root trenching of *Khaya* underplanted in forest RP 47 Bunyoro. (H.C. Dawkins)
 21/56 Some recent American work on arboricides. (H.C. Dawkins)
 23/56 Pre-germination of teak. (H.A. Osmaston and H.C. Dawkins)

1957

- 1/57 Plotting maps from aerial photographs. (A.B. Cahusac)
 3/57 Soil description and sampling. (revised). (H.A. Osmaston)
 4/57 Seed trials of *Maesopsis*; interim report RP 303 Entebbe. (D. Leuchars)
 5/57 Abstracts from colonial records. (D. Leuchars)
 6/57 Eradication of *Eucalyptus* coppice and Lantana. (D. Leuchars)
 7/57 An improved cutter blade for the Hayter. (D. Bacon)
 8/57 Changes in nomenclature of certain exotics. (D. Leuchars)

1958

- 1/58 Regeneration of *Khaya grandifoliola*. (H.A. Osmaston)
 2/58 Uganda hardwoods suitable for flooring. (C.H. Tack)

PUBLICATIONS

- 3/58 Terminology for tropical African vegetation. (H.C. Dawkins)
- 4/58 *Eucalyptus saligna* crop data from Kampala plantations, RP 107 & 108, conclusions. (D. Leuchars)
- 5/58 Arboricide research in Karamoja. (H.C. Dawkins)
- 6/58 Further measurements of felling damage in tropical forest. (H.C. Dawkins)
- 7/58 Sapwood thickness and volume of some indigenous trees. (H.C. Dawkins)
- 8/58 Seasonal effectiveness of arboricides. (H.C. Dawkins)
- 9/58 Kenya softwood plantations tour notes. (D. Leuchars)
- 10/58 A tour of South African forests. (H.A. Osmaston)

1959

- 72/59 General volume table for *Eucalyptus saligna*. (H.C. Dawkins)
- 73/59 Computation of survey traverses. (H.A. Osmaston)
- 74/59 A silve for use in Uganda. (H.C. Dawkins)
- 75/59 Forestry in Rwanda. (W.E.M. Logan)
- 76/59 Control of Ambrosia beetles in logs. (K.W. Brown)
- 77/59 Information on the Mpanga Research Forest. (H.C. Dawkins)
- 78/59 A nursery technique for dry areas. (J.R. Lang Brown and D. Leuchars)
- 79/59 Eucalypts in Uganda. (D. Leuchars)
- 80/59 Further experience of electric fencing. (H.C. Dawkins)
- 81/59 Nursery gadgets. (B. Kingston and D. Leuchars)
- 82/ [not issued]

1960

- 83/60 Eucalyptus taper and volume by diameter limits. (H.C. Dawkins)
- 84/60 Weekly measurement of rainfall. (H.C. Dawkins)
- 85/60 A nursery sprinkler. (B. Kingston)
- 86/60 Field characters of the Uganda Forest *Albizia*. (H.C. Dawkins)
- 87/60 Latin American conifers in Uganda. (D. Leuchars)
- 88/60 Volume table for *Eucalyptus saligna* poles. (H.A. Osmaston)

1961

- 89/61 Silves and volume tables. (H.A. Osmaston)
- 90/61 *Maesopsis* plantations in Kakamega Forest Kenya. (M.S. Philip)
- 91/61 Tour notes, Latin America, September–November 1960. (D. Leuchars)
- 92/61 Tour notes, Florida and Louisiana, November 1960. (D. Leuchars)
- 93/61 Notes on *Analeptes* (= *Diastocera*) *trifasciata* F. (Col. Lamidae) and *Kotochalia* (= *Acanthopsyche*) *junodi* Heyl. (Lep. Psychidae), two possible pests of *Eucalyptus*. (K.W. Brown)
- 94/61 Yields of *Arundinaria alpina* K. Schum. (M.S. Philip)
- 95/61 Report on the FAO Forestry Conference, Nigeria. (R.A. Butt)
- 96/61 Notes on tests of plywood preservatives. (K.W. Brown)
- 97/61 A report on various phytotoxicity tests. (K.W. Brown)
- 98/61 An interim report on termite research. (K.W. Brown)

1962

- 99/62 Notes on recent outbreaks of looper caterpillars. (Lep. *Geometridae*) in coniferous plantations in Uganda. (K. W. Brown)
- 100/62 Interim report on RPs 61, 62 & 76 for BCFC. (M.S. Philip)
- 101/62 Report on visits to plantations in Eldoret Division, Kenya. (A.M. Stuart Smith)
- 102/62 Interim report on RP 50, Budongo. (M.S. Philip)
- 103/62 A forestry history of Kigezi District 1900–1960/61. (A.H. Tothill)
- 104/62 Regeneration counts and early tending in Kibale Forest. (M.S. Philip)
- 105/62 R.P. 6 Budongo Forest. (M.S. Philip)
- 106/62 Establishment of *Dendrocalamus strictus*. (A.M. Stuart Smith and D. Leuchars)
- 107/62 Susceptibility of *Drypetes* sp., *Diospyros abyssinica* and *Parinari excelsa* sub-sp. *holstii* to Finopal. (M.S. Philip)
- 108/62 The effectiveness of different types and makes of paint when used on living trees. (M.S. Philip)

1963

- 109/63 Volume table for *Eucalyptus saligna* poles. (W. Finlayson)
- 110/63 Tending of *Maesopsis eminii* in grasslands. (R.P. 506). (M.S. Philip)
- 111/63 The policy for work subsequent to species trials in Uganda. (M.S. Philip)
- 112/63 Plantation sample plots. (H. A. Osmaston)
- 113/63 Provenance trials of *Cupressus lusitanica*. (R.P.396). (M.S. Philip)
- 114/63 Observations on crown-diameter, stocking, silviculture requirements and possible yield of *Maesopsis*. (H.C. Dawkins)
- 115/63 Interim Report – Afforestation trials on the alluvial sands bordering Lake Victoria. (M.S. Philip)

1964

- 116/64 Recommendations for the preservative treatment of small round timbers by sap displacement and for fencing techniques. (R.A. Plumptre)
- 117/64 Volume table for *Pinus patula* at Mafuga. (M.S. Philip)

1965

- 118/65 Some properties of Uganda grown *Eucalyptus saligna*. (R. A. Plumptre)
- 119/65 A rope ladder for high pruning. (B. Kingston)
- 120/65 Erection of fire-towers in Uganda. (B. Kingston)
- 121/65 Dry-wood termites in structural timber in Uganda. (K. W. Brown)

Appendix B. Glossary

Staff

CCF	Chief Conservator of Forests
DCCF	Deputy Chief Conservator of Forests
CF	Conservator of Forests
ACF	Assistant Conservator of Forests
PFO	Provincial Forest Officer
RFO	Regional Forest Officer
DFO	District Forest Officer
P/FS	Principal of the Forest School
AF	Assistant Forester

Miscellaneous

AFE	adequate forest estate
ALG, NG	African Local Government, Native Government. Authorities wielding certain devolved powers in each district. NGs were progressively converted to ALGs from 1950 onwards.
CFR	Central Forest Reserve (managed by the Forest Department)
CFS	Colonial Forest Service
EAAFRO	East African Agriculture and Forestry Research Organisation
EAR&H	East African Railways & Harbours
EP,WP, NP	Eastern, Western and Northern Provinces
FAO	Food and Agriculture Organisation
FPRL	Forest Products Research Laboratories
gab	girth above buttress
gbh	girth at breast height
GN	General Notice
Hoppus	a traditional British method of conservatively estimating log volume, based on squaring one quarter of the girth (see Appendix F)
IFI	Imperial (later Commonwealth, later Oxford) Forest Institute)
LFR	Local Forest Reserve (managed by an African Local Government)
LN	Legal Notice
MAI	mean annual increment

NHF	Natural High Forest
NPK	nitrogen, phosphorus and potassium fertiliser
Taungya	SE Asian term for a system of planting trees in temporary farmers crops.
TSI	timber stand improvement
UTS	Uganda Timber Sales

Trees

kirundo	<i>Antiaris toxicaria</i> (Rumph ex Pers) Lesch.
mahogany	<i>Khaya</i> and <i>Entandrophragma</i> species
mubura	<i>Parinari excelsa</i> Sabine subsp. <i>holstii</i> (Engl.) R. Grah.
muhimbi	<i>Cynometra alexandri</i> C.H. Wright
munyama	<i>Khaya anthotheca</i> (Welw.) C.D.C.
musizi	<i>Maesopsis eminii</i> Engl.
mvule	<i>Milicia</i> (formerly <i>Chlorophora</i>) <i>excelsa</i> (Welw.) C. C. Berg
nkoba	<i>Lovoa brownii</i> Sprague
podo	<i>Podocarpus</i> species
bamboo (mountain)	<i>Arundinaria alpina</i> K. Schum
bamboo (savanna)	<i>Oxytenanthera abyssinica</i> (A. Rich.) Munro
cane, rattan	<i>Calamus deeratus</i> Mann & Wendl

The commonest *Eucalyptus* species planted in the period was known as *E. saligna* Sm., but is now considered to be a form of *E. grandis* (Hill) Maiden.

Appendix C. Staff List

(to 1965)

Professional Forestry	Period
D.W.G. Bacon (Forest School)	1949–58
J. Ball	1963*
A. Beaton	1952–64
K.W. Brown (Entomologist)	1957*
M.C.F. Butler	1957–64
R.A. Butt	1944–63
A.B. Cahusac (Map Officer)	1947–65
W.V. Calder	1956–57
I.R. Dale (DCCF)	1938–56
H.C. Dawkins MBE (Ecologist)	1942–60
D.E. Earl	1963*
W. Finlayson (Forest School).	1961–63
J.R. Hilton	1949–50
J.F. Hughes	1958–63
R.C.B. Johnstone	1963*
P.K. Karani	1962*
B. Kingston	1958*
E. Kiwutta-Kizito	1963*
S.S. Kyama	1952*
J.R. Lang Brown	1955–63
G.J. Leggat	1946–62
D. Leuchars (Silviculturist)	1949–62
W.E.M. Logan OBE (CCF)	1957–62
D.C. Lyon	1953–62
D. Midholi	1949*
R.G. Miller	1949–54
Murekezi	1965*
E.K.B. Mwanga	1963*
J. Oakley	1963*
H.A. Osmaston (Working Plans)	1949–63
S. Otim	1965*
M.S. Philip MBE (Ecologist)	1947–64
R.A. Plumptre (Utilisation)	1957*
M.L.S.B. Rukuba (CCF)	1959*
R.G. Sangster	1935–52
E.K. Serwanga	1963*
D. Sim (Forest School)	1964*
G.W. St. Clair Thompson	1938–55
J.E.M. Stephens (Forest School)	1950–62
A.M. Stuart Smith	1950*
C. Swabey (CCF)	1951–57
T. Synnott	1960*

A. H. Tohill	1955–60
K. W. Trenaman	1949–56
R. B. Watson	1955–59
R. H. Watson	1956–63
A. W. M. Watt	1947*
G. Webster OBE (CCF)	1937–65
G. H. S. Wood	1949–53

Utilisation

C. G. Bouette (Saw Doctor)	1951–57
Brig. P. T. Goodwin OBE (Timber Grader)	1947–54
Sohan Singh Lall (Sub-Overseer)	1954–65
F. Mugwanya	1964*
C. H. Tack (Forest Engineer)	1949–63
D. D. H. Trask (Logging & Milling)	1956–58

Clerical

P. F. Antao	1925–60
J. M. S. Azavedo MBE	1923–56
R. S. Britto	1945*
J. S. Kabengwa	1937–60
P. Kateba BEM	1946*
B. A. P. Lobo	1951*
J. F. U. Pereira	1944–65
C. J. P. J. Rodrigues	1920–1952
D. F. P. V. de Souza	1950*
J. C. F. de Souza	1926–58

Subprofessional Forestry

E. A. Apyettu	1952*
J. N. Bakamunaga	1952*
J. W. Batesaki	1938*
G. Elliot	1937–57
E. A. Holyoak (Forest School)	1954–60
J. A. Fraser	1936–52
A. G. R. Jasi	1946*
E. J. B. Kadoko	1951*
E. O. K. Kauma	1941*
E. Kaye	1950*
C. M. Kerali	1954*
A. W. Kigundu	1935*
H. R. Kimera	1952*
C. M. Kiragga	1951*
S. D. Mukasa	1937*
S. D. Mukunya	1963*
L. E. Muwanga	1948*
G. Nsubuga	1951*

STAFF LIST

J. Rwaheru	1952*
H.R. Webb MBE (Forest School)	1929–53
J.B. Zabasaija	1952*

Notes

* Service continued after 1965.

Individuals are listed in their final category (professional, etc.) reached in 1965 or before, but their period of service includes any in a different category, e.g. for those who started as rangers.

Specialist and other posts shown against individuals often refer to only a part of that officer's service.

Due to looting during civil disturbances in the 1970s many records were destroyed, so some of the above information (mainly dates) may be inaccurate, or there may be omissions.

Appendix D. The History of Forest Reservation, 1898–1950

(extracted from the previous *Histories of the Uganda Forest Department*)

The Uganda (Buganda) Memorandum of Agreement, signed in March 1900 by Sir Harry Johnston and the Regents and Chiefs of the Kingdom of Uganda (Buganda), stated that 1,500 sq miles of forests in the Kingdom should be brought under the control of the Uganda Administration.

This applied only to the then Buganda Province (17,300 sq miles), the area of which was overestimated in 1900 at 19,600 sq. miles. The Agreement stipulated that 1,500 sq miles of forest not in private ownership were to be brought under the control of the Uganda Administration, together with a further 9,000 sq miles of waste and uncultivated land. The forests were to be maintained as woodland in the general interests of the country.

The Toro Agreement of 1900 and the Ankole Agreement of 1901 both contained a clause to the effect that all forest and waste and uncultivated land was the property of the British Government. The Bunyoro Agreement of 1933 vested in the Governor 'the control of all existing forests and all areas hereinafter to be declared forest' in Bunyoro. In areas where no Agreements were made, the Governor had the right under the Laws of the Protectorate to appropriate areas which he considered were required for forests, with the proviso that the Governor should in every such case consult the African Government concerned and give full consideration to its wishes. Rural lands in Uganda were, of course, held in trust for the use and benefit of the African population.

From the foregoing it is clear that the stage was set at a very early date for the reservation of forests in Buganda totalling nearly 9% of the land and swamp area of the Province, of all existing forests elsewhere in the Protectorate and of such uncultivated bushland as it was deemed advisable to reserve. Most unfortunately, the chance to effect this reservation early in the history of European administration in Uganda was not taken, nor was much attention paid to this most important matter by forest officers during the next two decades. This caused Nicholson to comment in 1929 that 'had half the money spent on various afforestation schemes been spent on selection and demarcation, the forest position in Uganda would have been far sounder than it is to-day' (J. W. Nicholson, *The Future of Forestry in Uganda*).

In 1904 the Survey Department began the task of surveying and demarcating the 9,000 sq miles of private and official estates recognised by the Uganda Agreement. There is no evidence to show that forest officers took any interest in the selection of the boundaries of these estates, and consequently of the Crown forests which were to be reserved. The surveyors immediately came up against difficulties about forest claimed as part of estates, but this issue was settled in 1907 by the Uganda Memorandum of Agreement (Forest), which declared that only forests half a square mile or more in extent, and 300 yards or more in width, could be claimed as Crown forests.

The interpretation of the Forest Agreement appears to have been left entirely to the surveyors of the Survey Department and it is recorded that one of them, Mr. J. M. Y. Trotter, earned the name 'Lion of Kyagwe' – the man who ate up the land – because of his insistence that there must be no encroachment on Crown forest in that area. Interrupted by the 1914–18 war, the survey of private estates was completed in 1936, when the total area of the forests demarcated in the process was found to amount to only 333 sq miles. In addition there were some 171 sq miles of forest worth retention which had not been demarcated separately from adjoining land, so that the total area of Crown forest in Buganda was 504 sq miles, only one-third of the area which it had been agreed should be maintained as woodland in the general interests of the country. Most of the forests were marked on maps as Crown

forest but none was actually gazetted as such until 1932.

The Eastern, Northern and Western Provinces, where private estates are few and scattered, had been gradually surveyed topographically by the Survey Department. On the maps produced, forest areas appeared as undefined patches of tree symbols, marked Budongo forest, Kibale forest, etc. Dawe investigated many forests in Buganda and the Western and Northern Provinces between 1903 and 1910, and some examinations for possible exploitation were made spasmodically between 1911 and 1928. Between 1928 and 1930 Nicholson toured most of Uganda, accompanied in 1929–30 by the Conservator. By 1932 the results of all forest investigations to date were embodied in recommendations to Government for the gazetting of a considerable number of demarcated and undemarcated Crown forests. The total gazettement amounted however to only 1,412 sq miles, or 1.8% of the land and swamp area of the Protectorate, and only 274 sq miles were demarcated.

In 1935 Government accepted the advice of the Conservator that a dangerously low percentage of the country had been constituted Crown forests and issued instructions to all Provincial Commissioners to prepare, in consultation with the Forest Department, proposals for further reservation, a decision which was of great assistance to Divisional Forest Officers. The fruits of this policy did not begin to appear in the Official Gazette until 1937, but between then and 1942 the labours of a number of officers, notably Eggeling, Sangster, Thompson and Cree, who had toured and argued with administrative officers persistently, resulted in the gazetting of very considerable areas and the settlement of boundaries of many forests vaguely described in previous gazetting.

In 1938 a new class of forest called Native Forest Reserves was instituted and it was possible to secure the reservation of some areas for control by Native Administrations which could not be gazetted as Crown forests.

1946 may be regarded as the beginning of the consolidation of the Forest Estate. Some of the land gazetted in the previous decade was on further investigation found to be useless for economic or for protective forestry, and excisions began.

The position at the end of 1950 was that Bugishu, Madi, Kigezi and Bunyoro had been declared to have adequate forest estates, Toro was about to be declared, and the Ankole reservation programme was almost complete. In the Eastern Province where forest and woodlands are small and population dense, great efforts were being made to reserve forest remnants and sites for plantations. In the North, reservation in the West Nile had started late but was proceeding well; the Acholi were co-operative and the Lango antagonistic; and in Karamoja, where many undemarcated reserves had been gazetted, further reservation and demarcation was at a standstill, owing to the backwardness of the country and to lack of staff.

It had been realised that the reservation of 1,500 sq miles in Buganda was impossible of attainment. Only 530 sq miles had been reserved, chiefly in southern Mengo. There was scope however for reserves in northern Mengo, Masaka and Mubende.

The progress of reservation in Uganda was as follows:

Year	Area in sq miles gazetted during the year		Total gazetted area in sq miles at end of the year
	Crown Forests	Native Forest Reserves	
1932	1,412		1,412
1940	1,230	87	4,919
1950	14	42	6,317

In the same period demarcation progressed as follows:

	Crown Forests	Native Forest Reserves
Forests demarcated up to end of 1932	274 sq m	0 sq m
Forests demarcated up to end of 1940	2172 sq m	57 sq m
Forests demarcated up to end of 1950	3544 sq m	218 sq m

Appendix E. The mvule (*Milicia = Chlorophora excelsa*) plantations of Lango and Acholi

Their Rationale and Early History

See plates 1–3

For those reading Chapter 4 who are unfamiliar with the previous history of these plantations it may be hard to appreciate fully the depressing tale of their decline and fall. They were started in a mood of optimism, apparently justified by the success of early trials, and by ecological views of what the climax vegetation of northern Uganda might be in the absence of fire. Their failure is a warning to future foresters that the successful establishment of this prime timber species is fraught with problems. Originally perhaps established by seed scattered by fruit-bats and birds in the banana gardens of Busoga, where it was protected from fire and grass, it grew up sufficiently spaced for *Phytolyma lata*, the Mvule Gall Fly, to be less of a problem than in close plantations. After being a mainstay of the Uganda timber industry for a century, recent surveys in Busoga have shown that in the last decade 80% of the remaining mvule has been cut. Perhaps the wheel has come full circle and the new land legislation, giving occupiers legal rights over their land and any planted timber on it, may encourage the re-establishment of mvule in the banana gardens of Busoga.

The following account is extracted from *A History of the Uganda Forest Department 1930–1950*. See also:

E. Kauma (1948) Short notes on nursery and planting techniques at Abera timber plantations, Acholi District, Uganda. *Empire Forestry Review*, 1948 27 (1) p. 76–79.

H.C. Dawkins (1949) Timber planting in the Terminalia woodlands of Northern Uganda. *Empire Forestry Review*, 28 (3), 226–247.

D.W.G. Bacon (1952) The Silviculture of Mvule. Letter to *Empire Forestry Review*, September 1952.

R. A. Butt (1962) Trials of species for timber planting in the savanna woodland zone of north Uganda. Paper presented to the Eighth British Commonwealth Forestry Conference.

Natural regeneration of mvule is practically non-existent in closed forest, very sparse and unreliable in bush and very difficult to protect from fire and browsing in the open, where any survivors are generally badly shaped on account of attacks of gall-fly (*Phytolyma lata*). It appears probable that most of the trees in Busoga germinated and grew up in the protection of banana gardens which were sometimes later abandoned. In 1900–1910 the previously dense rural population of south Busoga suffered 100,000 deaths from sleeping sickness carried by tsetse flies and much of the area was evacuated. By 1930 a considerable proportion of the larger mvule in south Busoga were dead, either from natural causes, fire or change of climate. In north Busoga there were few old but many young mvule, indicating a northward spread which could not be explained. For many years exploitation of mvule went on in Busoga and in 1930 serious experiments were started at Kityerera in the South Busoga Crown Forest to discover a method of raising a reasonable stock of young trees in bush or grassland. Sowing at stake and small plants failed miserably; stumps and large plants suffered from browsing, root destruction by pig and porcupine and severe attacks of gall. Planting in grassland failed and in the bush the low shade retarded growth. Shade reduction exposed the plants to their natural enemies, fencing of blocks was prohibitively expensive and individual protection of plants meant constant creeper cutting or the plant guards were smothered and growth slowed down. Experiments with lime and ash application to

accelerate growth through the age of vulnerability to animal, vegetable and insect enemies were in progress in 1941 when the South Busoga Crown Forest was closed on account of sleeping sickness.

Native Administration planting spread to Lango shortly after 1926 and a number of very good nsambya (*Markhamia platycalyx*) plantations were established there. In around 1929 planting of mvule became popular in Lango and in 1933 3,770 mvule were successfully planted in Koli County. At this date it was reported that Koli and Eruti counties were free from the mvule gall-fly and that the trees were growing well and fast. Most of the plantations were of pure mvule at wide spacing which encouraged heavy side branches; so in 1935 mixing with *Cassia siamea* as a nurse tree was tried in a number of small plots. T.R.F. Cox, who was then Assistant District Commissioner, Lango, took a great interest in the work and started several valuable experiments at first alone and later in co-operation with the department.

The encouraging behaviour of the species in Lango led to a search for a suitable area for reservation for State planting and eventually 14.5 sq miles of savanna land near Kachung Port were obtained and gazetted as the Kachung Crown Forest. In 1939, 50 acres of mvule in mixture with various other species, notably *Phyllanthus discoideus*, were planted. These did well and in 1941 a programme of 50 acres a year was put into operation.

At the same time an area of four sq miles of good *Terminalia* savanna in Acholi was gazetted as the Abera Crown Forest and experimental mixtures of mvule and large-leaf mahogany (*Khaya grandifoliola*) were started.

The results in both areas were astonishing after the disheartening struggles in Busoga, and A.S. Thomas, Senior Economic Botanist of the Agricultural Department, who was very interested in the efforts to grow mvule, attributed the difference mainly to soil quality. The fact that there were fewer browsing and rooting animals and the absence, probably only temporary, of the gall-fly were sufficient to account for a considerable difference. An effort was made to maintain a belt round the gall free area in which no mvule tree was permitted to grow, but as this could only be quite narrow and the fly might have alternative hosts, not much reliance was placed on it. In 1944 operations were extended to the Opit Crown Forest, Acholi, and an annual programme of 160 acres of mvule mixed with Tido (*Khaya grandifoliola*) was started. These plantations were much admired and were regarded by one eminent authority as the most promising mvule plantations he had seen. The ecological premise of this work was that it was hastening a natural succession from the present *Combretum-Terminalia* savanna, seen as a fire controlled sub-climax, to the supposed climax woodland.

During 1946 labour shortages appeared, and labour especially during the planting season became increasingly difficult. Nevertheless planting was increased in 1949 to 195 acres and by 1951 about 1,500 acres (600 ha) had been planted. By 1954 increasing evidence that the early good growth was not continuing and some mvule were actually dying, resulted in a halt of the main programme and for the next decade only protective and experimental work continued.

In conclusion it may be said that labour shortages and higher costs led to the decision that the economic success of the technique was dubious. Moreover, because of the recolonisation of well-established plantations by savanna grasses, despite the exclusion of fire, it was concluded that both the ecological premise and silvicultural success were increasingly doubtful. This was a sad end to a promising project.

A similarly promising project in Olwal LFR in western Acholi met similar problems, even though this was an apparently better site already supporting a dry type of natural forest which a sawmill started to harvest in 1953. Unfortunately the most abundant species was *Sapium ellipticum*, the wood of which proved to be difficult to saw. Trial plots of potential timber species were planted, the most promising broadleaf being musizi (*Maesopsis*) which reached 16 ft (5 m) height after only two years. However later growth proved to be very variable and in 1962/63 it was concluded that pines, especially *P. caribaea*, would be the best choice.

Appendix F. Conversion Factors

Hoppus/Imperial/Metric

1 km	=	0.6214 miles	1 sq ft QG*	=	0.116 sq.m
1 mile	=	1.61 km	1 cu m	=	28.66 H ft*
1 sq mile	=	2.59 sq km	1 H ft*	=	0.0349 cu m
1 sq km	=	0.386 sq mile	1 H ft*	=	1.273 cu ft
1 acre	=	0.4047 ha	1 H ft/acre*	=	0.0976 cu m/ha
1 ha	=	2.471 acres	1 sq ft/acre	=	0.230 sq m/ha
1 ft	=	0.30477 m	1 cu ft/acre	=	0.070 cu m/ha
1 m	=	3.28128 ft	1 ton/sq mile	=	0.419 tonnes/sq km
1 sq ft	=	0.0929 sq m	1 litre	=	0.035 cu ft
1 sq m	=	10.76 sq ft	1 litre	=	0.22 gal (UK)
1 cu ft	=	0.0283 cu m	1 gal (UK)	=	4.546 litres
1 cu m	=	35.34 cu ft	1 gal (UK)	=	0.004546 cu m
1 ton	=	0.984 tonnes	1 cental	=	100 lb (pounds)
1 tonne	=	1.016 tons	1 lb (pound)	=	0.4536 kg

* Hoppus or Quarter-girth measure

Appendix G. Forest Policy

1. Statement of Forest Policy

The Forest Policy of the Government of Uganda is:

1. (i) To reserve in perpetuity, for the benefit of the present inhabitants of Uganda and of posterity, sufficient land (either already forested or capable of afforestation) to maintain climatic conditions suitable for agriculture, to preserve water supplies, to provide forest produce for agricultural, industrial and domestic purposes, and to maintain soil stability in areas where the land is liable to deterioration if put to other uses.
 - (ii) To manage this forest estate to obtain the best returns on its capital value and the expenses of management, in so far as such returns are consistent with the primary aims set out above.
 - (iii) To foster, by education and propaganda, a real understanding among the people of Uganda of the value of forests to them and their descendants.
 - (iv) To encourage and assist the practice of sound forestry by Local Authorities and private enterprise; and to educate selected Africans in technical forestry.
2. To achieve the first objective of this four-point policy, namely the creation of an adequate forest estate, the following guiding principles shall be observed
 - (i) The climatic and physical conditions of the country must be preserved and, if possible, bettered, by first, the reservation of suitable land and secondly, the maintenance, improvement or re-establishment of vegetation on the most important catchment areas and on other strategic positions.
 - (ii) The supply in perpetuity of the, many forms of forest produce required to satisfy the wants of the people of Uganda both now and in the future must be assured by the reservation, preservation, development and management of the minimum area of forest land needed for this purpose.
 3. It is accepted that the satisfaction of the needs of the inhabitants of Uganda must take precedence over purely financial considerations and the establishment of an export trade; and that only when these needs have been satisfied can the aim of management be directed, in production reserves, to obtaining the greatest revenue compatible with a continuous yield, and to promoting an external trade in timber and other forest produce.

2. General Directions for the Implementation of Forest Policy

4. Greater attention shall be paid to the protection, management and development of savanna forests than has been the case in the past. By far the greater part of Uganda is covered by savanna vegetation and it is from the savannas, and not the closed forests, that the every day needs of the local inhabitants for forest produce are chiefly met.

Nevertheless, it is appreciated by Government that timber for industrial development can only come from the relatively small area of closed forest now remaining in the Protectorate and that this will therefore require intensive management.

5. The policy of Government for the general improvement of the soil in savanna regions in Uganda, both inside and outside forest reserves, is to apply controlled early burning. This policy may be varied in certain areas, for tsetse fly or other reasons.

It is accepted that late-burn areas may require to be protected from early fires by the Department controlling them in the same way that the Forest Department is responsible for the protection of forest reserves from firing generally.

6. Because of Uganda's dependence on agriculture, the rapid development of the country, and the continuing increase of its population, it is necessary to limit the size of the forest estate to the minimum area which will achieve the primary aims of management.
7. If maximum benefits are to accrue from this minimum area, the forest estate must be developed under controlled and carefully planned management. As this is impossible without security of tenure, it follows that first attention must be given to the secure establishment of the forest estate, with the general aim of a balanced distribution of reserves throughout the country, in so far as this is possible.
8. The forest estate shall be composed of two main categories of reserves, the first of chiefly regional value, controlled by the Central Government, and consisting mainly of larger reserves and plantations: the second of smaller reserves and plantations of strictly local value, controlled by Local Authorities.
9. Until a reserve is placed under planned management its boundaries may be adjusted at the special direction of the Governor only, and in accordance with major decisions of planned land utilization, with the object of obtaining a better balanced and better distributed forest estate. The boundaries of reserves which are placed under planned management are intended to represent long period decisions. They will, therefore, in general rest on a formal decision of the Governor-in-Council, and as it is the intention that they should not be changed save in wholly exceptional and unforeseen circumstances, no alteration will be made without the approval of the same authority.
10. Production forest reserves shall be managed, except in special circumstances approved by the governor, to produce a continuous supply of forest produce. Subsidiary objects of management shall be in accordance with the forest policy of the government.
11. Wherever the competence and will to undertake responsibility exists, the control and management of forest reserves of local value shall be devolved upon Local Authorities, who will receive all the revenue from them but who shall be subject to such control by Government as will ensure that management is in accordance with Government policy.
12. It is the policy of the Government of Uganda to encourage the acceptance of responsibility by Local Authorities. The Government wishes to encourage, also, as suitably trained Africans become available, the formation of a cadre of African Forest Officers (functioning within the Forest Department) with a view to the ultimate replacement of Europeans by Africans in the management and control of the forest estate.
13. Natural forest growth on unreserved land in areas which have been declared by the Governor to have an adequate forest estate may be exploited without replacement, in the interests of the local inhabitants, by the Local Authorities controlling the declared areas. Exploitation of this nature must, however, be subject to general safeguards designed to prevent excessive depletion of resources and to preserve local amenities. Such safeguards must include provision for the protection of the banks of streams, for the preservation of vegetation along roads, for the general protection of any types of forest produce of exceptional local or general value for food, etc., and for the creation of additional local productive reserves for the supply of forest produce to meet new demands. Thus if,

in a declared area, a steady demand which cannot economically be met from existing forest reserves should arise for the supply of forest produce to a specific undertaking, and it appears in the interests of the local inhabitants that this demand should be met, the 'user' of sufficient Crown land (the ownership of which would remain vested in the Crown) to meet the demand on the basis of a sustained yield might be assigned to the Local Authorities controlling the declared area for management by them as a production forest reserve. Reserves of this type would of course be profit earning and the profits would accrue to the Local Authority, after payment to the Central Government of any loan needed to initiate the scheme.

3. Immediate Steps to be taken to Implement Forest Policy

14. It is the intention of the Government of Uganda that its forest policy shall be implemented generally in accordance with the recommendations contained in the 'Development Plan for Uganda' The Government recognises the special necessity in forest matters of very long-range planning if the Department is to function efficiently, and subject to any alteration which may be required by the general financial situation it proposes during the next ten years to seek sanction in the normal manner for the necessary expenditure.
15. It is now clear that the cost of the 'normal expansion' envisaged in the Development Plan as published will be considerably greater than the figure given in the Report. Normal expansion on this scale, together with the degree of development proposed in the Report will require an average annual expenditure of approximately £78,000 a year. It would, however, be desirable if finance were available to undertake a greater degree of development which would bring the average annual expenditure up to approximately £89,000. During this period, revenue from forest activities will not, so far as can be foreseen, exceed a peak figure of £50,000 in any one year. On these figures the annual loss on the working of the Forest Department would vary between £30,000 and £40,000 or between £40,000 and £50,000, dependent upon whether it proves possible to finance forestry development on a bigger scale than is envisaged in the Development Plan for Uganda.
16. It must, however, be realised that the figures of expenditure mentioned are for estimating purposes and are purely provisional and that it remains to be determined from time to time what money can in fact be made available.
17. In the opinion of Government the primary tasks of the Forest Department during this decade must be to complete the formation of the forest estate. It considers that within ten years all major reservation and consolidation works should be completed, and that only then should priority be given to matters of management and supply.

J. Hathorn Hall,
Governor

Entebbe, 9th June 1948.

Appendix H. Continuous Forest Inventory

In 1958 a growing concern was felt for the adequacy of Uganda's future timber supplies, confirmed by an FAO. survey of the rapidly increasing consumption and a prediction of its future growth. Major efforts and expenditure were being made to regenerate the natural forests more productively after harvesting, while timber plantations were being made at an expanding rate to supplement the production of the natural forest. The capital investment which they represented demanded reliable information about their growth, to secure maximum efficiency and support requests for further funds.

Dawkins (ecologist) and Leuchars (silviculturist) therefore started a project for establishing permanent sample plots in all major forests, both natural and plantations, those for the former being based on the proposals for 'yield plots' in Dawkins (1958). Osmaston (mensuration officer) was responsible for its development and subsequently for analysis of the initial results obtained in plantations. Instructions to ensure uniformity and reliability of establishment and measurement practices were published in Departmental Standing Orders.

Softwood Plantations

The following information is summarised from UFD Technical Note number 112/63 (available on microfilm in the Oxford Forestry Institute Library).

Methods

By then these plantations totalled 6,000ac (2,500 ha). Permanent sample plots were progressively established in the plantations at an intensity of 1%, using 1 randomly sited fifth-acre (0.8 ha) plot for 20 acres (8 ha), starting when a crop was 4 years old. The sample plots were established at the time of the first thinning, usually at four years old, and in the oldest plots up to three consecutive measurements had been recorded. The total number of plots established up to the end of 1962 was *Cupressus lusitanica* 72, *Pinus* spp. 30, representing 2000 acres (800 ha).

This policy as a routine tool for management decisions and supervision was thoroughly vindicated by the valuable results already obtained and by the promise of more to come. Without these plots we should not have been able to make reliable comparisons between the growth of young crops here and in South Africa, which enabled us to place our estimates of future yields on a firmer basis. Nor should we have known to what extent the stocking of our plantations varied from that prescribed in our thinning schedules; nor whether those schedules were having the desired effect on the growth of the crop.

The difficulties which some people had predicted in marking, maintaining and relocating permanent plots were not too serious. The facility with which errors may be detected both by field checking and by comparisons between successive measurements was proven. Such checks showed that the sources of by far the largest errors were tree height measurements and the measurement of and correction for ground slope. Indeed the difficulty of measuring the former sufficiently accurately for making *short term* estimates of increment led to the recommendation to use conventional smoothed mean heights for this purpose, based on a height/diameter ratio of 6.0 for both *P. patula* and *C. lusitanica*. Dominant height is much more important than mean height, but there was slight divergence between the EAYT which used the 100 tallest trees/acre (250 trees/ha, 20 trees/sample plot) and the Uganda practice of taking the mean height of the 100 largest diameter trees per acre. It was recommended that to save effort in measuring the smaller and less important trees in young crops, the heights of only the 20 largest trees

should be measured. The mean height if required could be estimated from research plot data.

There is a dilemma between marking a plot and its constituent trees sufficiently clearly to make re-identification easy yet not so prominently as to result in 'special' treatment at thinnings, but the former is the most important. Plots were permanently marked by trenches and labels, and individual trees by an aluminium nail 20 cm above BH. Special care is needed to ensure that thinnings removed between plot measurements are fully recorded.

Plots should be measured at the following times:

1. One year after the first thinning, i.e. at about age 5 years.
2. One year later, chiefly as a check. If this was not fully satisfactory, then annually until it was so.
3. Every four years subsequently.

Results

The results of the measurements up to 1962 were analysed in detail and presented in graphs, the main conclusions being:

1. Comparisons were made with the South African (SA) yield tables for their 'fair average quality' crops (75 ft, 23m, at 20 years, planted 8 x 8ft, 2.5 x 2.5m). Dominant diameters for ages up to 15 years (25 cm) at Mafuga for both *C. lusitanica* and *P. patula* lay close to this, but slightly below at Lendu. Dominant heights at both plantations lay close to the SA line, 60 ft (18m) at 15 years..
2. Comparisons were also made with East African Yield Tables (EAYT) compiled at EAFFRO, mainly from Kenyan data. Major internal inconsistencies were found in the EAYT between figures for diameter, stocking and basal area which rendered comparisons with the two latter useless. The EAYT QC I/II curves for both diameters and heights lay close to the 75 ft SA one, so bore similar relationships to the Uganda crops.
3. Plots of dominant height (ft)/dominant diameter (in) for Uganda crops for *C. lusitanica* and *P. patula* lay along almost straight lines with a slope of 6.0 ft/in (equivalent to 0.72 m/cm), indicating that the thinning schedules were achieving a uniform degree of competition, since SA research had shown that this ratio is very sensitive to stocking. For the very fast-growing *P. radiata* however this ratio rose to 7.5 ft/in (0.90 m/cm) in the oldest plots, indicating that they had been inadequately thinned.
4. Existing thinning prescriptions had been based on age for convenience and from lack of knowledge. This had resulted in under-thinning the best crops and over-thinning the worst. In future the time of thinning should be based on growth. A new schedule was proposed based on crop height.
5. Based on these figures and the yields obtained in SA, Ugandan softwoods should yield about 6,000 cu.ft. u.b./acre of final crop at 35 years (420 cu.m./ha).

Eucalyptus Plantations

At this time there were about 20,000 acres (8000 ha) of fuel and pole plantations, predominantly of *Eucalyptus* spp., particularly *E. saligna* (= *grandis*), with peak yields of 850 cu.ft/ac/yr (60 cu.m/ha/yr). Initially a similar programme of establishing sample plots was started in these. These could be successful in well established first generation crops, but many of the plantations were in second or later rotations. In these it was found that site quality and growth are so irregular, the coppice regeneration from stumps after felling so inconsistent, and the proportion of beating up so variable in both amount and success, that it is impossible to get satisfactory results for predicting growth and yield from such

small and widely spaced plots. Adequate estimates of yields for the short rotation period (usually 5–7 years) of these crops can be derived from research plots. The programme was therefore discontinued, with the proviso that if Eucalyptus plantations for saw-timber production were to be established, it should be re-started in these.

Natural Forests

Similar problems of irregularity affect natural forest even more acutely, but the potentially high value crops and their long rotation make management control and yield prediction very important. The large areas involved permitted the sampling intensity to be low, only 0.8%. To economise effort and restrict records to manageable and essential amounts, attention was concentrated exclusively on the trees from which the final crop was likely to be drawn. These were expected to be about 50 trees per hectare of about 0.8 m dbh but, since changes and casualties among these are likely in natural forest, the best 100 trees/ha were monitored, subject the proviso of their being well distributed, i.e. defined as the four leading individuals of desirable species in each of 25 sub-plots. Although these were marked, damage or casualties might result in different ones being selected at the next measurement. Plots were measured every five years.

LAYOUT

2 randomly sited plots per 250 ha of forest.

Each plot was 100m x 100m, i.e. 1 ha.

Each plot was divided into 25 sub-plots, each 20 x 20 m.

In each subplot the four leading desirables (LDs) were recorded, i.e. the four largest (but not deformed) trees of a list of economic species, compiled separately for each forest. Each LD was marked with an aluminium nail and a paint band. Plots were located by bearing and distance from a marked point on an extraction road. The access line was marked by an interrupted line of trenches at 66' (20m) intervals, each 6'x1'x1' (2x 0.3x0.3m). Plot corners and the intersections of the 25 subplots were also marked by similar trenches and cairns.

A considerable number of plots was established in the Budongo, Bugoma and probably Mabira forests, but unfortunately remeasurements and analysis could not be maintained due to staffing problems after independence and later the civil wars. Though these old measurement records still exist, relocation of the plots is problematic and by now many of the young leading desirables will have grown big enough to have become victims of illegal pit-sawing.

(A programme for the establishment of similar continuous inventory plots has recently been restarted with a few changes, e.g. the recording of all trees over 20 cm dbh. The advent of computers has made record keeping and analysis easier.)

Appendix I. Present Wood Consumption and Future Requirements in Uganda

S.L. Pringle and J.E.M. Arnold, Food & Agriculture Organisation, Rome, Report to the East African High Commission 1287, 1960

A summary from pp.47–53 of *The Forests and Forest Administration of Uganda*
Paper for 8th British Commonwealth Forestry Conference, 1962

The sustained supply of the needs of this country for forest produce, enjoined by the Forest Policy, requires as close an assessment as possible of what those future needs will be, so that adequate and timely measures can be taken to meet them. Of the many forms of forest produce that will be needed, saw-timber takes the longest and is the most expensive to produce; poles and fire-wood can be produced in 4 to 12 years under Uganda conditions. Accordingly, during the past two or three years a good deal of attention has been devoted to assessing the future needs of Uganda for saw-timber. For this purpose, forecasts have been made up to the end of the century, as 30 to 40 years is about the minimum needed to grow saw-timber under Uganda conditions. At the same time, very rough forecasts have been made of future pole and fuel requirements over the same period, but as these can be grown relatively quickly and easily and as at present supplies exceed demands, the need for close prediction of the future requirements of these commodities is not so pressing as for saw-timber.

The Forest Department has from time to time made forecasts of future timber requirements. These indicated that future requirements were likely greatly to exceed supplies but they were of necessity based on somewhat slender data. Because, if these forecasts were correct, the cost of meeting the predicted needs would be heavy, it was considered desirable to obtain a second opinion on the Forest Department forecasts. Accordingly in 1958/59 the assistance of FAO was sought for an independent forecast. As the three last African territories form virtually a common market, the forecast was projected on an East African basis to cover all three territories separately. FAO generously acceded to this request and in 1959 a team of two forest economists provided by FAO commenced work in Uganda. The forecast in respect of Uganda was completed in 1960 and the team moved to Kenya and Tanganyika. The forecasts for these two countries have not yet been published. Although the main object of the work was to forecast future saw-timber requirements, the team took the opportunity also to include consumption of pulp and paper, poles and firewood in their study. The FAO team's figures have been taken as the basis for future planning in Uganda.

Owing to the complete lack of records of the large volume of forest produce removed free by Africans for their own use from public land, and to inadequacies in other records, it was impossible to obtain a satisfactory estimate of apparent consumption by striking a balance between production, exports and imports, so the main work of the team consisted of a census of actual current consumption. In the five largest towns, and for certain other consuming sectors such as Government and industry, estimates of consumption were prepared directly from statistics of building areas, bills of quantities and similar records. The remainder of the country, predominantly rural, was divided into strata according to the level of cash income and the availability of timber, and from these a sample of 143 parishes was selected; in each sample parish 25 African households and all other buildings were visited and for each the quantity of furniture, and the size and method of construction of any building started in the last five years were recorded. Estimates of the volumes of sawn timber and poles used were then derived by the application of conversion factors.

Present Consumption

Sawn timber

The present consumption of sawn timber in Uganda is about 3 million cu ft (85,000 cu m) a year. This is equivalent to about 6.7 million cu ft (190,000 cu m) of timber in the round, or roughly 1 cu ft (0.3 cu m) per head of population.

About two-thirds of this consumption is by African households and the balance is divided roughly equally between government and missions on the one hand, and commerce and industry on the other.

The African household consumption is mainly in the form of building joinery such as doors, windows and their frames, furniture and to a limited extent rafters. Timber-framed or clad houses are very rare. Consumption per head works out at an average of about 4 board feet (0.1 cu m) a year, but individual strata (income/wood availability) vary from two to ten board feet (0.05 to 0.28 cu m.).

The apparent consumption of sawn timber calculated from mills' production returns and from export and import statistics only amounts to two-thirds of the consumption revealed by the census. The difference is attributed to the extensive use of shorts and rejects not included in mill returns, of packing case material and, in some areas, of hewn wood.

Plywood and hardboard

The current annual consumption of these materials is about 2.5 million sq ft (230,000 sq m) of plywood and about 0.8 million sq ft (74,000 sq m) of hardboard. The consumption of fibre wallboard is included under pulp and paper products. Until 1959 all were imported, but in that year Messrs Sikh Sawmills and Ginnors Ltd. opened a plywood and blockboard mill at Jinja and in 1959/60 produced about 2.4 million sq ft (223,000 sq m). The ultimate production target of the plant is 10 million sq ft (900,000 sq m) annually. About half the plywood is used in tea chests and flush doors. The round timber equivalent of the present local production of plywood is about 0.1 million cu ft (2,800 cu m).

Pulp and paper products

The current annual consumption of pulp and paper products, including fibre wallboard and insulating board, is about 3,600 tons. Rather more than half of this is kraft papers and fibre-board, the greater part being kraft bags for the cement industry. All these materials are imported and there is no consumption of pulpwood in Uganda.

Poles

Most African houses are built with walls of poles and mud, and even in the very high income strata over 90% of new houses are built in this way. Roofs are similarly usually made of poles whether covered with thatch or corrugated iron (the latter being an ambition of nearly every householder), but some use of sawn rafters occurs in the more prosperous areas. There is little use of poles for agricultural purposes, such as fencing.

The consumption of poles varies considerably between strata, being lowest (1.8 cu ft/head/year – 0.05 cu m) in the prosperous areas, apparently due to the use of fewer but better poles, and being highest (5.5 cu ft) in the areas of medium and poor income and scarce timber, apparently due partly to tradition and partly to the poor quality of the poles and to their more rapid destruction by termites. The average consumption is 3.8 cu ft/head (0.11 cu m), which corresponds to a total annual consumption by African households of 22.8 million cu ft (0.65 million cu m or about 35–40 million poles). Other consumers use an additional 0.7 million cu ft (20,000 cu m), making the total pole consumption about 23½ million cu ft (0.66 million cu m).

Firewood

Because of the patent unreliability of consumption figures given by householders, the FAO census made no attempt to record the quantities, but merely recorded the type of fuel used by each household sampled. The results show that 67% of all African households use only wood-fuel, and that a further 27% use wood and some other fuel, usually grass or papyrus. Most of the remainder use charcoal. Applying an estimate of consumption of 18 stacked cu yds per household per year, the total consumption of the 1.2 million African households attains the large quantity of 22 million st cu yds. a year. Adding institutional and commercial uses, which are reckoned to amount to about 2 million st cu yds., the total firewood consumption at present is estimated to be very roughly around 24 million st cu yds a year. (1 st cu yd = 0.75 st cu m).

Present Sources of Supply

At present about half the country's saw and peeler log requirements (3 million cu ft) come from forest reserves, the balance being obtained from unreserved public land and private woodland. The sustainable yield of the forest estate is currently about 8 million cu ft (85,000 cu m) of saw-logs a year, assuming timber planting is continued at its current rate, so present supplies including those available from unreserved woodland are more than enough to meet present timber requirements.

The greater part of the pole and fuel requirements are obtained from unreserved public land and private woodland. Only a very small proportion comes from forest reserves; for poles it is about 2% and for firewood rather less than 1%. There is currently no shortage in supplies of these products; on the contrary, in many areas, supplies available from plantations exceed requirements.

Future Requirements

Because of the lack of data, predictions of the future requirements of Uganda are difficult to make and depend on a number of assumptions and intelligent guesses about the many factors that may influence future consumption. For the purposes of their forecast the FAO team assumed the following:

- (a) that current attitudes towards the use of timber, such as the prejudice against wooden railway sleepers and against wooden walled houses, will continue;
- (b) that the population will continue to grow at the same compound rate as between the 1948 and 1959 censuses, viz. at a mean rate of 2.54% per annum;
- (c) that mean cash income per head will grow at a rate between 1.0% and 1.6%, these representing low and high estimates respectively;
- (d) that the supply of timber will be increased so as to meet demands with the same facility as at present;
- (e) that in African households the future pattern of consumption will be related to income in the same way as at present;
- (f) that no major new use for sawn timber will develop. It is expected that even in the highest income stratum 50% of new buildings will still be pole and mud walled in 2000 AD though most of them will have sawn rafters. The rate of government building is likely to slacken, except for schools which will increase. A considerable increase in the consumption by commerce and light industry

is also foreseen with the increasing entry of Africans into these activities and the conversion of the country to a cash economy;

- (g) that the recovery of sawn timber in milling will improve from about 40% at present to 50% in 2000 AD;
- (h) that there will be great increases in the use of plywood and similar materials for joinery, furniture and tea chests;
- (i) that consumption of pulp and paper products would increase at approximately the lower rate forecast for African countries in the FAO. study, 'World Demand for Paper to 1975';
- (j) that house building poles will retain their importance, though economies may result from better design and the use of preservatives. The future for fencing poles is impossible to predict; scarcely any are used now, but if the teaching of the Agriculture and Veterinary Departments is popularly accepted substantial quantities will be needed.. The industrial use of poles is likely to remain steady;
- (k) that 90% of African households will still depend on wood-fuel in 1980, and 75% in 2000 AD.

On the basis of these assumptions and the current consumption figures, the future annual round-wood requirements of Uganda have been forecast by the FAO team to be as shown in the following table (for comparison, current consumption is also shown):

Product	Units	Present (1955-59)	Future		Round-wood equivalent in 1000s cu ft		
			Level of forecast	1980	2000	1960	2000
Sawn timber	1,000 cu ft	2,960	upper	6,390	11,900	14,185	27,800
			lower	5,470	11,040	12,143	22,080
Plywood & building board	1,000 sq ft		upper	10,000	26,000	390	1,014
			lower	8,000	20,000	312	780
Pulp and paper products	tons	3,660		12,000	30,000	1,800	4,500
Total, other than poles and firewood			upper			16,375	33,314
			lower			14,255	27,360
Poles	1,000 cu ft	23,500	upper			35,000	49,000
			lower			37,000	56,500
Firewood	st cu yds (st cu ft)	24 million (350 million)		34	46	5000,000	700,000

For conversion factors see Appendix F

Future Sources of Supply

The sustainable out-turn of saw and peeler logs from the permanent forest estate, assuming that timber planting is maintained at its present rate, will remain at about 8 million cu ft a year, until the increased yields which are expected to result from the present silvicultural treatment of the natural forest become available. These increases are not likely to become effective until about 2020 at the earliest.

In addition to the yield from the permanent forest estate, there will be a variable and unregulated quantity of saw-timber available from unreserved public land and private woodland. It is expected that this will be exhausted in 20 to 25 years' time.

From the mid-1980s onward, therefore, the supplies of saw-timber available from within Uganda are expected to fall short of requirements by a substantial and growing margin which may reach 15 to 20 million cu ft in the round by 2000. Part of this may be met by imports from Kenya but it is by no means certain that sufficient supplies will be available from this source and imports would in any case be an appreciable drain on the economy.

If Uganda is to meet all or a substantial part of her future timber requirements, a considerable expansion of timber planting and natural forest treatment will therefore be necessary. The extent of the expansion needed will depend on the degree to which Uganda decides to aim at self-sufficiency. If reliance is placed on importing 50% of Kenya's surplus timber, Uganda will have roughly to double her present rate of timber planting to about 1,800 acres a year and step up natural forest treatment so as to get round the whole of the productive natural forest within the next 80 years; allowing for second treatments falling due and the need to treat adolescent forest early, this will entail raising the rate of treatment of natural forest to about 17,000 acres (6880 ha) a year over the next five years. As indicated in the preceding sections, plans to this effect have been submitted to the Government for consideration.

These plans take no account of the increased requirements forecast for poles and fuel. A part of these will no doubt be met as they arise, by the by-products of timber production. Special measures to meet the rest are not needed at present and can be formulated much nearer the time that the needs arise, as poles and fuel can be produced in a matter of 4 to 12 years under Ugandan conditions. No shortages of these products are expected within that period.