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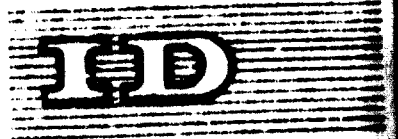
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United Nations Industrial Development Organization

Technical Meeting on the Selection of
Woodworking Machinery

Vienna, 19 - 23 November 1973

NEEDS AND CONDITIONS OF THE WOODWORKING INDUSTRY
IN GUYANA^{1/}

by

Carlton F. Collins
Utilization Officer, Forest Department
Georgetown, Guyana

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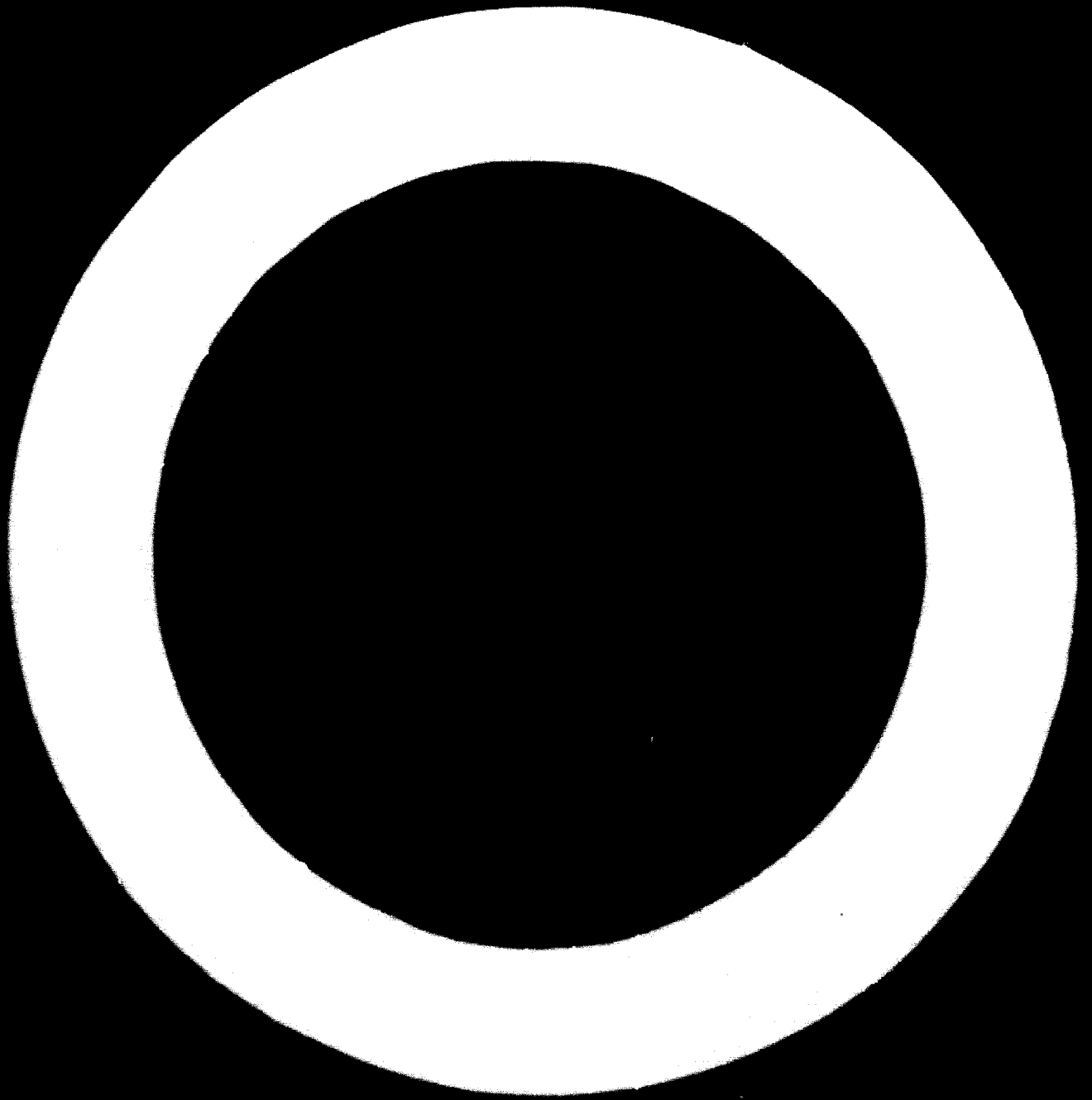
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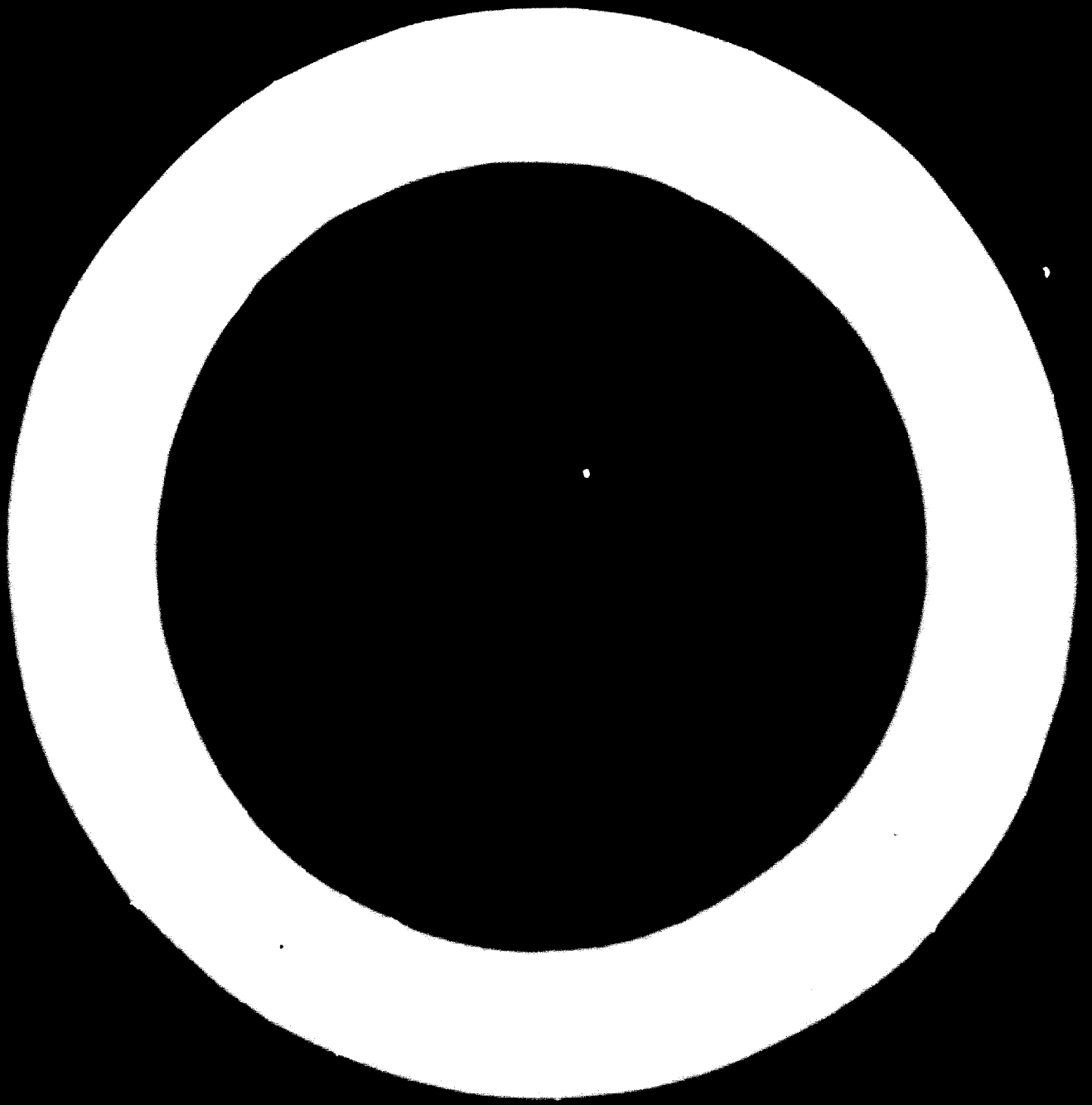
SUMMARY

The woodworking industry in Guyana is at a rudimentary stage of development, and its expansion is dependent principally upon obtaining an assured supply of raw material - wood, in a dry condition well machined and in sizes suitable for use by the industry, and by mechanizing the various manufacturing processes through the installation and increased use of woodworking machines and equipment.

The sawmilling industry does not at present supply the needs of the woodworking industry in terms of quality because it is itself in need of improvement nor in terms of output because it has been geared to supply the greenheart export markets and the building industry, where the demand for lumber far exceeds the supply. Saw-

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will improvement will be achieved when matters concerning their location, systems of ownership, scale of production, security of tenure and credit financing have been resolved.

Both the furniture and joinery industries consist mainly of small operators. There are only two factories which employ about 150 persons each, and the remaining between 1-20 persons. The industries are by no means organised along the lines of those of the industrialised countries. Specific problems facing the industries concern raw material supply, wood machinery, difficulties when working the dense tropical hardwoods which preclude, low level of machine utilisation, lack of finance for industry improvements, incompetent and disinterested management and ownership in the larger establishments and competition from that segment of the industry using non-wood raw materials.

In the initial stages of industry expansion, machinery requirements will include both light and heavy duty single and multi-purpose woodworking machinery. More automatic machines will be required at a later stage. The cost factor in machinery selection tends to override all other considerations and competent manufacturer representation is required locally.

The investment climate is good and the government offers the industry encouragement in tangible ways. Excellent market opportunities exist for wood and wood manufactures both locally and regionally and the industries if given a helping hand to mechanise will progress rapidly, and expansion thereafter will soon become self sustaining.

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I. PHYSICAL AND TERRITORIAL

1. Guyana, formerly British Guiana, obtained its independence from Britain in 1966 and four years later in 1970 it became a republic within the British Commonwealth. It is located on the northeastern coast of South America between Venezuela, Surinam and Brazil.

2. The area of Guyana is 83,000 square miles. It has a coastline of 270 miles and there are three different types of terrain. The low coastal plain, an undulating central plain and a highland region. A large network of rivers traverses the country from north to south and east to west and dense forests cover the greater part of it except for the plateaux and two extensive grassland areas. The climate is typically equatorial with high rainfall and humidity and not much variation in temperature. Appendix 1 shows a map of Guyana showing the various forest regions, and the location of settlements.

3. The population of Guyana in 1969 was 726,500. Although the overall population density is only nine persons per square mile this figure does not give a true impression because 90% of the population inhabits the narrow coastal strip which varies in width from half a mile in the west to about 30 miles in the east. On this strip, which is predominantly agricultural, the population density is 360 persons per square mile as compared to the rest of the country which is predominantly forested where it is only about one person per square mile.

4. Because of this pattern of settlement, infrastructural development has been confined mainly to the coast and apart from the limited infrastructure created by three mining companies and government administrative centres, the interior of Guyana is completely lacking in roads, railways, electricity and other basic infrastructural inputs which encourage settlement and the exploitation of its natural resources.

River transportation is impeded by the presence of rapids and waterfalls and communication with the widely dispersed settlements in the interior is provided for by a government-owned airline which services the country with scheduled passenger and cargo flights. It is the government's policy however, to encourage the settlement of the interior and develop its resources through the construction of access roads.

The Forest Resource

5. Guyana's forests extend over an area of 70,000 square miles. A striking feature of the forests is their complex floristic composition. Any given acre of forest in a mixed forest type may contain from 30 - 60 different tree species, while a square mile may contain as many as 100 - 200 different species out of an approximate 1000 species known to occur in Guyana. Individual species or species groups may however display dominance within the forest types. Medium to high density tropical hardwoods are the most frequent. There are no indigenous softwoods and plantation forests are limited to experimental plots of softwoods.

6. In spite of this rich resource the forests of Guyana play a very minor role in the economy of the country providing only 1.5% of G.D.P. The forests are not intensively utilised. Logging is extremely selective and one species, greenheart (*Coccoloba roosei*) accounts for about 60% in volume of the species removed from the forests. Table 1 shows the production of timber in Guyana by species for the year 1970. Expansion of the forest industry is therefore largely dependent upon the increased utilisation of all suitable worthwhile species.

7. All productive forests in Guyana are owned by the State. The Forest Department is the responsible authority for controlling the exploitation of state forests by the issue of leases and permits for the removal of forest produce. It collects royalties, is responsible for the regeneration of state forests and for silvicultural

research and also for utilization research, extension and grading services and the issue of patents and licences for the erection and operation of sawmills.

Timber Production

8. Primary conversion of timber in Guyana is confined to the manufacture of sawn wood, i.e. saw round piling, poles, posts and split shingles, wood for fuel and charcoal and a veneer factory. There are no plywood or veneer mills, hardboard plants or pulp and paper mills. The only particleboard plant which operated sporadically during the 1960's finally ceased operation in 1967. Sawn and round piling (greenheart) is produced almost exclusively for export as well as sawn greenheart squares up to 16" x 16" and 90 ft. long. Sawn lumber other than the aforementioned greenheart squares is produced almost exclusively for the local market. Table 2 shows the total production of sawn wood for the years 1961 to 1970.

9. Apart from the clearing of the forests for high valued species logging in the not too distant past has been concentrated mainly along the river banks; felling was done with axes and the logs were extracted by agricultural tractors and winches. Thereafter they were transported down the rivers either by rafting in the case of the light weight hardwoods or by being suspended off the sides of ballbooms (boats), pirogs or on pontoon decks in the case of those hardwoods which do not float.

10. Today however much of the timber along the river banks has been removed and loggers now have to go further inland for their supplies. This involves additional transportation by log in trucks along poorly constructed roads built by the lessees. Although extraction methods have remained basically the same there has been within the last 4 years an introduction and ever increasing use of chain saws for felling, and rubber tired skidders for hauling. There has been no improvement in the quality of the extraction roads and river transportation methods remain more or less the same. This combination of factors

contribute in very large measure to the high logging and extraction costs and naturally the high cost at which logs are delivered to the sawmills which are located principally, on the coast.

II SAWMILLING AND LOGGING IN GUYANA

The Sawmilling Industry

11. The pattern of development of sawmilling in Guyana has followed the pattern of settlement in that, with few exceptions, the sawmills are all located on the coast in spite of the fact that they are dependent upon their entire raw material supply from the hinterland. Sawmilling has hardly been responsible for settlement and in the few exceptions where such sawmills have located in the interior they have done so with the purpose of supplying the sawn wood requirements of an existing settlement of a size such as may have been established by a mining company, trading post or government administrative centre. There is however a group of three sawmills which have located themselves in the near interior and whose produce is mainly sawn greenheart squares for export. To put the picture of sawmill location in better perspective however it must be realised that there are no sawmills located within the forest resource as such except for a recent venture by the government wherein a small semi-permanent mill has been so located, and a permanent one which is now being built by a private company.

12. The fact that the majority of Guyana's sawmills are located on the coast has prompted much speculative opinion as to whether they are properly located, whether they should re-locate and whether new sawmills should be located nearer the forest resource, and some of the factors which have constantly come up for consideration are:-

- 1) The cost of road and river transportation of logs.
- 2) The location of the markets.
- 3) The disposal of saleable waste.
- 4) The possibility of transporting unsound logs.
- 5) The availability of labour.

- 6) The transportation of sawmill plant could have been left in the forest if the logs were sawn there.
- 7) The availability of services for repair.
- 8) The separation of the functions of manufacturing and selling and duplication of management.

13. Government opinion in the industry tends towards the view that the mills should be located nearer the forest resource, but it is the opinion of the sawmill owners themselves that their mills have been properly located on the coast and their principal reason for arriving at such a conclusion is their desire for the mill to be as near the market as possible. This reasoning on their part is understandable, for apart from the obvious advantages of such a location, the disadvantages, such as the high cost of log transport, do not affect them directly since this cost is passed on to the customer. This fact is partly responsible for the high cost of lumber in Guyana today and is contributing towards its decline as a competitive building material.

14. Sawmill ownership in Guyana is almost entirely a mixture of sole proprietors and family businesses. The largest sawmill in the country which is now owned by the government since 1972, was established and operated by the Commonwealth Development Corporation. There are no publicly owned sawmills per se.

15. There are 71 sawmills in Guyana up to the end of 1972. The sawmills themselves are built on the river banks to facilitate the easy haulage of logs from the river onto their log decks. They vary in size from small circular headrigs employing eight or so persons to large band and multi gang mills employing as many as 500 persons. Mills using sash gang headrigs predominate and there is a reason for this, and that is, that the sawmilling industry in Guyana has developed around the greenheart export trade which requires sawn squares of considerable length. The greenheart wood contains severe stresses as a growing tree

and it has been found that successful sawing of this species for the product in question, is dependent upon the simultaneous release of the stresses by using at least two saw lines on the opposite faces of the log such as can be achieved by gang sawing, or for that matter twin band headrigs.

16. Initially the side cuts from the squares provided the bulk of the local lumber requirements and naturally these side cuts were of equally long lengths. The local consumer therefore became accustomed to buying his lumber in long lengths with the result that not only were species other than greenheart sawn into long lengths but new sawmills, not using greenheart, were designed and built to saw all species into long lengths to meet customer demands regardless of whether or not such pieces were crosscut at the sawmill or subsequently at the building site for use. Even circular sawmills were built with carriages to accommodate logs 30 ft. long and over because it is the practice to prepare a two face cant on the circular headrig before passing it to the gang headrig.

17. In addition to the headrig, all sawmills will have a winch for hauling the logs from the river up to the log dock, a two or three saw edge and a pendulum type cross cut saw. With the exception of the government owned sawmill, resaws are unheard of, and complete conversion of the log is done at the headrig. There are no log hauls; debarking is not done as there is as yet no market for chips; there is one live log deck at the new government owned semi-permanent sawmill in the forest, a few have log turners and power assisted dozing, and automatic networks on the log carriage; power driven rollers, cross transfers, slab dumps and green chains are absent at all but one sawmill; there are no selective saw trimmers, few waste conveyors and sawdust extraction equipment.

18. Needless to say the sawmilling industry is inefficient, productivity per man is low and quality of product in many cases leaves much to be desired. Seasonal practices exist only at the government

owned sawmills one of which also does processing of timber by the dip diffusion method. Part of the reason for the low quality and low productivity is the lack of good sawmilling practices. Realising this the Government has established and operates a sawmilling training centre which is fully equipped to sharpen and to mend repair circular, hand and gang saw blades. There has been a marked improvement in both quality and output in many sawmills since the introduction of this service.

19. Sawwood products for the local market consist of lumber, scantling and beam sizes for construction since most of the houses in Guyana are built of wood. Very little wood is used specifically for the furniture and joinery industry. Other saw products include railway crossties, lumber for boat building and the manufacture of softdrink boxes, concrete shuttering etc. Exports of saw wood products are greenheart squares, softdrink boxes, dressed lumber for flooring siding and panelling and prefabricated building components.

20. The inefficiency of the sawmilling industry has continued to exist because of the consumer demand situation, which is a sellers market, and the lack of incentive on behalf of the sawmill owners to upgrade their equipment and practices. In this latter respect the sawmillers claim that the lack of incentive to invest in new equipment is a result of an inadequate and unmeasured supply of logs to feed their mills. Many of them do not have their own woodcutting leases but have to buy logs on the open market and where this is the case many factors come into play to militate against them. An assured supply of logs is a prerequisite to a healthy sawmilling industry.

21. The prospects for growth of the sawmilling industry in Guyana are good. The Forest Department's recently installed semi-permanent sawmill is highly mechanised by local standards and within such limits as is possible in a semi-permanent installation. It has been set up within the forest resource and is destined to set as a pilot or demonstration sawmill utilising a large number of species within a

short haul. It has introduced a new system of using
lumber in a more efficient manner and the labor saving
efficiency of this method of working has been well
known to lumbermen. The service on a commercial scale is being
introduced for the first time and it is expected that the manufacture
of a better quality product at a lower price will create a competitive
situation within the industry. Considerable interest has already been
aroused among existing and prospective sawmills.

22. Emphasis is being placed on product diversification in both
government sawmills, the recent being on the manufacture of prefabricated
building components for the local and export markets, the latter of which
has shown considerable increase within the past year.

23. An unusual feature of the sawmilling industry in Guyana is
the existence of planing and moulding facilities within the sawmill
itself. Although a sawmill may be completely lacking in the equipment
types which have been mentioned earlier, there hardly exists a sawmill
which does not have a planing and moulding machine, for without this
facility the sawmiller would find it extremely difficult to sell his
rough sawn lumber to the consumer.

24. Once again, with the exception of a government operated
lumber concentration yard and planing mill there are no other businesses
of such a type.

25. It is the practice at most of the sawmills to manufacture
the fresh sawn lumber straight from the saw into dressed products such
as flooring, siding and paneling with a small quantity of square
edged lumber for laths etc. Scantling, sizes and planks are not usually
dressed. Needless to say this practice is frowned upon by the Forest
Department and it does not exist in the government-owned sawmills but
it is difficult to stop and it has only been by example and promotion
that the demand for seasoned lumber has been on the increase. This
demand however far exceeds the supply and many a customer has to

be satisfied with the use of wet-planed lumber.

26. The advantages to the sawmiller of manufacturing this type of product are threefold. First of all he is able to contract within limits his sawing defects by planing wet lumber; secondly he is able to do so only because the lumber is wet and is thus easier to plane, for had such lumber been allowed to season, the variations in thickness would have presented a formidable task for the planing and moulding machines many of which are of a rather light construction. Thirdly he disposes of his produce quickly and does not tie up capital in lumber in stock. It has therefore been well nigh impossible to get the private sawmiller to cease manufacturing wet lumber for sale.

27. The Forest Department's lumber concentration yard and planing mill buys rough, wet lumber of the lesser known species from small sawmillers, grades it, air seasons it and manufactures it into flooring, siding, and panelling of standard sizes. The purpose of the plant has been to encourage the use of the lesser known species and to introduce seasoned and well manufactured lumber to the market. It has been able to obtain its supplies from the sawmillers precisely because of the fact that it is using species which were not in popular demand at the time. Today however the venture has been so successful in achieving its objectives that the plant is experiencing difficulties in obtaining its raw material supplies. This situation however is being remedied by the involvement of the Forest Department in sawmilling.

28. Growth opportunities exist for increasing the supply of seasoned lumber through the introduction of low temperature dryers and other drying systems which prove to be economical. Among these are the refrigeration type moisture extraction units which can dry several species simultaneously according to claims.

The Furniture Industry

29. The Furniture industry in Guyana leaves much to be desired, especially with regard to its organization as an industry and its level of machine utilization in the furniture manufacturing processes. Two of

the largest plants in the industry are located in Georgetown, the capital city on the coast, as well as most of the small workshops which make up the rest of the industry.

30. The industry is in a very rudimentary state of development and has been described as a highly fragmented one with little relationship to standard production and distribution practices as is known in industrialised countries. Like the sawmilling industry ownership ranges from sole proprietorships employing no more than one or two persons to a small private company employing about 150 persons. These small companies are invariably the production facilities for a retail store and there are no organised furniture factories of such a size which manufacture furniture for the open market. The smaller manufacturers which employ up to about 20 persons build furniture to order for other retail outlets which do not have their own production facilities and for government institutions such as offices, schools and hospitals. The smallest operator may do likewise but he usually does custom work for private individuals.

31. This is an industry where there is hardly any division of labour. There are no wood machinists as such nor are there assemblers or finishers. Most of the persons employed are cabinet makers or joiners and each man may make an entire article from the rough lumber to the finished product. There is however specialisation with regard to products, each specialising in such items as chairs, tables or case goods.

32. The smallest unit for example is the sole operator. He usually works at his home or at rented space under somebody else's home. He may have no woodworking machinery at all but if he does it may consist of a 10" circular saw, often home made. If he is more prosperous he may have a 14" band saw as well and if he is really doing well he will have in addition a 6" jointer a 12" thickness planer, a 14" drill press with mortising attachment and a portable electric belt or orbital sander and maybe a portable router. He carries no lumber stock and purchases

his requirements from a sawmill or lumber dealer with a cash advance given to him by the contractual party. He then proceeds to build the entire article, finishes it usually by french polishing, delivers it himself, is paid off and recommences the production cycle upon receipt of the next order. The quality of the product varies with the skill of the operator but it is usually good.

33. The medium sized operator will have employees. His function is to secure the order, provide the manufacturing facilities and materials and depending on the size of his establishment, he may or may not participate in the production process since he is usually a skilled cabinet maker himself. His employees are assigned jobs in accordance with their product specialities and they are paid on a piece work basis. He will have woodworking machinery of the kind and quantity as detailed for the sole operator. With close supervision the quality of the product is usually good.

34. The big operator (the production facility for a retail outlet) provides the production facilities and the materials - lumber which he usually buys in large quantities. Management of such an operation is usually the responsibility of a non technical man who knows little about furniture manufacture himself and depends upon his employees for the proper execution of all production processes. The woodworking machines are usually of a heavier type and in addition there may be a spindle moulder with dovetailing attachment, an overhead belt sander and a heavy duty chisel morticer. Tenoners are virtually absent, the work being done on a circular or band saw, or with the aid of a rebating table or a small jointer. The radial arm saw has within recent years become increasingly popular and this machine equipped with a dado head is often used to cut tenons. These large operators make a high percentage of upholstered furniture, and woodwork consists mainly of upholstery frames. Semi skilled labour is usually employed in this department with the result that quality is poor and full advantage is not made of the better class of woodworking machinery which is available for their use.

35. Because of the absence of an industrial sector, product and imported plywood and particleboard is expensive when compared with solid lumber. There are no veneers either or none are imported with the result that good quality furniture is made almost exclusively of solid wood. There is nevertheless an increasing use of plywood and particle board for furniture manufacture since the availability of a wide variety of cheap plastic laminates. This type of furniture is very popular but it does not find its way into the better class homes which still prefer solid wood furniture. It is popular because of its reasonable price and attractive and durable finish. Good quality solid wood furniture is usually french polished or finished with a hand rubbed lacquer. There are no production facilities for spray finishing furniture.

36. Growth prospects in this industry are good since there is a big local demand for better quality wood furniture. There are no exports of furniture at present but markets exist in the Caribbean and one manufacturer is preparing to supply upholstery frames to the region.

The Joinery Industry

37. The supply of joinery items in Guyana is catered for by the specialised departments of councils and the construction industry and some small operators who do nothing else but manufacture wooden windows and doors.

38. These small operators supply the bulk of windows for the house building industry. They are set up somewhat like the medium sized furniture manufacturer with regard to factory, location, machinery utilisation, the securing of orders, allocation and payment of work. Raw material supplies for the manufacture of windows is almost entirely of imported softwood (principally white pine from Canada). Local hardwoods have been found to be inherently unstable and many contain tension wood. This plus the lack of seasoning and the use of some low density species which are non-resistant to decay have prejudiced users against local hardwoods.

product. This branch of the industry is becoming very competitive but unfortunately at the expense of quality. The demand for wooden windows is expected to continue to rise with the projected increase in the level of the building industry.

39. The manufacture of wooden doors is done by departments of construction companies as well as by a few small operators. Flush doors are the most popular and they are made from hardwood frames and cores and imported plywood skins. They are manufactured on a batch production basis using relatively simple woodworking machines, presses and cramping equipment the latter of which are sometimes manufactured locally. This branch of the industry is also very competitive and like the manufacture of windows, growth prospects are good for the same reasons.

40. The government owned sawmill has a "joinery" department where it manufactures prefabricated building components for both the local and export markets. Its factory is very well equipped with heavy duty woodworking machines and the company plans to expand its production to meet increased local needs and the foreign demand of the Caribbean countries. Solid wood is used exclusively for the components which are well machined to reasonably close tolerances. The demand for this type of product is expected to continue to rise. Product diversification includes the manufacture of block type parquet flooring.

Other Wood Industries

41. Other secondary wood using industries include factories for the manufacture of soft drink boxes, coffins, turned wood ware and novalites, broom sticks, truck bodies and carts. The Forest Department operates a woodworking shop principally for research and demonstration purposes but it also undertakes the manufacture of specialty items and high class furniture for government ministries. The demand for the high quality items produced is great and the shop will be going commercial shortly.

III SPECIFIC PROBLEMS FACED BY THE WOODWORKING INDUSTRY

Raw Material Supply

42. Now that the conditions of the existing sawmill industry have been put in their proper perspective and the demand/supply situation with regard to lumber is realised it is an easy matter to understand that tremendous shortages exist for the supply of raw material to the secondary wood manufacturing industries. A prerequisite for the successful operation of the wood using industries is a continuous supply of seasoned, well manufactured and if possible, graded lumber. No such assured supply exists in Guyana at present and this shortage of lumber is not only the greatest drawback to the existing wood using industries but the primary stumbling block to the establishment of new industries and the consequent expansion of the industry in general.

43. This does not speak well for a country like Guyana with its tremendous forest potential. True enough there is a short supply in the forest of light to medium density species which are traditionally suitable for the manufacture of furniture and the problem becomes more acute when such species find their way into the building trade as construction lumber. What is needed is a programme of species utilisation so to speak, wherein end uses are assigned to species according to their suitability for a particular purpose and conversion of the log is carried out in accordance with the lumber sizes considered to be most suitable and desirable for the particular end uses. The Forest Department has implemented such a programme at its newly established semi-permanent sawmill. By these means the furniture manufacturer for example will not have to salvage his requirements from manufactured flooring, siding, panelling floor joists or studs as is very often the case.

44. Apart from the difficulty of obtaining lumber of the required

species and dimensions, problems exist as to obtaining it in a dry condition. The ever increasing demand of the building industry for seasoned lumber strains the capacity of the government run industries to supply, and as a result little attention is being paid to the needs of a fragmented furniture industry for example. The result is that the small and medium sized operators very often purchase wet lumber and allow it to dry out for a couple of weeks in order that the surface moisture of the wood does not affect the immediate bonding of joining operations. The large operators buy their raw material in bulk and place it in stock for only so long a time as required to consume it. Usually it is never there long enough to air dry thoroughly. The installation of a low temperature dryer at the Forest Department's lumber yard is expected to improve the situation to some extent but this malady of the industry will not be fully relieved until the private sawmillers undertake to season at least some of their output.

45. The absence of a cheap panel product and wood veneers on the local market hinders the expansion of the furniture industry especially in the manufacture of case goods e.g. kitchen cabinets, and the like. Particleboard, plywood or blockboard suitably veneered is also preferred for office furniture in air conditioned buildings. Solid wood furniture under similar conditions experiences problems of moisture content changes in the wood due to relative humidity fluctuations in the room. Many local woods tend to warp during seasoning and re-manufacturing, especially if they have not been properly stacked during drying or have not been thoroughly or properly dried. Straightening of twisted wood on a surface planer is a must especially for edge jointing into panels.

Wood Machining Difficulties

46. The inherent shortage of light to medium density hardwoods for secondary manufacturing industries has led to the substitution of the denser species which happen to be very decorative. One of the most beautiful species weighs 80 lbs. per cu. ft. In addition to the

high density, many species display characteristic grain patterns which result from irregularities of growth such as alternating grain. Such species present considerable difficulty in working to a smooth finish by both hand and machine tools. Experienced, skilled and interested operatives overcome these difficulties in time but disinterested personnel working on piece rate basis neither have the time nor the inclination to do so and the quality of their output is shoddy, resulting in poor customer sales appeal and an eventual rejection of the species by some sections of the industry.

47. Rapid dulling of the cutting edges of saws and cutters when working dense hardwoods is another problem. Cutting knives have been known to chip when planing certain species and circular saw blades run hot and lose their tension. I am not at this time referring to woods which have siliceous inclusions; these present problems of their own. Mortising by hollow chisel and bit is totally unsuited to dense hardwoods. There are of course technological solutions to these problems but they are costly to implement, even in the industrialised countries, much less in a developing country like Guyana where money does not flow freely and the promise of financial rewards for process improvements seem remote.

Machine Utilisation

48. The level of machine utilisation is low being confined to such processes as ripping, crosscutting, jointing and thicknessing, bandsawing, boring and mortising. The machines are being utilised for rough conversion only and it has been difficult to convince many of those employed in the industry that machines are capable of producing finished surfaces which only require sanding. The quality of work done on the machines is often of such a standard that it takes a considerable amount of hand work to finish the process. Very often improvised cutters are used and these produce an exceedingly rough surface even on the softer woods which would otherwise machine properly if the correct

tools were used. Handwork is costly and a better quality product can be produced at lower cost employing more precise methods of woodworking machinery utilisation.

Process Improvement - Finance

49. The system of ownership, whereby the large furniture factories are the production facilities of retail outlets, is not conducive to healthy management and efficient plant operation since neither the owners nor the managers are fully conversant with furniture manufacturing processes. Their employees are on the other hand only semi skilled and can offer little help with regard to process improvement, and because of the system of the payment of labour by piece work the owners themselves are not generally interested in improving production techniques although they are financially able to do so. As a matter of fact their incentive to improve is lacking, since they can easily sell their entire output to the less discriminating consumers who happen to be in the majority.

50. On the other hand the small and medium sized operators are skilled cabinet makers who take pride in their work. They however have no assured market outlets and business for them is never as bright as their so-called competitors. Although they are willing to improve their operations through machinery installation, they are unable to do so, because they do not have the funds nor the credit worthiness to acquire them as far as local financiers are concerned.

51. This is one of the main problems facing the woodworking industry in Guyana and one it is hoped will be remedied by industry reorganisation which will produce new systems of ownership.

Competition from Non-Wood Materials

52. The shortage of adequate supplies of suitable lumber and production facilities for converting it into high quality furniture have

resulted, over the last twelve to fifteen years, in the appearance on the local market of fully upholstered furniture and tubular steel furniture plus a prolific use of high pressure plastic laminates. The growth rate of these new types of material oriented furniture industries have been fantastic and they have claimed at least two-thirds of the furniture market which was predominantly of wood. The mass markets have fallen to the tubular steel type while good quality (in appearance) fully upholstered furniture has captured the fancy of the more sophisticated buyer. The large furniture manufacturers referred to earlier are making this upholstered furniture on wooden frames and because the frames are not seen, their quality of manufacture is not considered to be important, and wet wood is therefore used together with assembly methods which are the barest minimum for lasting strength and durability.

53. In the joinery industry at least half the markets for wooden windows have been lost to aluminium and steel framed windows. The situation in this respect however is improving on account of the present building boom.

54. The loss of these markets to competitive materials and processes is a serious problem facing the furniture and joinery industries in Guyana and one which can only be solved by correcting the conditions which have contributed to their decline.

IV MACHINERY REQUIREMENTS

55. Some idea has already been given that even at the present level of development there is need for more woodworking machinery but there are problems on one hand associated with creating the demand for this need where such a need exists and on the other hand of supplying the demand where the need has already been realized.

56. Machinery requirements for the woodworking industry in Guyana will depend more than ever on how the industry is likely to expand. The converse of this statement is also true and that is that the expansion of the woodworking industry in Guyana is largely dependent upon obtaining a suitable source of supply of woodworking machinery that suits its present and anticipated needs at a price it can afford. If any accent should be placed on the various aspects of the foregoing statement then it should be on the last, "at a price it can afford".

57. Will the industry expand? Along what lines will it do so? What areas are expected to expand first? Will the raw material supply position be improved? Will there be a change in the systems of ownership and in what ways? What about the markets; will expansion be geared to cater for both local and export markets. Answers to these and other questions are essential in order to determine projected machinery requirements and an attempt will be made to discuss them in the next chapter. There are other questions however more intimately related to woodworking machinery requirements and they concern costs, scale of production, level of automation, problems associated with operating and maintenance skills and machinery sales and service including the availability of spares.

Machinery Sales and Service

58. The last named of the aforementioned viz: machinery sales and service including the availability of spares, is another factor the absence of which has contributed to slow development rate of the woodworking industry in Guyana. It has not been mentioned previously because it is believed that it is a problem which can more appropriately be dealt with under the heading of this chapter.

59. Sawmilling and woodworking machinery has in the past, been purchased upon personal recommendation and past performance within the limits of existing machines which have become well known locally. Sales for these machines have been made by business houses which usually have exclusive sales rights for the territory, but which themselves lack personnel who are up-to date on the merits and demerits of the machines they have for sale, and consequently are of no help in offering prospective customers informed advice regarding the selection of sawmilling and woodworking machinery for their particular needs.

60. With the introduction of new concepts in sawmilling and in woodworking, the existing sales representatives are not even in a position to help because they have not kept themselves up to date with developments, in these industries, the world over. Although their principals may have kept them up to date with these developments in the form of sales brochures, most of the local representatives as of now are unable to discuss intelligently the issues and make reasoned recommendations regarding the products they sell.

61. In the absence of professional Forest Products Consultants, who will be capable of assessing the machinery and equipment needs of prospective wood industries and advising thereon, there exists in Guyana an acute need for sawmilling and woodworking machinery representatives, dealers, agents or whatever they may be called, who are well informed about the wood industries, familiar with the machinery and equipment that is available and are at least knowledgeable about the

products that they themselves offer for sale. An example of this last named shortcoming is cited in the case where the tools department of a large hardware store had displayed for sale a well known brand of power tools, but sales were moving slowly and certain items were not being sold at all. Eventually all the items were put "on sale" at reduced prices and this inspired a colleague of mine to make a purchase. He called for the item by name but seeing that the salesman, who had many years of experience in that department, did not know to which item he was referring, my colleague pointed to the article on display. The salesman's remarks were thus "Is that what you call it? How does it work? What does it do?" Perhaps it may be useful to mention that the hardware store did not import these items directly from the manufacturer but had ordered or rather had been sold them by a commission agent.

62. Professional consultancy service is now available free of charge from the Forest Department, but what good is professional advice when a final decision to buy may be unduly influenced by sales cuts, the offer of financing, as sometimes occurs in respect of sawmilling machinery, known performance of existing machinery, basic price, the promise of availability of spares or just by a fast talking salesman who may misrepresent his company's product in terms of capability beyond accepted functional or performance standards. Some of the above factors are definitely worthwhile considerations which may influence a sale and as such may at first seem to contradict my statement about professional advice. This is not so because the professional forest products consultant is needed to offer independent and unbiased advice to the industry, but what is also needed is the emergence of his counterpart in at least the appropriate skill viz: sawmilling and machine woodworking technology, in the sales organisations which handle sawmilling and woodworking machinery. In this way the prospective purchaser will be offered the item of machinery or equipment most suitable to his needs, and the offer of financial or other incentives will then become secondary but nevertheless worthwhile considerations.

63. After-sales service and the availability of spare parts are very important considerations in deciding upon which product to buy. The more reputable representatives of sawmilling and woodworking machinery in Guyana can, by placing orders with their principals on request, obtain the spare parts for their clients, and only in very few cases are essential parts stocked. This arrangement has been fairly satisfactory, and where difficulty is experienced the sawmillers have had to have parts made locally. It is appreciated that it could be extremely expensive to stock spare parts for a wide range of the relatively few items of sawmilling and woodworking machinery and equipment which are in Guyana, but there is no excuse for not being able to offer a true after sales service which should consist of at least being able to help a customer identify a problem or fault which may exist or develop in his machine, and make recommendations, perhaps after consultation with his principals, as to how to deal with the problem or remedy the fault which may be peculiar to his machine.

64. While on the subject of the functions of machinery sales and service organisations, there is another type of service which can be very satisfying to the prospective customer and rewarding to the sales organisation themselves in terms of close of sale with knowledge that the customer's needs have been satisfied. I am referring to a demonstration service and I believe that more woodworking machinery can be sold in Guyana if facilities existed for the demonstration by sales personnel of the scope and relative advantages of particular items of machinery.

65. Lastly under this heading, is the question of credit financing. It has been my experience in Guyana that in referring enquirers to woodworking machinery manufacturers representatives etc., that the question is almost invariably asked as to whether or not the manufacturer is prepared to extend credit facilities to the prospective customer. An answer to this question is of course outside my terms of reference but it does seem to me that more woodworking and sawmilling machinery can be sold in Guyana if credit is more easily available to the customer. This is a tricky question but I feel obliged to mention it for what

It is worth.

66. It is concluded therefore that the expansion of the forest products industries in Guyana will benefit from the establishment of sales and service organizations which are adequately staffed with skilled personnel who are well informed about the industry, who keep abreast of new technological developments, who are knowledgeable about the products they sell, who have facilities for demonstrating their machinery, who are prepared to offer or arrange credit for their customers, who are prepared to stock spares and ancillary equipment and offer after sales service, and who are capable of interpreting and satisfying their customers' needs in terms of suitability, quality and price.

Machinery Costs

67. All items of sawmilling and woodworking machinery needed by the industries in Guyana are imported from the industrialized countries. Twenty years ago this commodity was considered to be expensive, the gap between developed and developing countries like Guyana has widened, wage structures in Guyana have not kept pace with the escalating prices of imported goods plus ever increasing freight rates with the result that machinery for the wood industries is now considered to be fantastically expensive. A comparison has continuously got to be made between competitive sources of supply. Traditionally machinery supplies were ordered preferably from the English speaking countries like Britain, the U.S.A. and Canada with specialized items coming from Germany.

68. The rising prices of machinery from these countries plus revaluation of their respective currencies and that of Guyana, have not operated to the benefit of the latter costwise for this imported commodity. New sources of supply have been found and today sawmilling and woodworking machinery is also imported from Italy, Sweden, Holland, Japan, France, Austria and Belgium and investigations as far afield as Australia and China and as near as Brazil as well as some Eastern European Countries are being carried out in an effort to locate suitable

machinery at reasonable cost. Table 3 shows the imports of sawmilling and woodworking machinery by country origin for the period 1966-1970.

69. Perhaps the purchase of used and reconditioned machinery is the answer. Reconditioned gang headrigs and heavy duty planing and moulding machines have been imported into Guyana for many years and have performed to the satisfaction of their owners. Old and worked out machinery is not what is required but machinery which may be considered obsolete by the standards of the industrialised countries may be just what Guyana requires at this stage of development of her wood industries. Within Guyana itself there is a continuous recirculation of used sawmilling machinery. A most recent example is the case of a large sawmilling company which has ceased operations and has sold its equipment for removal. Much of the equipment is over eighty years old and includes two steam driven gang headrigs and a circular saw headrig. This equipment will form the nucleus for two separate sawmills which are to be erected shortly. This is perhaps an extreme case in point but it nevertheless goes to show that a demand for machinery for new industrial units exists, that there is an unwillingness to pay a high price for new machinery, that whatever machinery is available will be put into use and that there are indigenous skills available to do so.

70. Is there such a thing as knock down woodworking machinery for the do-it-yourself industrialist? There are companies in the U.S.A., Britain and France which manufacture and market the basic units for certain items of woodworking machinery for the do-it-yourself enthusiast who then has to build a wooden frame, table etc., to support the essential operating parts which he has purchased. But this is not what I have in mind. Perhaps there is a way whereby a complete woodworking machine may be purchased in a disassembled condition needing only simple machining and/or assembly operations to put it together. If perhaps by such a process a saving can be effected on the initial cost of the machine, possibly also on the cost of ocean freight and eventually upon the reduction or elimination of import duties, then it is a matter

worthy of further consideration by the machinery manufacturers of the industrialised countries, if of course, this would mean a net increase in sales for them.

71. In conclusion I would like to stress that in Guyana the cost factor in machinery selection tends to override all other considerations and it is therefore suggested that manufacturers and other interested persons give serious thought as to ways and means of satisfying the woodworking and sawmilling machinery requirements of developing countries like Guyana at prices below the present market prices for new machinery.

Scale of Production and Level of Automation

72. At the present level of development of the furniture and joinery industries in Guyana, woodworking machinery will be required for units of rather small scales of production. It is not envisaged that even in the initial stages of industrial expansion that the units will be comparable in size to those of the industrialised countries. Outlets have to be built up. The local market is known to exist but it is a market for 726,800 persons including children. Export markets will have to be located in order to provide outlets for surplus local production for it is only by this means that any semblance of large scale production facilities may be created, and it will be some time before the raw material supply position will be able to fully sustain such facilities. Automation of a very rudimentary type and pertaining to machining processes such as shaping will be introduced at this stage or perhaps somewhat earlier. Automation of specialised machining processes for the manufacture of specialty products such as brush backs and broom handles can of course be introduced now.

73. Woodworking machinery of various functional, capacity and performance groups to suit the different scales of production will be required. At the bottom of the group are the low cost, single or multi-purpose light duty machines which will be needed for the hand-craft or cottage type of units. Next are the light duty, single purpose type of machines suitable for the manufacture of small items of wood-

work on a commercial scale such as novelties and painted type of low cost furniture. The use of this type of machinery provides the means of creating self employment opportunities for the small and enterprising man, and is a way of entry into the secondary wood manufacturing business. Next are the heavy duty combination types of machines. These are the nucleus for a small furniture or joinery factory, since they provide good quality machinery at a low price for use in limited space with a minimum of installation expense. Furthermore the savings effected on a single machine for performing basic machining operations can be spent on machines which perform specialised operations and which are really needed for the manufacture of woodwork of something more than elementary, functional design. Next are the heavy duty single purpose machines usually found in the larger furniture and joinery factories. This is where the costs begin to escalate rapidly in initial purchase, installation, operation and depreciation (book value) expenses. This type of machine is however essential for the serious manufacture of good quality furniture on a medium to large scale. Lastly are the heavy duty automatic types of machines suitable for large scale production. These are the best, and where markets exist that warrant their installation in terms of output they cannot be beaten, because they can produce a high quality product to close manufacturing tolerances, at the lowest cost per unit and with the highest level of safety. Machines of this type will be needed in Guyana when the time comes to supply the discriminating markets of the industrialised countries with wooden components of a functional type.

74. Unlike the woodwork industry which will need to expand with a certain amount of caution, the sawmilling industry is in need almost immediately of machinery and equipment at all scales of production. The important point to bear in mind however is that heavy duty machinery equipped with good quality saws, capable of converting dense tropical hardwood logs in remote and primitive areas is what is needed. Highly automated machinery will have its advantages, but unless suitable facilities for the maintenance of such equipment can

be set up it would be best to purchase a generator in favour of reliability such as is usually obtained from less accelerated machinery operating under the conditions outlined above.

75. There are no real problems regarding the operational or maintenance skills for either the woodworking or sawmilling industry except as mentioned above. For example, there are as of yet, no skills in Guyana for the maintenance of computerised sawmills.

Other Machinery Requirements

76. In order to meet the demand for seasoned lumber, methods to **accelerate** the drying rate of wood will need to be introduced. Seasoned lumber will be required throughout the country which means that the total demand will be split up in widely separated geographical areas, and each area will then require relatively small quantities of dry wood. Conventional kilning methods are the most economical when large quantities of homogeneous species are to be dried. This will not be the case in Guyana where small quantities of heterogeneous species will be the order of the day.

77. **Accelerated** low cost drying methods will be needed and these can probably be met through the introduction of low temperature and refrigeration types of lumber dryers. Solar dryers may even have their usefulness but these can be built locally from standard imported components.

78. Should an export trade develop for the supply of manufactured lumber products such as strip and parquet flooring, panelling and wooden furniture components dried to specified moisture contents, then there will be a need for humidity control in the factories and storage areas before and after manufacture. This, like drying, will call for specialised equipment which will need to be imported.

79. Other equipment for the secondary processing industries will include door presses, and cramping equipment for windows, chairs and case goods. In the application of industrial finishes the field is wide open since only elementary type of equipment is now being used and on a very small scale. With the development of a veneer and plywood industry and the consequent availability of cheap raw material of this type a need will be created for veneering, perforating and dielectric heating equipment.

V IDENTIFICATION OF COMMERCIAL OPPORTUNITIES

Investment Climate

80. Before identifying the commercial opportunities which exists in the primary and secondary wood processing industries in Guyana an attempt will be made to appraise the investment climate by drawing the readers attention to those areas in which the government by fiscal and other means, have laid the foundations for the creation of an investment climate which will stimulate the expansion of the industry.

81. At the request of the Guyana Government, the United Nations Development Programme through the Food and Agriculture Organisation of the United Nations acting as executing agency under a programme entitled Forest Industries Development Survey, carried out a study in Guyana with a view to assessing the country's forest resources and executing and making recommendations in the fields of logging, management utilization and marketing. The survey was completed in 1970 and the work done and reports submitted now provide a basis upon which prospective investors will be better able to assess the timber resources of a given area and profit from the investigations and improvements effected in the various technical fields.

82. Previous to the completion of this study other surveys were carried out by persons appointed by various external agencies at the request of the government, and recommendations made as to ways in which the forest and wood using industries can be expanded. Some of these reports have, in my opinion, made a correct assessment of the local situation and have put forward practical suggestions for the improvement of the industry.

83. The initiation of these studies portrays the government's continued concern for the expansion of the wood industry in Guyana. In order to encourage investment, the government offers financial incentives

to new industries which are set up to help attain the objectives of its development programme. New forest resource industries qualify for such incentives which include income tax holiday, duty free importation of raw materials e.g. adhesives, accelerated write-off of industrial buildings, machinery and equipment, and tariff protection. In addition a ban has recently been placed on the importation of furniture into Guyana.

34. On the more practical side, government has established institutions for the promotion of industrialisation, providing credit, establishing standards and for export development. The Guyana Development Corporation for example has been set up:-

- (1) To establish industrial estates with sites and buildings equipped with all facilities such as electricity, water and roads
- (2) To organise training programmes for managers and other personnel of factories.
- (3) To assist with local and export marketing of industrial products.
- (4) To provide services to small and new industries in such fields as engineering, technology, organisation and methods and accounting.
- (5) To sponsor and participate in national and international advertising programmes and trade fairs.
- (6) To undertake industrial research in co-operation with private and public agencies both at home and abroad.

- (7) To foster close relations with all organisations concerned with industrial development and to deal with such matters as tariffs, import policy, full use of local products and all matters connected with industrial development.

85. The Guyana Credit Corporation provides financial assistance to new small industries such as sawmills and furniture factories.

86. A Bureau of Standards is to be established and the Timber Export Marketing Board will become operative within another few months. The purpose of the latter is to locate export markets for Guyana's woods, allocate them to local producers, conduct a timber grading and inspection service for the establishment and maintenance of quality standards. All timber exported will have to be done so through the board which will also deal with services such as shipping.

87. Mention has already been made of the function of the Forest Department and frequent references have been made throughout the text as to the role this department is playing in the establishment of methods and criteria conducive to the expansion of the industry.

Infrastructural Developments

88. As mentioned in the introduction, infrastructural development is confined mainly to the coast. In the field of communication and transportation the country has good connections with all major cities and ports of the world. A modern international airport is located 2½ miles from the capital city of Georgetown which has a 24 hour harbour service for ocean going vessels. Most of the docks are privately owned, but this situation is not ideal for the storage and shipment of large quantities of timber for export. The government has plans however for the establishment of a public dock system. It already owns and operates a short railway and all river and internal air services.

89. The coast is well serviced with roads but these are significantly deficient in the interior where wood industry development has to take place. Road building is a priority item in the Government's development programme so it is to be expected that plans and programmes in this respect will be implemented soon.

90. Excellent postal, telegraph, telephone and telex services are available both locally and overseas. Reliable electricity service is available only on the coast. Five international commercial banks have branches in Guyana plus a National Co-operative bank. Health and Medical services are provided for by government and private hospitals throughout the country. Potable water is available everywhere.

91. The literacy rate is about 85% and this is a result of primary education which is compulsory and free. Secondary education is mostly free and there is one University. Technical and vocational education is provided by two government technical institutes, an industrial training centre and many handicraft centres throughout the country, all of which have courses in woodworking. The Forest Department operates a Sawdoctor training centre. There is one teacher training college. Thus the educational system has provided the country with an intelligent labour force which can be easily trained in the manual, technical and managerial skills necessary for industrial development.

Commercial Opportunities

92. Government's industrial policy aims at fostering a mixed economy in which the State, the Co-operative and the Private Sectors can function harmoniously to achieve the national goals. It is the government's policy that new industries or enterprises must fulfill all or most of the following criteria:

- (1) They must lead to the development of the country's resources.

- (2) They should contribute substantially to the industrial origins of the gross domestic product and hence add to the net national product.
- (3) They should eventually lead to technological innovation if possible.
- (4) Their establishment should eventually lead to a savings in foreign exchange or foreign exchange earnings.

Forest industries development meets all of the above requirements and their establishment is desirable and encouraged.

93. The co-operative sector of the economy is the one that is being stressed and the implementation of this system will produce significant changes in the pattern of ownership of both existing and prospective wood processing industries. Such changes will provide for the coming together of small operators in all segments of the industry. The benefits to be realised in such cases are obvious. Not only will they be able to pool their human resources and so establish themselves on a footing which will enable them to receive consideration for credit financing, but also as a body they will be able to take advantage of commercial opportunities which are better served by a more united body. Good sawdilling for example is an expensive business even at its lowest level, for the small operator of slim financial resources as is usually the case.

94. The government on the other hand is participating and intends to do so even more in the forest resource industry, and welcomes partnership with private enterprise in exploiting the country's forest resource.

95. These new patterns of ownership provide real opportunities for investing in forest industries development in Guyana especially in the primary processing fields, thus providing the raw material necessary for the establishment of the secondary processing industries on a sound resource basis.

96. Because of the lack of education in the past in sawmill operating and maintenance skills, the small sawmills especially, produced poor quality lumber. Their continued existence was therefore frowned upon and the erection of new mills of this type was discouraged. Sawmilling came to be considered as being suitable only for big business and as a matter of fact only the overseas corporations which it was felt were the ones suitable for making the high capital investments and at the same time providing guaranteed export markets for their products.

97. Now with technological knowhow and new systems of ownership possible, the sawmilling industry should begin to expand. Opportunities exist in the other primary conversion fields such as plywood, particle-board and hardboard manufacture and pulp and paper making, but it is beyond the scope of this work to do anything other than to make mention of them.

98. The demand for sawn lumber on the local market increases every year. Satisfying the country's housing programme offers the greatest opportunity for expansion. Most of Guyana's houses are built of wood and 8,000 housing units are required each year. This area offers opportunities for the joinery manufacturers as well. Estimating five doors per unit would give a figure of 40,000 doors per year that will be required. The market for windows will be almost as good taking into consideration that some of it is captured by the metal window industry.

99. Export opportunities exist for meeting the lumber requirements of many of the countries of the Caribbean area with which Guyana has trade agreements. Softwoods are in demand for homebuilding in this area and hardwoods are imported for furniture and joinery construction. Guyana having no softwoods and a paucity of light to medium density hardwoods would at first glance appear to be in a poor position to supply those countries with their lumber needs. Guyana however is experienced in the building of houses with dense hardwoods and is prepared to pass on its techniques. A more advantageous prospect however is to supply house building material in a precut and/or prefabricated state to the benefit of both the customer and the supplier. This method will call for a considerable amount of machining to be done in the manufacture of building components. One government owned factory has a full order book; there is a need for many more factories of this type fully equipped with heavy duty woodworking machinery.

100. In the field of secondary wood products manufacturing the commercial opportunities are limitless. The recent ban on the importation of furniture provides prospective investors with assured markets although competition will still come from that segment of the industry using metal based products as their raw material. Table 4 shows the imports of furniture into Guyana during the years 1966 - 1970.

101. Like the prefabricated building industry, export markets can be found for fully machined furniture components. In the U.S.A. for example there are furniture factories which have never cut up and machined lumber for their own use and have no intention of doing so. They rely on a supply of well dried and fully machined components which have been manufactured to close tolerances. The requirements of the California market for example is probably well over US\$50,000,000 per year. Factories in Guyana, well equipped with highly specialised woodworking machinery, kilns and other equipment, can with local raw materials and labour produce components for even a small fraction of the American market.

102. Numerous other opportunities exist at various levels of production for the establishment of secondary manufacturing industries which use solid hardwoods or wood manufactures as raw material.

103. The sawmilling and woodworking industries in Guyana have only one way to go and that is forward; they cannot even remain at a standstill. Their expansion is largely dependent upon the implementation of manufacturing processes which can only be achieved through the greater utilisation of machinery and equipment. The methods of obtaining these requirements as practiced in the industrialised and other countries can not entirely be achieved by a developing country like Guyana which is short in capital resources. Other methods need to be investigated so as to enable the wood processing industries in the country to achieve the minimum level of industrial take off and thereafter to expand and progress along similar routes charted by their more established counterparts, paying for the means of their continued expansion in the normal ways of a competitive industrial society.

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Table 1

WORLD PRODUCTION OF SELECTED LOG SKIN PRODUCTS IN 1970

LISTING SPECIES AND THEIR USES

Local Name	Botanical Name	Volume to nearest 100 cu.ft. approx	Main uses
1. Greenheart	<i>Ocotea rodiaei</i>	3,793,900	1 (Export trade) 5,6, 8,10 (Vat bottoms)
2. Kabukalli	<i>Geoplia glabra</i>	506,900	5, 6
3. Jalleba	<i>Eperua</i> spp.	330,200	2 (Export trade) 3,9,19
4. Crabwood	<i>C. rupa guineensis</i>	271,400	5, 6, 7, 8, 13
5. Lora	<i>Lora excelsa</i>	265,400	4 (Export trade)
6. Purpleheart	<i>Peltogyne</i> spp.	235,600	5, 6, 8, 13
7. Aoreti	<i>Acetea</i> spp.	211,700	7, 11, 13, 16
8. Wurenire	<i>Muniria balsamifera</i>	124,300	5, 6, 8
9. Dufelli	<i>Paraharcornia amara</i>	118,500	7, 11, 16, 18
10. Tatabu	<i>Diploptropis purpurea</i>	86,000	5, 14, 15
11. Simarupa	<i>Simarouba amara</i>	68,900	7, 11, 18
12. Ealli	<i>Virola surinamensis</i>	47,600	7,11,18 (Logs Export trade)
13. Locust	<i>Synceus</i> spp.	34,600	5, 6, 8, 13
14. Shibaon	<i>Aspidosperma</i> spp.	31,300	11
15. Kirikua	<i>Irythraea</i> spp.	30,400	7, 11, 16
16. Silverballi Brown & Yellow	<i>Aniba</i> and <i>Licania</i> spp.	29,900	7, 11, 13, 15, 16
17. Marshere	<i>Dialomyces morotoni</i>	29,300	17 (Sylinta)
18. Kurumi	<i>Protium Ceanothum</i>	25,300	7, 13
19. Kububalli	<i>Lexopterygia sagottii</i>	19,900	13, 18
20. Dukuria	<i>Stecoglottis</i> spp.	17,600	
21. Kambilli	<i>Loroneber coccinea</i>	11,400	5, 12, 14
22. Hainriballi	<i>Alexa</i> spp.	11,400	
23. Cedar, White	<i>Tabeuia insignis</i> var.	11,200	7, 8
24. Wamere	<i>Swartzia leiocalycina</i>	9,400	5, 6, 7, 13
25. Fakari	<i>Platanus insignis</i>	8,900	
26. Duka	<i>Tapirira morobandi</i>	7,900	7, 11, 17 (Bones)
27. Menni	<i>Symphonia globulifera</i>	7,600	5
28. Cedar, Red	<i>Cedrela odorata</i>	7,100	13
29. Baromalli	<i>Crotalaria</i> spp.	7,100	16
30. Suya	<i>Pouteria speciosa</i>	5,800	7, 16
31. Tutui	<i>Jacquinia copala</i>	5,800	11, 16

Table 1 (Cont'd)

Local Name	Botanical Name	Volume to nearest 100 cu. ft. Koppus	Main uses
32. Itikiboreballi	Swartzia	4,200	13, 19
33. Surudan	Hieronyma laxiflora	3,000	5, 12, 14, 15
34. Pakadi	Terminalia spp.	2,900	13
35. Ulu	Trattinichia sp.	2,500	11, 13
36. Determa	Cecotia rubra	2,400	13, 14, 15
37. Dukaliballi	Brosimum	2,300	13, 19
38. Kurehara	Calophyllum sucidum	2,100	13, 15
39. Aromata	Glaucotropis spp.	2,000	8, 13
40. Other Species	-	27,700	
41. Other Production K.S.S.	-	102,100	
TOTAL		6,524,500	

Sources: Forest Department Annual Reports.

KEY TO USES (Suggested)

1. Piles and other marine uses.
2. Transmission poles.
3. Fence posts, Pickets and Vat staves.
4. Railway Sleepers.
5. Framing - building construction.
6. Exterior Siding - building construction.
7. Interior Partitions - building construction.
8. Floors.
9. Split Shingles.
10. Cooperage - tanks and vats.
11. Boxes, Crates and Stacks.
12. Bridges and Culverts.
13. Furniture and Woodwork.
14. Wheel-wright work - carts and trucks.
15. Boatbuilding.
16. Concrete Shuttering.
17. Natches.
18. Plywood.
19. Decorative Veneers.

Table 2

PRODUCTION OF SAW WOOD FOR THE YEARS 1961 - 1970

Year	Quantity of wood consumed in cu. ft. Hoppus (i)	Equivalent volume in f. b. m. of lumber	Number of persons Employed (ii)
1961	5,091,465	30,548,790	2,220
1962	3,730,269	22,381,614	1,465
1963	4,063,797	24,382,782	1,186
1964	4,926,677	29,560,062	1,481
1965	5,168,805	31,132,830	1,831
1966	5,653,753	33,952,518	1,769
1967	4,941,948	29,751,688	2,652
1968	4,992,356	29,954,136	2,441
1969	5,521,918	33,131,508	2,851
1970	5,240,664	31,443,984	2,815

Notes:-

(i) These figures are based on those supplied by the industry.

(ii) These figures are rough estimates only and are not based on a census.

Source: Forest Department annual Reports.

Table 2

IMPORTS OF SAWMILL LOGS AND LOGS OF OTHER SPECIES

THE YEARS 1966 - 1970

Country of Origin	C.I.F. Values in G\$: G\$1.00 = US\$0.50				
	1966	1967	1968	1969	1970
United Kingdom	91,622	128,072	195,984	103,281	168,244
Canada	3,299	19,760	46,423	61,372	133,939
Bire	2,828	8,716	3,173	-	-
U. S. A.	28,656	91,568	87,560	114,850	159,389
Netherlands	99	-	-	-	-802
Norway	317	-	-	-	-
Sweden	13,336	11,481	14,283	36,385	16,877
West Germany	46,045	98,820	53,783	108,066	92,018
Australia	-	7,314	-	-	-
Belgium	-	27,427	252	641	-
Italy	-	2,272	-	-	2,438
France	-	-	256	3,320	-
East Germany	-	-	-	539	-
Japan	-	-	133	-	6,079
Austria	-	-	331	-	1,930
Total:	186,202	395,430	402,176	428,434	581,736

Source: Statistical Bureau, Ministry of Finance, Georgetown.

Table 4

IMPORTS OF FURNITURE, FIXTURES AND PARTS FOR THE

YEARS 1966 - 1970




Description of Article	C.I.F. Values in G\$; G\$1.00 = \$0.50				
	1966	1967	1968	1969	1970
All Wooden Chairs	22,145	22,537	169	2,882	26,946
Other Wooden Furniture	109,877	52,364	1,420	3,982	50,395
Metal Chairs	87,783	42,380	2,135	1,641	73,936
Metal Beds	495,442	510,829	30,640	77,749	339,721
Filing Cabinets, Desks and other office Furniture N.E.S. of Let. 1	189,239	186,980	21,735	440	310,543
Other Let. 1 Furniture and Mixtures of Parts N.E.S.	114,700	115,752	12,318	3,324	202,659
Furniture of Plasticware	19,964	23,229	-	-	7,143
Other Furniture and Parts N.E.S.	49,876	59,604	15,000	3,339	74,442
Total:	1,139,111	1,013,675	64,408	93,351	1,085,785

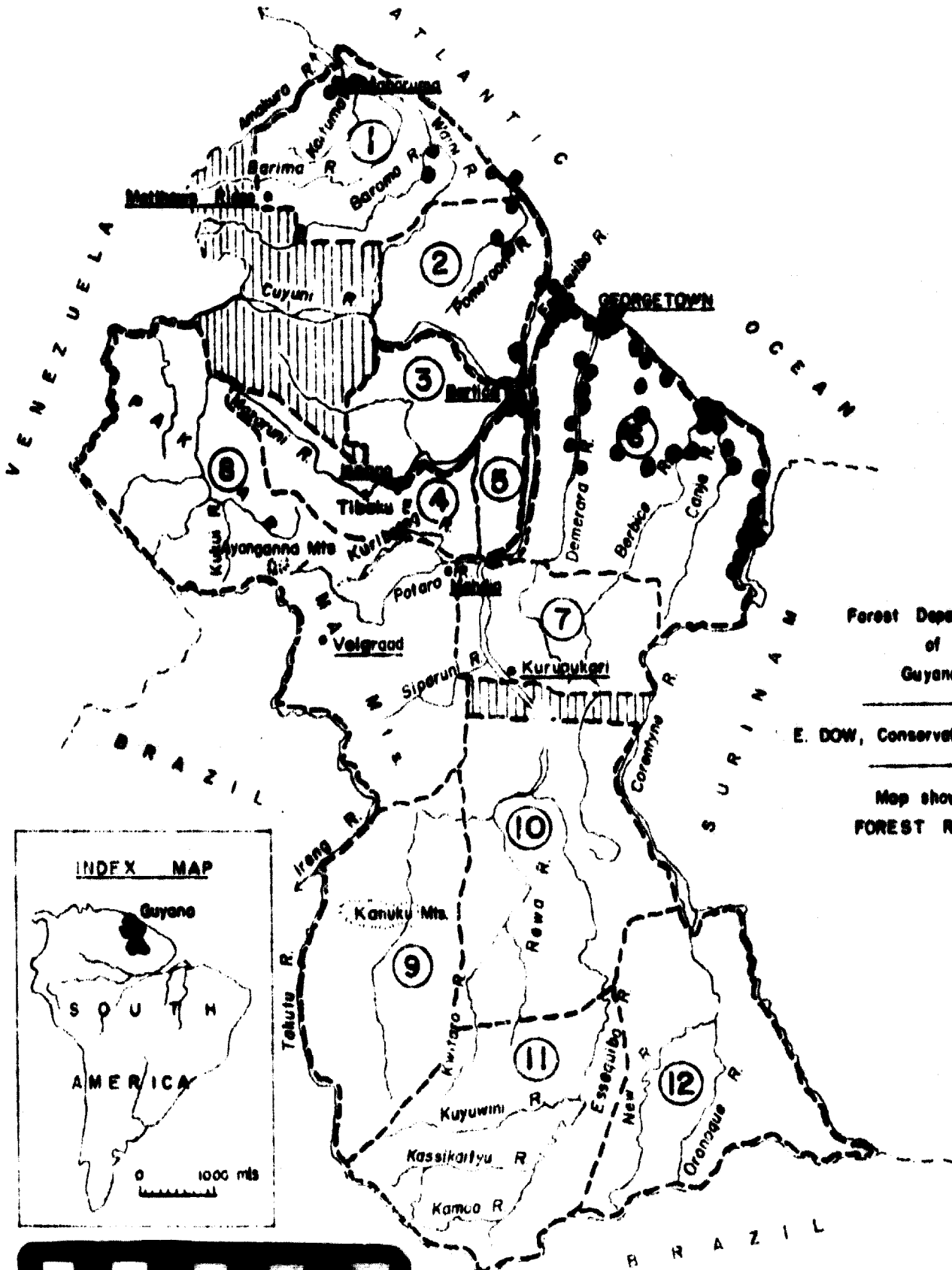
Source: Statistical Bureau, Ministry of Finance, Georgetown.

GUYANA

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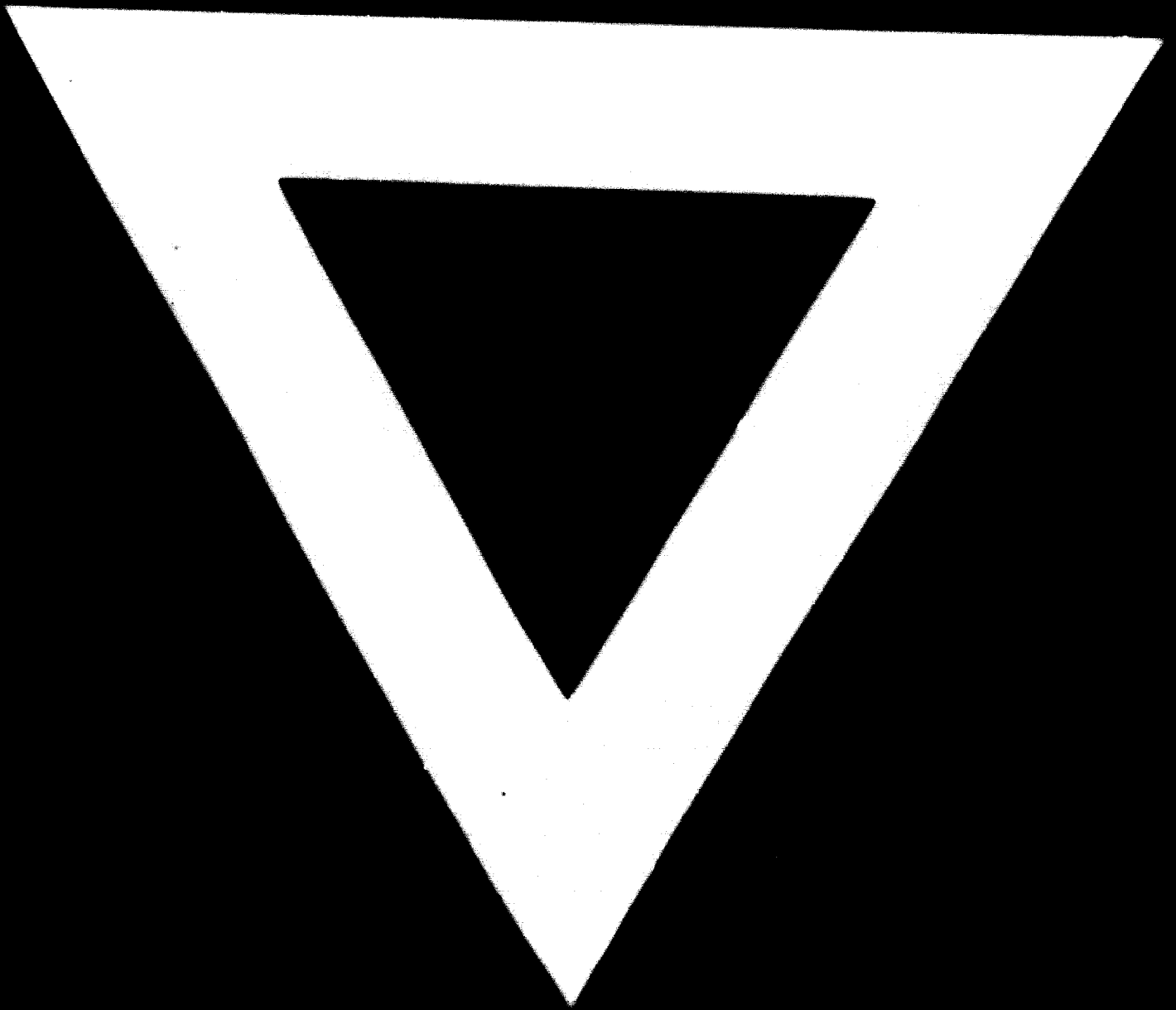
-  Forest Regions (Nos. 1-12)
-  Unsurveyed areas
-  Location of Sawmills



Forest Department
of
Guyana

E. DOW, Conservator of Forests

Map showing
FOREST REGIONS



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