GOVERNMENT OF THE PHILIPPINE ISLANDS.
DEPARTMENT OF THE INTERIOR.

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USEFUL INFORMATION CONCERNING PHILIPPINE PUBLIC FORESTS AND POSSIBILITIES FOR THEIR EXPLOITATION.

Although the future prosperity of the Philippine Islands depends mainly on their agricultural development, yet it is generally recognized that the proper exploitation of the extensive Philippine forests will add exceedingly to the future prosperity and also aid greatly in agricultural development.

More than one-half of the land area of 120,000 square miles in the Islands is forested; that is, covered with a tree growth. Of the 60,000 square miles of forest, 40,000 square miles are in the more thinly settled Islands of Mindoro, Samar, Palawan, and Mindanao, or about 80 per cent of their total area.

It must be admitted, however, that large parts of this timbered area can not be considered commercial forest by lumbermen. Scattered stands of small unmerchantable trees and inaccessible mountain forests cover considerable areas. Estimating conservatively, there are 25,000 square miles, or 16 million acres, of timber which can and will be exploited on a reasonably large scale. An average yield of 2,500 board feet of merchantable timber per acre on this area is a conservative estimate, giving a total supply of 40 billion board feet. The total annual cut in the Islands is now less than 50 million feet or only about one-eight of 1 per cent of the probable supply. This cut is an insignificant item of the annual growth in these forests. The forests under conservative treatment should furnish an annual supply of at least 400 million feet of mature timber and be improved by so doing.

The timbers in the Islands include a great variety ranging from Pine and Calantas, or soft tropical cedar, to the extremely heavy and hard Dungon and Mancono. In general, Philippine woods are hard and heavy, yet there are not lacking abundant supplies of light and strong construction timbers which can well be substituted for

the White Pine, Oregon Pine, and California Redwood, which are imported. Lauan is a fairly soft, strong wood and can well take the place of Oregon Pine and California Redwood. Apitong, harder, heavier, and stronger than Lauan, is equal to Oregon Pine and Longleaf Pine for general construction. Lauan and Apitong and the other species of the same family, Dipterocarpaceæ, are not only the most abundant timber occurring in the Archipelago but they are very large trees. Timber up to 90 feet in length can be secured from them. They are also excellent finishing woods, equal to most American woods used for interior finish.

The following comparative figures of weight and strength are taken from Bulletin No. 4, Bureau of Forestry, "Mechanical Tests, Properties, and Uses of Thirty-Four Philippine Woods:"

Name.	Locality.	Compression along the grain.		Cross-bending.			
		Average per cent moisture.	Average stress at rupture (pounds per square inch).	Average per cent moisture.	Average modulus of rupture (pounds per square inch).	Average modulus of elasticity (1,000 pounds per square inch).	Average specific gravity of dry wood.
Lauan	Philippine Islands	12.4	6,180	10.4	9,760	1,653	0.446
Oregon Pine	United States	12	5,700	12	7,900	1,680	.51
California Redwood	do	13.3	5,560	12.3	9,110	1,320	.445
Apitong	Philippine Islands	14.4	7,250	14	11,620	2,144	.645
Longleaf Pine	United States	15	6,900	15	10,900	1,890	.61
Guijo	Philippine Islands	14.6	7,940	13.7	15,150	2,158	.708
White Oak	United States	12	8,500	12	13,100	2,090	.80
Pignut Hickory	do	12	10,900	12	18,700	2,730	.78
Dungon	Philippine Islands	10.7	9,420	11.6	17,110	2,209	.857.
Yacal	do	13.4	9,220	15.6	15,690	2,583	.843
Molave	do	12.7	8,330	10.4	8,580	1,614	.785

Some of the finest cabinet woods in the world are found in the Philippines. Ebony, Acle, Narra, Camagon, and Tindalo give the greatest choice in beautiful color and grain. These and others would make superior substitutes for the American cabinet woods which are so rapidly disappearing. For Cherry and Mahogany, Narra, Tanguile, Balacbacan, Calantas, and Lumbayao, though differing somewhat in grain and hardness, can be used; for Black Walnut, Acle and Banuyo can be used; and so on, every American furniture wood having numerous Philippine substitutes. Besides there are valuable woods, such as Ebony, Camagon, and Tindalo, which have no counterparts in the United States.

At present Philippine lumber is produced almost exclusively for the local demands. In the fiscal year 1904–5 the Islands used about 75 million board feet of lumber, of which they produced about 40 million feet. The remainder was imported from the Pacific coast. It seems

anomalous that a country so rich in timber should not produce more than one-half of the supply necessary for its own people. The reasons are that lumbering is generally on such a small scale and with such inefficient methods and facilities for transportation of timber in the islands at present so poor that Oregon Pine is sold, in Manila and other large cities, cheaper than most native lumber.

Conditions demand the development of a modern lumber industry and the installation of large sawmills and suitable transportation facilities so that Philippine lumber can dominate in the Philippine Islands and penetrate to foreign markets. Large operations, well capitalized and efficiently managed are necessary if the Philippine people are to receive a proper economic benefit from the possession of their valuable forests.

The company desiring to establish a large lumbering operation in the Philippines can not study too carefully the factors governing the lumber industry here. These factors are the character of the forests, the accessibility of the timber, transportation facilities, labor conditions, stumpage prices, and market conditions.

CHARACTER OF PHILIPPINE FORESTS.

A lumberman desiring to operate on a large scale demands in a commercial forest accessibility, comparatively few species per acre, most of which are merchantable, and enough merchantable timber per acre to permit the use of modern logging methods. Large areas of Philippine forest although containing valuable timber fail to answer these requirements.

In Benguet and neighboring provinces at an altitude of more than 2,000 feet are the open pine forests. Along the coasts, especially at the mouths of the rivers, are extensive salt-water or tidal swamps known as "manglares," from which come firewood, tanbark, and dyebark. The low coast flat is another forest type, characterized by scattered trees of Ipil and a few other valuable species. The tangled forests of the deltas and river bottoms present the greatest variety in species but are not satisfactory for extensive lumbering. Finally there is the extensive hill or upland type of forest which is the most suitable for lumbering operations.

The upland forests are the most extensive and are the ones in which the lumberman will be most interested in the future. There are two general classes of upland forest depending generally on soil conditions.

On rocky, exposed and thin-soiled uplands the forest is thinner and is characterized by a smaller proportion of commercial species. Here Molave, Narra, Tindalo, Acle, and other of the most valuable trees are found scattered through a stand composed largely of small unmerchantable trees. The other type of upland forest grows on the better, deeper soils. Here is generally found a fairly dense stand of large trees principally members of one family, Dipterocarpaceæ. The best example of this type

is the forest in northern Negros where a lumber company is now operating. Here Balacbacan, Red Lauan, Almon, White Lauan, and Apitong make up a stand of 32,000 feet board measure of merchantable timber per acre. This type of forest naturally answers best the requirements of modern logging, and upon it will largely depend the development of an extensive lumber industry. Both classes of hill forests are found throughout the Islands.

The Bureau of Forestry is gradually locating and roughly mapping the best commercial forests of all these types. The information thus collected is available to all interested parties.

ACCESSIBILITY OF COMMERCIAL FORESTS AND TRANSPORTATION.

The commercial forests are found either along the coast where the timber can be skidded directly to the beach and loaded in suitable harbors, along navigable and floatable rivers where it is skidded directly to the rivers and floated or rafted down them, or at some distance inland so far from deep water that short railroads are advisable or necessary. As long as timber remains close to the beach and large rivers, logging is easy and cheap, requiring but little capital. In such forests there are a large number of operators, cutting small quantities of timber. But these forests are being fast destroyed by the farmer. Lumbering in the future will be in the extensive forests some distance from the coast, where carabao will not serve for hauling.

The difficulties and expense in transporting lumber to the markets are great. A lumberman who does not own his own boats is handicapped. Few of the interisland steamers are adapted for carrying lumber, and freight rates are high and sometimes prohibitive. From the Island of Palawan to Manila, a distance of about 300 miles, the freight rate for logs is about $30, gold, per 1,000 feet board measure. Such rates are manifestly absurd. Only the good prices in Manila make it possible to ship native lumber under such conditions.

A company operating on a large scale should own its own means of transportation from the woods to the market. One lumber company which is operating more extensively than any other in the Islands has a fleet of steamers and barges to transport the sawn lumber to the markets of Cebu, Iloilo, and Manila. Freight from its mill in the Island of Negros to Manila costs them less than $5 per 1,000 feet board measure. It is reasonable to expect that lumber can be shipped between most points in the Islands at a cost not exceeding this figure.

Freight rates from Manila to the Pacific coast amount to $7, United States currency, per ton (logs), about 40 cubic feet, or $12 to $14 per thousand feet board measure. Freight rates from Manila to the Atlantic coast of the United States are $14 to $15, United States currency, per thousand feet board measure, or $8 per ton of 40 cubic feet; light-weight material, $5 per 40 cubic feet.

TARIFF RATES.

There are no export duties on timber or on the manufactured product. Logs imported into the United States are admitted free. The import duty at Manila on sawmill and logging machinery is 5 per cent ad valorem.

LABOR CONDITIONS.

The oft-repeated saying that Filipino labor is inefficient does not apply in the lumber industry. Dollar for dollar of outlay, much better results will be secured both in the woods and in the sawmill from Filipino labor than from American labor. The Filipino has a natural aptitude for running machines and is easily taught. Given a good American foreman it is surprising how well a Filipino crew can handle a sawmill. They work for small wages—$0.25 to $0.75, gold, per day—and given fair treatment make fairly steady and permanent workmen.

In the thinly settled forest regions it is necessary to import labor from the more thickly settled districts. Yet there are tracts of commercial forest so located that there is an abundant and good supply of labor available in the regions themselves. One lumber company is located in the sugar-growing district of Negros where labor is abundant and cheap. It has found no difficulty in securing a force of several hundred men, to most of whom it pays $0.25 per day. The laborers are satisfied and work well.

A lumberman will not find the labor problem a difficult one. He will find that he has escaped many of the vexatious labor difficulties of the United States to meet comparatively few in the Philippine Islands. Patience and fairness in treating the Filipinos will secure most excellent results.

STUMPAGE PRICES.

The Philippine Government sells its timber cheap. The Government charges range from $0.25 to $1.25, gold, per cubic meter, or approximately $1 to $5 per 1,000 board feet. One dollar per 1,000 board feet is charged for Lauan which sells in Manila for $35 per 1,000 board feet. Similar grades of California Redwood for export are worth $20 to $25 in San Francisco and stumpage at present can not be secured for less than $2, gold, per 1,000 feet. The cheap Philippine stumpage is still more marked in the fine cabinet woods. For Narra and the other most valuable woods, it is but $5, gold, per 1,000 board feet, less than pine stumpage in many parts of the United States.

MARKETS.

The lumberman, however, is not satisfied alone with a satisfactory forest, cheap labor and stumpage, and good transportation, but probably wants to know first what the market is for Philippine timber.

Approximately 80 to 90 million feet board measure of lumber are used each year in the Philippines; of this a large amount is imported, being

mostly Oregon Pine and California Redwood. The imported timber is being driven out of the Islands' market by the cheaper and more abundant kinds of native timbers. About 5 million board feet has recently been added to the consumption of native timber by the decision to use native lumber almost exclusively in construction for the United States Army in the Philippines. China and Australia used of American pine during the past year 85 million and 63 million board feet, respectively, a large part of which can be furnished by the Philippine Islands when their lumber has been introduced in those markets by large lumber companies properly equipped and capitalized.

The following distances (in miles) to markets show the advantageous position of the Philippine Islands in competition with the Pacific coast:

Distance from—	To—					
	Manila, P. I.	Cebu, P. I.	Iloilo, P. I.	Hongkong, China.	Shanghai, China.	Sydney, Australia.
Seattle U. S. A.	6,400	----------	----------	6,300	6,200	6,800
Cadiz, Negros Occidental, P. I.	400	140	70	800	1,300	3,370
Bongabon, Mindoro, P. I.	200	----------	----------	700	1,200	3,570

A market for Philippine lumber should also be secured in the United States. Most Philippine timbers are unexcelled for cabinet work, interior finishing, etc., where beautiful hard woods capable of high polish are required. Such woods are rapidly disappearing in the United States. The difficulty has been that there were no lumbermen in a position to supply a strong demand. Consequently the fine Philippine woods are still unknown in the United States.

The lumberman, however, who now contemplates lumbering in the Philippine Islands can not figure entirely on what the market may be, but must depend mostly on what it is now. He must feel that he can secure his share of the local trade. The following are the prevailing prices in Manila for some of the principal native woods, Oregon Pine, and California Redwood:

	Price (in gold) per 1,000 feet B. M.
Lauan	$30.00–$40.00
Apitong	35.00– 50.00
Guijo	49.00– 70.00
Molave	107.50–150.00
Yacal	80.00–100.00
Red Narra	125.00–150.00
Tanguile	47.50– 60.00
Ipil	90.00–112.00
Oregon Pine	30.00
California Redwood	47.00

It is evident from these prices that a lumber company properly equipped and managed and operating on a suitable timber tract should be able to deliver many kinds of native lumber in Manila at a cost about one-half of these prices. Cheap labor and low stumpage offset the increased expense of machinery and management in the Philippines.

There should always be an opportunity for small operators in supplying the local provincial demands, but the growth of a lumber industry worthy of the Islands will depend on the investment of considerable capital. Such lumbermen should be prepared to handle the lumber in all stages from the forest to the market. In this way they can compete successfully, not only in the Philippines but also in Chinese, Australian, and even American markets.

PRESENT LUMBERING OPERATIONS.

Lumbering at present is mostly carried on in a crude, inefficient way by numerous small cutters, few of which cut a significant amount. There is also a great waste in logging. Skidding and hauling are done with carabaos, which are poor draft animals for this purpose. Several carabaos are needed to move an ordinary log, and much of the timber is too large to be hauled by them. In this kind of logging the requirements for cheap logging are lacking, and the output is necessarily small.

Since the American occupation, the number of small sawmills has greatly increased, yet a large part of the native timber used in the Islands is whipsawn. In all there are thirty-one sawmills in the Philippines. These do not manufacture more than 250,000 board feet of lumber per day. Of this, 90,000 feet can be cut by the five Manila mills. This indicates well the condition of the lumber industry at present. Extensive lumbering is only beginning in the Philippine Islands. Yet there are a few operations now being successfully carried on which indicate to lumbermen the possibilities in the Pnilippine forests.

LARGE OPERATIONS.

The operations of a company in Negros Occidental are more extensive than those of any other company in the Islands. It is operating on a tract of 69 square miles, 60 square miles of which are covered with an unusually heavy stand of timber averaging about 32,000 board feet of merchantable lumber per acre. The mill, which has recently been completed, is a modern band mill of the best type with a capacity of 100,000 board feet and should manufacture at least 60,000 board feet per day when a mill crew has been trained. This company is able to sell Lauan and Apitong in Manila at a lower price than that prevailing for Oregon Pine or California Red Wood. Its operation is an example of what can be done in the Philippines by a well-equipped company operating with

modern methods. Donkey engines are employed to skid the timber to a logging railroad on which the logs are hauled to the mills. The company's steamers and barges carry the lumber to Manila, Iloilo, and Cebu.

SUITABLE TIMBER TRACTS AVAILABLE.

In pursuance of its policy to do everything possible to stimulate the forest industries of the Philippine Islands, the Bureau of Forestry, during the past two years, has located and roughly mapped timber tracts suitable for large operations. It is now in a position to give definite information regarding some such tracts to prospective lumbermen.

In northern Negros are 60 square miles of dense virgin forest, similar in species and equal in yield to the forest of the Insular Lumber Company which adjoins it. This forest covers the slopes of Mount Silay, ranging in elevation from 200 to 4,000 feet above the level of the sea. About 40 square miles lay below 1,000 feet and are an execellent lumbering proposition for a company with a large capital. The new railroad in Negros is planned to pass within 3 miles of the edge of the forest. A company would build its sawmill on the line of this railroad, run its own logging railroad into the forest, and ship its lumber to a port on the coast to be loaded for Cebu, Iloilo, Manila, or Hongkong and New York. On the 40 square miles most accessible is a total stand of about 800 million board feet of merchantable lumber, enough to supply a mill cutting 50,000 feet per day more than fifty years. It is a Dipterocarp forest, that is, composed mostly of Almon, Lauan, Apitong, and Tanguile.

In the well-forested region of northeastern Mindoro is another suitable tract of some 200 square miles. It is located west of Lake Naujan and about 13 miles from Calapan, the provincial capital. This also is a Dipterocarp forest composed mainly of Almon, Lauan, Tanguile, and Apitong. A rough survey showed an average stand of about 20,000 board feet per acre. Logs may be rafted across the lake and down the river to the coast or a tramway built direct to Calapan, which is about twelve hours by steamer to Manila.

On the northern half of the peninsula of Bataan, across the bay from Manila, is another forest tract suitable for a large lumbering operation. Although logging is much more difficult here than on the other tracts mentioned, the proximity to Manila makes it a good proposition.

OBTAINING A TRACT OF TIMBER.

The public forests of the Philippine Islands are not sold, but are exploited under a license system. Small cutters generally operate under ordinary yearly licenses for definite small areas. In the case of large operations involving the investment of considerable capital in permanent enterprises, exclusive licenses are granted for periods up to twenty years for definite large tracts of timber, which licenses are practically equivalent to concessions.

Applications for exclusive licenses on tracts not exceeding 2,500 acres in area are forwarded by the Director of Forestry, after due investigation, to the Secretary of the Interior with recommendations. The Secretary may then grant an exclusive license if he decides that it is in the public interest. For an area of more than 2,500 acres when the Secretary of the Interior is convinced that the granting of an exclusive license is in the public interest, proposals for bids to secure the said privilege are published in the Official Gazette and other newspapers. The license will then be granted to the highest and best bidder who offers to install the most complete and efficient plant most promptly and to do the greatest amount of annual development work and who furnishes the best bond as a guaranty of performance.

The right to reject any and all bids is expressly reserved, and in general it may be stated that no exclusive license will be approved except upon a reasonable showing that the licensee will be able within the period fixed in his license actually to exploit the resources of the forest tract covered by it. The man who means business must show the Government that he really intends to develop the tract for which he secures an exclusive license and will protect the interests of the public in the concession.

The Bureau of Forestry is now in a position to assist lumbermen desiring to locate here. Some have recently made applications for exclusive licenses for large tracts and have found the maps and information furnished them by the Bureau of great value. Trained foresters with two or more years of experience in the Philippine forests will be placed at the service of lumbermen to assist them in finding suitable forest tracts.

The available publications of the Bureau will be sent on application to interested parties.