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PROSPECTS FOR INTEGRATION IN THE WOODWORKING  
INDUSTRY OF THE CARIBBEAN COMMUNITY

UC/CAR/86/201

Technical report: The situation in Saint Vincent and the Grenadines\*

Prepared for the CARICOM Secretariat  
by the United Nations Industrial Development Organization

Based on the work of Pietro Borretti, woodworking consultant

Backstopping officer: A. V. Bassili  
Industrial Management and Rehabilitation Branch

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## 1. Introduction

1.1 Title and number of the project under which this country report has been prepared:

Development of integrated industry programme for the woodworking and furniture industry sector in CARICOM - UC/CAR/86/201

1.2 Cooperating Agency:

Caribbean Community Secretariat, Georgetown, Guyana

1.3 UNIDO consultant:

Pietro Borretti, Consultant in Woodworking Industry Sector.

1.4 CARICOM counterpart:

Ivor Carryl, Industrial Economist, Economics and Industry Division.

1.5 Main institutional contact in Saint Vincent:

Central Planning Division, Ministry of Finance

1.6 UNIDO Backstopping officer:

Antoine V. Bassili, Senior Industrial Development Officer, Industrial Management and Rehabilitation Branch, IIS

1.7 Period of mission to Saint Vincent:

20 to 24 May 1987

1.8 Terms of reference:

To survey selected furniture plants in order to establish their requirements for imported lumber and evaluate the efficiency of those plants in the utilization of timber inputs.

1.9 Main activities:

- (a) Visits to selected furniture plants;
- (b) Review of shipping links with Guyana, Belize and Dominica;
- (c) Review of lumber and furniture import trends;
- (d) Providing lumber importers and furniture manufacturers with lumber export contacts in Guyana, Belize and Dominica;
- (e) Making known to the Guyana Forestry Commission, the Belize Forestry Department and Dominican Lumber suppliers Saint Vincent's requirements for furniture-type lumber.

1.10 Background:

Among the primary aims of the Caribbean Community Secretariat (CARICOM), established in 1973, are the coordination of economic policies and development planning, and setting up of a special regime for its less developed members. In line with these aims, the CARICOM has developed an industrial programme for the industrial development of its 13 member states. The emphasis is on the production of goods and services for the regional market with a view to minimizing costly imports.

The development of the timber industries sector - and in particular the promotion of the supply of wood products from within the Region - has been assigned a priority role by the CARICOM secretariat, since the Caribbean Community as a whole is heavily dependent on extra-regional sources of supply to meet its lumber demand.

A regional project of assistance to CARICOM - entitled 'Development of Integrated Industry Programme for the Woodworking and Furniture Industry Sector in CARICOM' - was undertaken in this connection in 1987 by the UNIDO consultant Pietro Borretti who visited nine of the twelve CARICOM countries together with his counterpart Ivor Carryl.

As a result of the missions the consultant prepared eleven reports to highlight to the CARICOM Secretariat and the authorities of the member states the situation of the sector and its potential. He also recommended certain immediate measures for the development of the sector. This report concerns the mission undertaken by the consultant in Saint Vincent.

1.11 Related reports prepared under project UC/CAR/86/201:

The eleven reports prepared under the project include the following:

- (a) The project's terminal report (reference no. IO/R.52) entitled 'Prospects for Integration in the Woodworking Industry of the Caribbean Community dealing with the situation in the region as a whole:

The report proposes, inter alia, the implementation of three projects of regional scope:

- i Study on the establishment of a timber distribution centre in Barbados or Trinidad to facilitate the supply of lumber from within CARICOM;
- ii Holding a regional WOODTECH course/exhibition of woodworking machinery in Barbados in order to promote the transfer of technology for the small-scale furniture and joinery industry in the Caribbean.
- iii Intra-regional tool maintenance training programme for the furniture and joinery industry.

- (b) Nine country reports covering the CARICOM member states 1/ visited by the consultant and his counterpart in the course of the project, and

1/ Antigua, Barbados, Belize, Dominica, Guyana, Jamaica, St. Lucia, St. Vincent, Trinidad and Tobago.

(c) A technical report on the selection of woodworking equipment for the small-scale furniture/joinery industry in the Caribbean Community (report no. IO/R.53).

The report covers both wood processing and tool maintenance equipment. It also includes sawdoctoring equipment for the maintenance of inserted teeth of circular saw blades, gang saw blades and band resaw blades.

## 2. Summary

Woodlands and commercial forests cover 45 percent (17,000 ha) and 27 percent (10,500 ha) respectively of Saint Vincent's land area. Conservation is the main objective of forest resources management.

Sawmilling processing is carried out by a mobile sawmill and a number of chain sawmillers and pit-saw units. The total local lumber production accounted for only 5 percent (423,800 BM or 1,000 m<sup>3</sup>) of the apparent lumber consumption (about 2.9 million BM or 6,800 m<sup>3</sup>) in 1985.

Some 36 percent of lumber imported consists of coniferous species whose main suppliers are Honduras and the USA. The only lumber supplied from a CARICOM source, Guyana, amounted to 427,000 BM or 700 m<sup>3</sup> in 1985.

Although the West Indies Shipping Company (WISCO) should in principle provide a monthly shipping service between Guyana and St. Vincent, this link has been deteriorating due to the decline in intra-CARICOM trade and of WISCO's precarious financial situation. This has adversely affected the lumber export flow from Guyana to St. Vincent and most of the other CARICOM smaller islands.

A keen interest was expressed by the furniture manufacturing companies visited during the consultant's mission in Saint Vincent in importing Mahogany substitutes from Belize, Guyana and Dominica, and Hububalli from Guyana. Lumber export contacts were provided by the consultant in this respect (see heading D in Annex II).

Saint Vincent's furniture manufacturing sector is possibly the smallest one in the Caribbean Community. It comprises 16 workshops and provides employment to some 200 workers. None of the workshops is equipped with a complete set of basic woodworking machines of the industrial type. A similar problem applies to tool maintenance, although limited services are provided by a small tool maintenance unit.

Some furniture had been exported by St. Vincent to Trinidad during the latter's oil-boom years. At present, however, St. Vincent is a net furniture importer.

## Recommendations

(a) To study the feasibility of establishing a timber distribution centre in Barbados to allow delivery on short notice of small volumes of furniture-type lumber from Guyana and Belize to St. Vincent as well

as to the other minor Windward and Leeward islands. A draft project document has been prepared by the consultant in this respect. See annex VII of the project's terminal report (report reference no. IO/R.52).

- (b) To introduce modern yet appropriate woodworking and tool maintenance machinery in the furniture/joinery industry sector towards attaining a meaningful transition from artisanal methods to the industrial system. A separate technical report has been prepared by the consultant in this respect as listed in paragraph 1.11 (c) of this report.
- (c) To demonstrate the use of jigs in connection with the operation of standard woodworking machines as a means of increasing productivity, accuracy and safety in wood processing. This activity has been included in a Caribbean regional project proposed for implementation in Barbados. It would consist of a training course combined with an exhibition of modern woodworking equipment for the benefit of the small-scale furniture/joinery industry. A draft project document has been prepared in this context and attached as Annex VI to the project's terminal report (report reference no. IO/R.52).
- (d) To provide short-term expertise to the existing tool maintenance centre operated by the Hutchinson Trading Company in connection with the envisaged introduction of additional equipment designed to extend its tool servicing scope. A draft project document in this respect is given in Annex III.
- (e) The Furniture Manufacturers' Association should establish contacts with the Guyana Forestry Commission <sup>2/</sup> in order to obtain details on the Pilot Solar Kiln Unit introduced with UNIDO assistance in Guyana.

### 3. Forest Resources

Woodlands and commercial forests cover 45 and 27 percent respectively of Saint Vincent's land area. Conservation is the main objective of the management of forest resources which consist of small volumes of Mahogany, Red Cedar and White Cedar. Plantation resources include species such as Blue Maho (*Hibiscus elatus*) and Caribbean Pine (*Pinus Caribaea*).

### 4. Sawmilling

The bulk of sawmilling work is carried out by one single mobile sawmill unit which is also engaged in experimental work on the conversion of coconut trees into lumber. Current utilization of plantation timber consists of processing thinning logs of a diameter of around 14 inches. Lumber is also supplied by a number of small producers using either the chain-saw or the pit

2/ Address:  
Guyana Forestry Commission  
1 Water Street, Kingston, Georgetown, Guyana  
Telex GY 2262, Tel.: 02-67271

saw techniques. The total local production of lumber is estimated to be 1,000 m<sup>3</sup> (123,300 BM) per year or about 5 percent of the country's total consumption which, based on the volume of lumber imported in 1985, would amount to about 6,800 m<sup>3</sup> (2.9 million BM).

### 5. Lumber Imports

Lumber imports provide about 95 percent of the local market requirements. The import trends in the period 1981 to 1985 are shown in the following table.

Table 1: St. Vincent Lumber Import Trends, 1981-1985 - Total figures.

Quantity and Value	1981	1983	1985
m <sup>3</sup>	6,543	6,833	5,787
BM	2.8 million	2.9 million	2.4 million
EC\$	6 million	3.4 million	4.23 million
US\$	2.2 million	1.27 million	1.56 million

Source: St. Vincent Custom Records

Some 36 percent of the lumber imported in 1985 consisted of coniferous species. Of the remainder, 43.7 percent (1 million BM or 2,532 m<sup>3</sup>) included mixed non-coniferous species not otherwise identified, and the remainder 20.3 percent comprised of hardwood species such as Greenheart, mainly from Guyana (127,190 BM or 700 m<sup>3</sup>); Mahogany, mainly from Brazil (130,530 BM or 308 m<sup>3</sup>); and Cedar from Brazil (53,822 BM or 127 m<sup>3</sup>). The main supplier of coniferous species were Honduras (712,764 BM or 1,696 m<sup>3</sup>) and the USA (66,112 BM or 156 m<sup>3</sup>). The bulk of coniferous species consisted of Pitch Pine from Honduras and Southern Yellow Pine from the USA.

Only 31.2 percent of lumber imported in 1985 was supplied in rough form; the remaining 68.8 percent consisted of lumber planed and/or tongued and grooved. This indicates that most of the imported lumber must have been utilized in building construction.

### 6. Lumber Prices, Imports Duties and Landing Charges

	Retail prices	
	EC\$/BM	US\$/BM
Lumber of local production		
mixed species	1.50 to 2.00	0.55 to 0.74
Imported lumber		
Mahogany	1.67	1.73
Cedar	1.68	1.73
Greenheart	3.00	1.44
Purpleheart	3.80	1.40



	<u>EC\$/BM</u>	<u>US\$/BM</u>
- Pitch Pine		
- dressed	2.18 to 2.29	0.90 to 0.84
- treated and dressed	2.40 to 2.60	0.88 to 0.96
- White Pine		
- dressed	2.04 to 3.00	0.75 to 0.96
- Southern Yellow Pine		
- treated and dressed	2.26 to 2.36	0.33 to 0.87

There is no duty payable for lumber of CARICOM origin. However, consumption and stamp taxes are applied on the CIF value regardless of origin.

Port handling charges - involving landing, stacking and delivery of lumber (LSD charge) - amount to US\$ 300 per 20 ft. container, or US\$ 30 per ton for break bulk cargos.

### 7. Shipping Links

St. Vincent has direct shipping links with Guyana and Dominica, but not with Belize. The main shipping services are listed below:

- (a) Guyana-St. Vincent (WISCO), monthly service with freight rate of US\$ 1,625 per 20 ft. container, rate includes Guyana handling and LSD charge for St. Vincent.
- (b) Dominica-St. Vincent (TMT Shipping), weekly service with roll on/roll off (RO/RO) trailers, with a freight rate of US\$ 1,360, and US\$ 1,900 for 20 and 40 ft. containers respectively, rates include loading and discharging service.
- (c) Dominica-St. Vincent (RMC Lines Ltd.), monthly service.
- (d) Belize-St. Vincent (via Puerto Rico, shipment handled by TMT Shipping from Puerto Rico to St. Vincent through their weekly RO/RO service to the Leeward and Windward islands.

The regularity of the monthly shipping service between Guyana and St. Vincent, as well as between Guyana and most of the other CARICOM destinations, has been affected by the drastic decline in intra-CARICOM trade since 1980. Thus at present shipment of lumber from Guyana depends almost entirely on charter vessel arrangements, which prevents serving on a regular basis the needs of the Leeward and Windward islands for shipment of small lumber loads.

### 8. The Furniture Manufacturing Sector

The furniture and joinery manufacturing sector comprises 16 workshops with a total employment of 200 workers and an estimated lumber consumption of 256,000 BM (604 m<sup>3</sup>) per year. A number of industrial-type basic woodworking machines are available to the industry, although only very few workshops are equipped with a balanced set of machinery. The available equipment includes,

among others, two single end tenoners, chisel mortisers, dimension saws, stroke belt sanders, chain mortisers, one heavy-duty multipurpose machine, turning lathes, etc. There is only one spindle moulder in operation which is incorporated in a British-made multipurpose machine; a second one, installed at the Cara Staff Workshop is out of order.

Although sanding equipment is lacking, this should not be viewed as a major problem because most sanding operations can be performed effectively by semi-skilled labour - thus enhancing the employment potential of the woodworking sector in a country suffering from a high unemployment rate (40 percent in 1984).

In most workshops the gap in availability of a full range of woodworking machinery is bridged by the use of power tools, which are unsuitable for regular, heavy production work as in the case of wood shaping operations. In one particular case (Sutherland's workshop) money has been invested in a single end tenoner, but the matching part of the joint (the mortise) is produced inefficiently with a hand router. This problem could have been avoided if, when first equipping the workshop, the management had purchased a standard planer/thicknesser equipped with a slot-mortising attachment at little extra cost.

St. Vincent shares, with most other CARICOM countries, operational problems derived from the lack of tool maintenance equipment. In view of this situation, the W.B. Hutchinson Trading Co. has set up a small tool maintenance centre for the benefit of the woodworking industry. The Centre is only equipped with two hobby-type machines for the maintenance of carbide-tipped circular saws and of planer knives and has no facilities for the maintenance of bandsaw blades, router cutters, moulding cutters, etc.

Moreover, the Centre is not equipped to re-tip carbide circular saws; thus these expensive tools have to be sent abroad for reconditioning when carbide tips break off. The same applies to bandsaw blades once they break, as there is no equipment for welding them.

Finally, a serious obstacle is posed in the development of the industry's export potential due to the absence of kiln drying facilities on the island.

The following furniture/joinery workshops were visited in the course of the mission:

- (a) O. T. Mayers Finishing and Furnishing
- (b) Duncan's Furniture Stores and Hardware
- (c) Sutherland Furniture
- (d) Dennis George's Furniture
- (e) W. B. Hutchinson's Tool Maintenance Centre

Of all the workshops visited, the Sutherland Furniture had the widest range of woodworking machinery including, among others, a single end tenoner, router and stroke belt sander. It lacked, however, a proper slot mortiser machine and a spindle moulder.

In St. Vincent, the furniture designs are very conservative, with strong emphasis given to the use of turnings and spindles. Dark-stained furniture is the preferred finish, although clear finish is applied to Pinewood office furniture. In addition to heavy designs of colonial type, there is also a liking for furniture of adapted eighteenth century style.

The main furniture workshops have grouped into a Furniture Manufacturers' Association within the framework of the Chamber of Commerce.

### 9. Wood Furniture Exports and Imports

Up to 1983, Trinidad had offered a good export outlet to St. Vincent's furniture industry. However, this market has since dried up due to Trinidad's severe recession. In fact, in 1985, St. Vincent recorded a negative balance in the external trade of furniture. The export/import trend in the period 1983-1985 is shown in the table hereunder.

Table 2: Trends in St. Vincent's Exports and Imports of Wood Furniture, 1983-1985.

	1983	1985
Exports		
EC\$	61,012	20,750
US\$	22,597	7,685
Imports		
EC\$	31,179	310,880
US\$	11,548	115,140
Trade Balance	US\$ + 11,049	US\$ - 107,455

Source: St. Vincent Customs Records

Furniture worth EC\$ 2,700 was exported to Trinidad in 1985 down from EC\$ 34,200 (US\$ 12,000) in 1983. Currently, limited batches of furniture are being exported to Grenada and Martinique. The main source of imported furniture is the USA.

### 10. Selected Technical Assistance Requirements of the Furniture/Joinery Manufacturing Sector

(a) Strengthening of existing Hutchinson's Tool Maintenance Centre. Requirements:

1. Selection of additional tool maintenance equipment <sup>3/</sup>.
2. One-month assistance by a tool maintenance expert to train in the operation of the additional tool maintenance equipment (see draft project document in Annex III).

(b) Selection of following equipment <sup>3/</sup> for the members of the Furniture Manufacturers' Association:

- <sup>3/</sup> Purchase specifications are given in the ad hoc technical report listed in paragraph 1.11 (c).

1. Heavy-duty multi-purpose woodworking equipment
2. Heavy-duty multi-boring machine
3. Sliding-table attachment for the production of tenons on spindle moulders.
4. Heavy-duty spindle moulder, semi-automatic tenoning machines and slotting machine. (See Annex IV).

(c) Sixteen copies of UNIDO manuals on Jigs and Upholstery to be mailed by UNIDO to the Chamber of Commerce for distribution to the members of the Furniture Manufacturers' Association.

#### 11. Potential for Lumber Imports from Guyana, Belize and Dominica

Contrary to the prevalent trend in other CARICOM countries, only 36 percent of St. Vincent's total lumber imports consist of coniferous species, whereas mixed hardwood takes 45 percent of the total. Moreover, one particular hardwood species from Guyana - Crabwood - has already found acceptance in the building industry. Thus, there seems to be a favourable climate for the introduction of Mahogany substitutes such as Determa from Guyana and Santa Maria from Belize. A very keen interest was expressed in Hububalli, both on the part of manufacturers and lumber importers. One particular furniture manufacturer, O. T. Mayers, was impressed with samples of Commier and planned to visit Dominica to negotiate supplies of this species.

#### 12. Specific Requirements for Lumber Quotations and Samples

##### Requirements by Builders' Mart Ltd. (lumber importers)

###### Samples of Hububalli and Determa

5 pieces each species, size 1" x 6" x 6'

5 pieces each species, size 1" x 10" x 6'

CIF quotation

##### Requirements by Sutherland Furniture

###### Samples of Hububalli, Kereti Silverballi and Santa Maria

6 pieces size 1" x 2" x 8'

3 pieces size 3" x 3" x 7'

3 pieces size 2" x 7" x 7'

##### Requirements by Corea's Trading Ltd. (lumber importers)

###### CIF quotation for Determa and Hububalli

Thicknesses: 1", 1 1/2", 2" and 3"

Lengths: 8' to 16'

Widths: 6", 8", 10", 12"

Grade: Prime

Moisture content: 15 to 20 percent

Quantity: one 20 ft. container (33 m<sup>3</sup>)

CIF quotation for Santa Maria (same specifications as above).

## ANNEX I

## Persons Met in Saint Vincent

Mrs. J. Glasgow	Assistant Secretary, Central Planning Division, Ministry of Finance, Kingstown
Mr. C. M. Leach	Manager, The Development Corporation (DEVCO), P.O. Box 811, Kingstown
Mr. Nicholls	Chief Forestry Officer, Forests Department, Gibson Building Supplies, Victoria Park, Kingstown
Mr. C. Nicholson	Deputy Chief Agricultural Officer, Ministry of Trade, Industry and Agriculture, Kingstown
Mr. H. Williams	Vice President for Manufacturing of the Chamber of Commerce, P.O.Box 612, Campden Park Bay
Mr. D. D. Sutherland	Manager, Sutherland Furniture Manufacturing, P. O. Box 1059, Largo Heights
Mr. H. E. Duncan	Managing Director, Duncan's Furniture Workshop and Hardware Store, Middle Street
Mr. O. T. Mayers	Managing Director, O. T. Mayers Furniture Manufacturer, Lower Middle Street
Mr. D. George	Managing Director, Dennis George's Cabinet Making Workshop, Lower Middle Street
Mr. O. A. Veira	General Manager, W. B. Hutchinson & Co. (St. Vincent) Ltd., (importers of woodworking equipment - tool maintenance centre) P. O. Box 110, Kingstown
Mr. R. France	General Manager, Builders' Mart Ltd. (lumber importers), P. O. Box 362
Mr. Nanton	Manager, COREA's Trading Company (lumber importers), P. O. Box 122

ANNEX II

Properties of Selected Guyanese, Belizean and Dominican  
Timber Species suitable for Furniture Manufacturing

Content

- A. Guyana Species
  - 1. Andiroba (Grabwood)
  - 2. Courbaril (Locust)
  - 3. Determa
  - 4. Hububalli
  - 5. Purpleheart
  - 6. Silverballi
  - 7. Simarupa
  
- B. Belize Species
  - 8. Santa Maria
  
- C. Dominica Species
  - 9. Gommier
  
- D. Exporting contacts

1. Andiroba ('Crabwood')

Scientific name:

Carapa guianensis (family: Meliaceae)

Other names:

Krapa, Guino, Figueroa, Tungara, Carapa, Crappo

Wood appearance:

Heartwood varies from pale pink to rich red-brown when freshly sawn, darkening to a fairly uniform dull reddish-brown.

Sapwood pale brown or oatmeal coloured, not always sharply defined. Wood resembles a plain mahogany in appearance, but lacks its natural lustre. Texture medium to coarse; grain generally straight but sometimes interlocked.

Bole 50-80 feet long; diameter 16-20 inches.

Physical and mechanical properties:

Comparable in strength to European Beech (Fagus spp.). Density about 610 kg/m<sup>3</sup> (39 lb/ft<sup>3</sup>) seasoned. Small movement. Moderately hard with good mechanical properties and is fairly stable in use.

Natural durability:

Heartwood is moderately durable and fire resistant. Logs liable to attack by ambrosia (pinhole-borer) beetles.

Timber processing:

Drying: Dries fairly well but rather slowly with a tendency to split in the initial stages. Kiln schedule C.

Working: Saws without difficulty. Interlocked grain makes planing difficult. Works easily and turns well, finishing smoothly.

Assembly: Glues and holds nails well. Tendency to split on nailing.

Finishing: Takes stain and polishes satisfactorily.

Uses:

Suitable for general carpentry, furniture, cabinet work, turnery and interior joinery.

Supplies:

Occurs in reasonable quantities in Guyana. Regular supplies possible.

-----  
Source: Guyana Forestry Commission.

2. Courbaril (Locust)

- Scientific name: Hymenaea courbaril (family: Caesalpinaceae)
- Other names: Copalier, Algarrobo, Gaupinal, Jatoba.
- Wood appearance: Heartwood light brown to brown often with dark streaks and with a subdued golden glow. Sapwood of whitish grey colour is sharply defined. Texture medium coarse.
- Grain straight, lustre medium, uniform vessel lines distinct.
- Bole 60-80 feet long, diameter 24-36 inches.
- Physical and mechanical properties: Very hard and strong. Density varies from 910 to 1000 kg/m<sup>3</sup> (57-62 lb/ft<sup>3</sup>) seasoned. Moderate shrinkage, relatively stable once dry. Good mechanical properties, especially elasticity.
- Natural durability: Very resistant to decay.
- Timber processing: Drying: dries readily without distortion or splitting.
- Working: moderately difficult to work but finishes smoothly. Planes and turns without difficulty. Good bending to steaming process.
- Assembly: glues well, but difficult to nail. Fastenings are held well.
- Finishing: Finishes smoothly. Polishes and varnishes without difficulty
- Uses: A wood of decorative appearance suitable for use in the manufacture of high grade furniture, cabinet work, decorative joinery and veneer. Also used for ship-building, general construction, and the making of tool handles and croquet mallets.
- Supplies: Occurs widely but not abundantly in the Guyana forests. Regular supplies in modest quantities are available.

-----  
Source: Guyana Forestry Commission.



### 3. Determa

<u>Scientific name:</u>	<u>Ocotea rubra</u> (family: <u>Daubeneae</u> )
<u>A.T.I.R.T. standard name:</u>	Louro Vermelho
<u>Other names:</u>	Wana, Grignon Franc, Red Louro
<u>Wood appearance:</u>	Pale reddish-brown with subdued golden lustre. Grain straight to irregular, texture rather coarse. Bears some similarity to a dense grade of African Mahogany. Pole 60-80 feet long, cylindrical; diameter 24-36 inches.
<u>Physical and mechanical properties:</u>	Average density about 620 kg/m <sup>3</sup> (39 lb/ft <sup>3</sup> ). Hardness - soft to medium. Strength class 5/4, generally below the average for its density. Movement low to moderate. Determa responds extremely slowly to atmospheric changes and is, thus very stable in use.
<u>Natural durability:</u>	Determa heartwood is rated durable in graveyard and pure culture tests. The wood equals Honduras Mahogany in its resistance to termites, and is also fairly resistant to marine borers.  Determa is highly resistant to moisture absorption and has excellent weathering characteristics.
<u>Timber processing</u>	<u>Drying:</u> kiln schedule E. Because of the slow diffusion rate of the moisture in the wood Determa is difficult to season.  <u>Working:</u> saws well, works easily with all tools; turns and carves well.  <u>Finishing:</u> stains and polishes well after filling.
<u>Uses:</u>	A general utility timber, widely used for all kinds of indoor and outdoor work. Uses include boat and ship building (keel frame, planking and decking); carriage and waggon building; building construction both interior and exterior (framing, stairs, windows, sash frames, flooring strips, interior trim); cooperage, furniture and cabinet work. The wood is suitable for bending to a moderate radius of curvature.

Supplies:

Available in considerable quantities. Supplies adequate to meet all likely requirements, both in quality and quantity. The timber is available in large sizes.

-----  
Source: Guyana Forestry Commission.

1. Hububalli

- Scientific name: Loxopterygium sugotii (family: Anacardiaceae)
- A.T.I.B.T. Standard name: Slangenhout
- Other names: Koika, Onotillo, Koel pialli
- Wood appearance: The wood is brown to reddish-brown, attractively figured; contains numerous narrow to rather wide darker stripes and streaks. Lustre medium. Texture medium, uniform. Grain straight, sometimes interlocked or wavy.
- Physical and mechanical properties: Density about 800 kg/m<sup>3</sup> (50 lb/ft<sup>3</sup>). Strength class 4, moderately hard; toughness medium to rather brittle. Movement rather low. Air dry Hububalli compares closely with Burma Teak in all strength properties except compression and tension perpendicular to grain.
- Natural durability: Resistant to decay; moderately resistant to termites. The wood is highly resistant to moisture absorption.
- Uses: Because of its attractive figuring and relative scarcity the wood is best suited for panelling, high-grade furniture and cabinet work.
- Supplies: The wood is frequently found in the far interior. Moderate quantities are available for export.

### 5. Purpleheart

- Scientific name: Peltogyne pubescens and P. Venosa (family: caesalpiniaaceae)
- A.T.I.B.T. standard name: Amarante
- Other names: Amaranth, Morado, Pau Roxo, Bois Violet, Barabu
- Wood appearance: Dull brown when freshly cut, rapidly oxidizes to violet-purple on exposure to light and gradually toning down in course of time to dark purplish-brown. Sapwood whitish or cream coloured. Grain generally straight, sometimes wavy or interlocked. Texture moderate to fine. Bole 50-90 feet long, cylindrical; diameter 20-44 inches.
- Physical and mechanical properties: Wood is very tough, strong and resilient. Density about 860 kg/m<sup>3</sup> (54 lb/ft<sup>3</sup>) seasoned. Movement small, bending strength 147 N/mm<sup>2</sup> (21399 lbf/in<sup>2</sup>) modulus of elasticity 1600 N/mm<sup>2</sup> (242,000 lbf/in<sup>2</sup>) compression parallel to grain 78.5 N/mm<sup>2</sup> (11380 lbf/in<sup>2</sup>). Shock resistance medium.
- Natural: Highly resistant to decay, termites and fire. Heartwood very durable and extremely resistant to preservative treatment, but sapwood is permeable.
- Timber processing: Drying: dries well and fairly rapidly with little degrade. Kiln schedule E.
- Working: not difficult to work. Saws, planes and turns well, finishing smoothly; takes a high polish.
- Assembly: it takes glue well and holds nails and screws satisfactorily.
- Finishing: gives good results when lacquered or polished.
- Uses: Possesses high strength and very good durability and is an excellent structural timber suitable for heavy outdoor constructional work such as bridges, dock work and park benches. As flooring it has

high wearing qualities and is suitable for most conditions of traffic. Has been used successfully in chemical plants for vats, filter press plates and frames. Suitable for high-grade furniture and turnings. Also used for making billiard cue butts, tool handles, interior and exterior joinery. A valuable wood for its attractive appearance and its strength.

Supplies:

Regular supplies are available.

## 6. Silverballi (Group)

- Family: Lauraceae
- Scientific names: Brown Silverballi: Licaria canella  
Kereti Silverballi: Ocotea puberula, Ocotea wachenheimii, Ocotea oblonga  
Kurahara: Ocotea glomerata  
Swizzlestick: Ocotea schomburgkiana  
White Silverballi: Ocotea canaliculata  
Yellow Silverballi: Aniba ovalifolia
- A.T.I.B.T. standard name: Canela
- Other names: Pisie, Caralou, Canelo, Louro Branco, Inamui, Preto
- Wood appearance: In Guyana the Silverballi group is divided into 'hard' and 'soft', with the dividing line being put at an air dry density of 585 kg/m<sup>3</sup> (37 lb/ft<sup>3</sup>).
- The heartwood ranges from greyish through yellowish buff to light brown and darkens on exposure. Lustre medium to high. Texture rather fine to moderately coarse. Grain straight. The wood usually has a pleasant aromatic odor.
- Bole 60-70 feet long; diameter 16-24 inches.
- Physical and mechanical properties: The 'hard' Silverballi is rather light to heavy with densities above 37 lb per cubic foot. The group is generally in strength class 2.
- Movement rather low; the lighter species shrink less than the heavier types.
- Natural durability: Moderately resistant to insects and decay, but susceptible to termites. Highly resistant marine borers. Difficult to impregnate.
- Timber processing: Drying: kiln schedule G. Silverballi air dries well with little degrade.
- Working: saws well and works easily.
- Assembly: holds nails, screws and glue well.
- Finishing: Finishes smoothly unless grain is severely interlocked. Paints well.

Uses:

'Hard' Silverballi: General carpentry, boat building (planking), suitable for both interior and exterior work in house building; furniture and cabinet work; suitable for veneer and plywood.

'Soft' Silverballi: general carpentry, interior work, light furniture; suitable for utility plywood.

Supplies:

Occurs frequently in the Guyana forests. Regular supplies are available for orders placed in the Silverballi group.

7. Simarupa

- Scientific name: Simaruba amara (family: Simarubaceae)
- A.T.I.B.T. Standard name: Marupa
- Other names: Aceituno, Acajou blanc, Scomardepa, Bitterwood.
- Wood appearance: Heartwood whitish, not differentiated from the whitish or straw coloured sapwood. Wood has a slightly bitter taste, but is odourless. Grain straight. Texture is medium, uniform and lustrous. Bole 70-90 feet long; diameter 20-24 inches.
- Physical and mechanical properties: A very light, soft timber. Density about 430 kg/m<sup>3</sup> (27 lb/ft<sup>3</sup>) seasoned. In several respects very similar to Obeche (Triplochiton scleroxylon). Movement small. Low in bending strength stiffness, crushing strength and shock resistance.
- Natural durability: Timber of low durability, blue stains easily. Timber converted while still green can easily be treated by short dipping and diffusion.
- Timber processing: Drying: dries very rapidly and very well. Kiln schedule L
- Working qualities: Easy to work with both manual and machine tools.
- Assembly: glues well. Can be easily nailed with good holding qualities.
- Finishing: easy to paint, stain or varnish.
- Uses Suitable for use where a light, easily worked hardwood is required and where its lack of durability and low strength are not important. Examples are in furniture for interior use, drawer slides, and some types of cabinet framing; interior joinery and shoe heels. Excellent qualities for model making, utility woodware and toy manufacture. Simarupa peels well and makes attractive plywood.
- Supplies: Adequate supplies available in commercial quantities.

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Source: Guyana Forestry Commission



2. Properties of a Belinean Timber Species suitable as a substitute to Mahogany in furniture production

Names

Trade name: Santa Maria  
Botanical name: Calophyllum brasiliense var. rekoi Standl. Guttiferae.  
Local name: Santa Maria, Leche Maria, Jacareuba (Brazil).

Range

Mexico to Brazil and through the West Indies.

Description of Wood:

Sapwood - pale pink, 1-2 inches wide.  
Heart - light pinkish to reddish brown.  
Odour and taste - not distinctive.  
Grain - generally interlocked.  
Texture - medium.  
Growth rings - indistinct, usually limited by a fine line of parenchyma.  
Pores - medium, visible, in diagonal to radial chains and in irregular groups, rather numerous.  
Vessel lines - distinct, darker than background.  
Rays - very fine, invisible to naked eye on cross section; fine but distinct on radial surface, darker than background; faintly visible on tangential.  
Gum Veins - often associated with calcium carbonate deposits, rather frequent.  
Parenchyma - in concentric or broken tangential lines, indistinct on cross section; distinct because of darker colour than background on longitudinal surfaces, where an irregular pattern is produced.

Physical properties

Density: 540-715 kg/m<sup>3</sup> (34-45 lb per cubic foot) at 15 per cent moisture content.  
Hardness: moderate, about equal to that of English Oak.  
Shrinkage: above average. From green state to about 11 per cent moisture content: tangentially 5/8 inch per foot, radially 3/8 inch per foot.  
Distortion: There is some tendency towards distortion in seasoning unless the logs are suitably converted, preferably by the semi-quartered method. But given this, and careful seasoning, the wood has been observed to give satisfactory results in good class joinery trials over a period of eight years.

Durability:

Resistance to fungal and insect attack moderately high. Heartwood moderately durable in contact with the ground. Constructional material in exposed situations very durable. Not readily attacked by termites. Not

resistant to marine borers.

Resistance to impregnation with preservatives: Sapwood readily amenable to impregnation, but heartwood extremely resistant.

Mechanical properties

In resistance to static bending, shock load and splitting, the timber is slightly superior to English Oak. It has poor bending qualities and cannot be compressed without buckling.

Working qualities

Works with moderate ease in most operations with both hand and power tools and is comparable with medium quality English Oak in resistance to cutting. Saws: Flat-sawn green wood may cast off the saw. Planing: For the dressing of seasoned stock cutter knives require to be kept in good condition while the rate of feed should be relatively low in order to obtain the best results. Unless this care is taken pronounced pick-up may occur in the stripe figure of fully quartered stock, thus necessitating extra sanding prior to finishing and polishing. If obtainable, a cutting angle of less than 20 degrees materially improves the finished surface. Drilling: The wood tends to tear at the exit hole and the wood must be carefully supported to minimize damage. Turns: readily to a reasonably good finish. Stains and finishes: well but quarter-sawn stock requires much sanding to remove 'picked-up' grain. Nailing: The wood is rather hard to nail and, in dimension stock, nails once driven are very difficult to pull. Where the darker coloured gum streaks are present the associated calcium carbonate tends to dull the cutter edges.

Laboratory tests:

- (a) One small log of Santa Maria was tested at Imperial Institute, London in 1922.
- (b) A preliminary test on 5 logs was made at the U.K. Forest Products Research Laboratory in 1932 and a major test on some 1100 cubic feet in 1933.
- (c) Four bolts from different parts of the same tree were tested at Yale School of Forestry in 1932.

Trade trials:

Material from the major test was tried by woodworking firms.

(a)

Veneer and plywood: The interlocked grain persisting throughout the wood caused tearing of rotary cut stock. Gum streaks were present. Veneers showed a tendency to buckle and in drying the interlocked grain caused splitting both at the ends and middle of the sheets. Plywood showed open end-split, torn grain and gum streaks while distortion was pronounced.

(b)

Plywood: A short log taken from the parcel described in laboratory test (b) above was examined by a firm of decorative veneer manufacturers, who stated that interlocked grain was present and caused tearing of rotary cut veneer, and that gum streaks were present, thus causing a tendency towards splitting and buckling in the veneer when drying. Nevertheless plywood made up from these veneers and kept under observation for some years has remained flat and shows a fairly decorative appearance. For future plywood manufacture care should be taken to select at source logs which are the most suitable in size and shape, and as far as possible free of the defects mentioned.

(c)

Trials as general purpose furniture: A favourable report was made on a parcel of about 500 cubic feet by a furniture manufacturer. The wood was used for turnings, light articles of furniture, small tables, chairs, mattress sides, couches. It was noted that the condition was very fair and comparable with other commercial British Commonwealth timbers. Defects and distortion after resawing were not more than 5 percent, which is reasonable. The timber had good 'standing' qualities during manufacture and final assembly.

Source:

Notes on Forty Two Secondary Hardwood Timbers of British Honduras, 1946, Forest Department of British Honduras.

9. Properties of a Dominican Timber Species suitable  
for Furniture/Joinery Making

Gommier

- Scientific name: Dacryodes excelsa Vahl. D. hexandra (Hamilt. Griseb (family: Burseraceae)
- Other names: Gommier blanc, Gommier montagne (Guadeloupe and Martinique); Tabonuco (Puerto Rico)
- Distribution Gommier occurs in Puerto Rico and the Lesser Antilles, generally in small groups along ridge-tops and upper slopes of the rain forests in Dominica, Saint Lucia, St. Vincent, Grenada, Guadeloupe and St. Kitts.
- The tree: Gommier is a large to very large evergreen tree reaching a height of 36.0 m and a diameter of 1.0 m to 1.5 m although mature trees are more commonly 18.0 to 24.0 m tall and 0.5 to 0.75 m in diameter. They are deep rooted, without buttresses, and able to stand up well to the numerous hurricanes of the Caribbean. The boles are straight and well formed.
- The timber: Gommier is variously reported to resemble birch (*Betula*), mahogany, and sometimes yellow poplar (*Liriodendron*). It is perhaps closer in appearance to the botanically associated gaboon or okoume (*Aucoumea*), but harder, heavier and much finer textured.
- The sapwood is narrow, greyish in colour and not clearly demarcated from the heartwood which is uniform pale brown with a purplish cast when freshly cut, turning a pinkish brown when dried, and a lustrous brown on exposure. The grain is sometimes interlocked, producing an attractive ribbon stripe. The lustre is high and often satiny in appearance. The texture is fine to medium and uniform, and in general is somewhat finer textured than mahogany.
- The wood weighs about 640 kg/m<sup>3</sup> when dried.
- Drying: It dries easily with no appreciable distortion or other defects. Its volumetric shrinkage from green to oven dry is 10.5 percent; tangentially it is 6.4 percent and radially 4.1 percent, which is superior in terms of drying to those values for African and Honduran mahogany.

Durability:

Moderate.

Working qualities:

The timber is easy to work but with a tendency to dull cutting edges due to the high silica content of the wood. When sharp cutting edges are maintained, the wood finishes smoothly and takes glue and all finishes effectively. It is good wood for turning and for holding nails.

Uses:

Gommier is used extensively in the Caribbean area for furniture and cabinet making, and in Puerto Rico is often stained and sold as 'mahogany'. It is also used for boat-building, shingles and crates. In the Caribbean, it is considered very susceptible to termite attack, and for exacting purposes not as good as mahogany with its known resistance to termites. Gommier also produces very good veneer. Tests made at the Centre Technique du Bois indicate that gommier is suitable for plywood, with selected stock suitable for decorative veneer. This was substantiated by other tests carried out in Canada with the recommendation that eccentric peeling produced better quality veneer.

Exporting Contacts

Guyana

Mr. H. E. Cort, Marketing Manager, Guyana Forestry Commission, 1 Water Street, Kingston, Georgetown, Guyana, Telex: 2262 WALABA GY, Tel.: 02-54191

Belize

Mr. H. Flower, Chief Forest Officer, Forestry Department, Ministry of Natural Resources, P. O. Box 118, Belmopan, Belize, Telex: 192 FOREIGN BZE, Telephone: (08) 2415

Dominica

Mr. E. W. B. Jerome, Manager, North Eastern Timbers Sawmill, Palm Tree, Woodford Hill, Dominica, Tel.: (809)419-7042

Mr. D. Southwell, Managing Director, Dominica Timbers Ltd., (Portsmouth) Sawmill, P. O. Box 198, Roseau, Dominica

ANNEX III

DRAFT PROJECT DOCUMENT

Country: Saint Vincent and the Grenadines

Title of project:	Technical assistance for strengthening the existing tool maintenance centre of W.B. Hutchsinsons & Co. Ltd.
Company address and contact person	W. B. Hutchinson & Co. (St. Vincent) Ltd., P. O. Box 110, Kingstown, St. Vincent W. I., Tel.: 71224, Telex 7526 HUTCH (Mr. Oswald A Veira, General Manager)
Government implementing Agency	Forests Department, Gibson Building Supplics, Victoria Park, Kingstown, St. Vincent, W.I.
Executing Agency	United Nations Industrial Development Organization (UNIDO) or other organization as selected by the Government
Duration	3 months
Estimated starting date:	3 months after approval of the project
External inputs:	US\$ 17,000
Government inputs	In kind.

PART I - LEGAL CONTEXT

To be indicated in the final project document.

PART II - THE PROJECT

PART II A - Development Objective

To promote the operative efficiency of the furniture and joinery industry in Saint Vincent.

PART II B - Immediate Objective

To enable the existing Tool Maintenance Centre of the Hutchinson Co. to acquire the know-how needed for the operation of the new equipment expected to be purchased towards expanding the servicing scope of the Centre.

PART II C - Background and Justifications

The Saint Vincent Furniture manufacturing sector comprises 16 workshops with a total employment of 200 workers and an estimated lumber consumption of 256,000 BM (604 m<sup>3</sup>) per year. A number of industrial-type basic woodworking machines are available to the industry. However, hardly any of the existing plants is equipped with a full range of heavy duty equipment of the type required by small-scale woodworking plants in order to attain an appropriate degree of efficiency and productivity. As a result, St. Vincent has yet to attain self-sufficiency in the supply of furniture. In fact, imports of furniture increased from EC\$ 31,179 (US\$ 11,548) in 1983 to EC\$ 310,880 (US\$ 115,140) in 1985.

An ad hoc technical report has been prepared under the UNIDO/CARICOM project UC/CAR/86/201 with respect to the selection of appropriate wood processing and tool maintenance equipment.

This project proposes to provide short term expertise to the existing tool maintenance centre in connection with the utilization of additional equipment to be purchased to cover the full range of tool maintenance services required by St. Vincent's furniture/joinery industry.

PART II D - Outputs

1. The tool maintenance equipment purchased for the tool maintenance servicing centre commissioned and operational.
2. Three technicians trained in the operation of the equipment.

PART II E - Activities

1. Preparation of plant layout of the maintenance centre;
2. Supervision of the installation and trial operation of the equipment;
3. Calculation of appropriate servicing charges for standard maintenance work;



4. Setting up a simplified costing system to monitor the Centre's expenditure and income; and
5. Training in the operation of the equipment in the process of providing maintenance services.

PART II F - Inputs

1.	<u>External inputs</u>	<u>man/month</u>	<u>US\$</u>
11-01	Tool maintenance expert (split mission)	3	21,000
51-00	Miscellaneous expenses		1,000
	Total external inputs		25,000
2.	<u>Government inputs</u>		
2.1	Local transport		in kind
2.2	Secretarial services	3	in kind
2.3	Counterparts	9	in kind
3.	<u>Inputs by the W.B.Hutchinson &amp; Co. Ltd.</u>		

Cost of the tool maintenance equipment. Cost of auxiliary equipment consumed.

PART II G - Related Activities

Selection of tool maintenance equipment

The selection of the equipment is provided in the ad hoc report prepared under the UNIDO project UC/CAR/86/201 entitled guidelines on the selection of woodworking equipment for the small scale furniture/joinery industry in the Caribbean Community (report reference no. IO/R.53).

Prior Obligations

The equipment must have been purchased before the final approval of this technical assistance project.

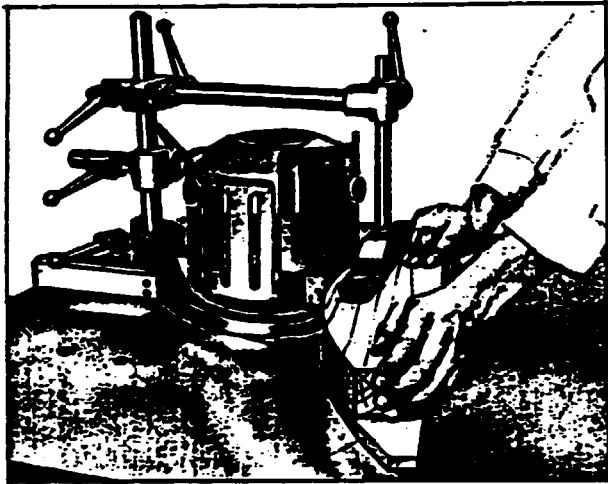
ANNEX IV

Details of Spindle Moulding Machine and Sliding Table  
Tenoning Attachment

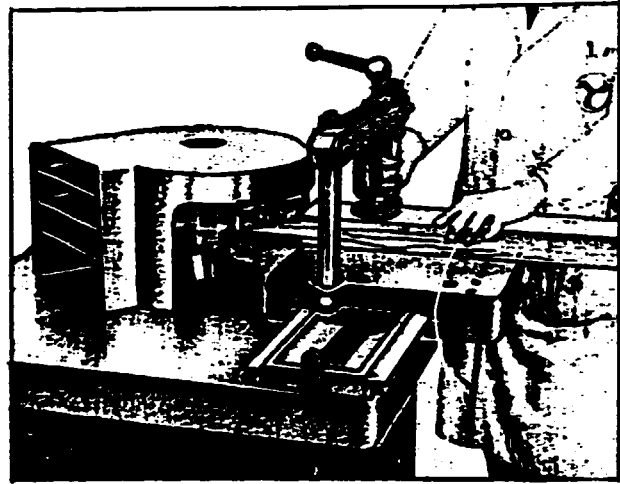
Equip. Ref. No.	Qty.	Description
BE/20	1	Spindle moulding machine (single spindle) EUMAPDS classification 12.311
		1. Specifications
		1.1 To be provided with the following optional attachment 1/:
	1	- Dovetailing attachment;
	1	- Corner locking attachment;
	1	- Tenoning attachment;
	1ea	1.2 Interchangeable cutting spindles of 30 and 35 mm dia. to accommodate cutters having corresponding bore diameters.
		1.3 Recommended R. P. M. of cutting spindle: 3000; 4500; 6000 and 8000;
		1.4 Minimum power of motor : 5.5 kW (7 1/2 HP);
		1.5 Lubricated-for-life bearings are preferred
	1set	1.6 Flat hold-down springs attached to the spindle moulder fence and table to provide pressure on workpiece in the moulding process;
	1	1.7 Overhead hood guard for shaping work;
		1.8 Overload switch protection;
		1.9 Tropical insulated motor.
		2. Spare parts requirements
	1set	Wearable parts for two-year operation
		3. Typical equipment
		Supplier Wadkin-Bursgreen, Mod. BER 4 150
		Address: Wadkin PLC; Green Lane Road;
		Leicester LE5 4PF
		United Kingdom
		Tel.: (0533) 76 91 11, Telex: 34 646

1/ Attachments to be supplied with one set of typical cutters.  
2/ The only spindle moulder supplied with dovetailing and corner locking attachment.

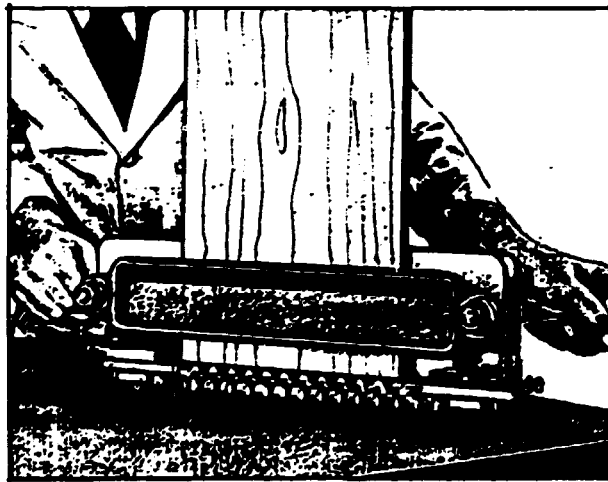




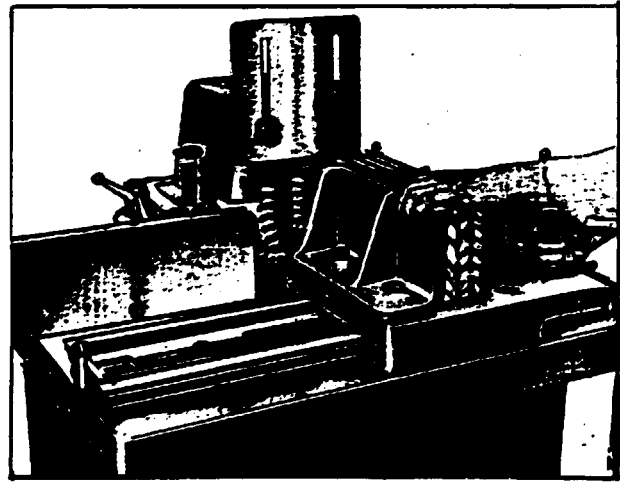
**Moulding Curved Surfaces**



**Tenoning**



**Dovetailing**



**Corner Locking**