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MESSAGE

I convey cordial greetings to the readers of FORESTRY LEAVES, the official organ of the alumni and student body of the College of Forestry, U. P., on the occasion of our celebration of Arbor Week.

It is fitting and proper that we should all endeavor to make our people more conscious of our forest resources. Our forests provide our nation not only with many of our daily needs, but also with one of our leading dollar-earning industries. It is rather unfortunate that this source of wealth has lately been taken for granted, and even abused, to such an extent that during the last regular session, Congress has been forced to pass a measure intended to protect our forests from further depredations and careless exploitation.

I urge the alumni and student body of the College of Forestry to lead in a nationwide movement to protect the riches of our country which can be found in our forests. A law remains a law written on paper until it is given living meaning by persons of good faith. Such persons of good faith are found in the ranks of the alumni and student body of the College of Forestry. I know they will live up to the expectation that I express here.

E. RODRIGUEZ, SR.
President of the Senate

Manila, Philippines

UNIVERSITY OF THE PHILIPPINES
QUEZON CITY

MESSAGE

The care and propagation of trees is, for all of us, a task that has no end. Trees conserved are a ready source of wealth. More, they give protection and bring joy. They inspire hope and sustain life -- this means change and growth. When trees are cut with reckless abandon, as it happens now, to feed a hungry market abroad, we needlessly destroy something of our own. Without the protective mantle of our forests, the rich soil will not hold, the wind will tear out its flesh, the floods will come, leaving tragedy in their wake. This is the grim future we face unless we realize that our vaunted rich forest resources are not limitless. We must replace what is cut or destroyed by careless hands. This is the thought that I pass on to you as you observe Arbor Week.

V. G. SINCO
President

Forest Research In The Philippines

By FLORENCIO ASIDDAO
Chief, Forest Research Division
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The administration of the public forests in the Philippines during the Spanish regime, from 1863 to 1898, was centered mainly on the collection of statistical information regarding the extent of state and private forests belonging to corporations, towns and churches; the opening up of virgin lands from agricultural lands; the granting of concessions for the extracting of timber and resins; and the collection of forest charges and imposition of fines upon forest violators. Forest research was on a small scale and was concentrated on the building up of herbarium collections, forest botanical studies, and to a very limited extent on the survey of portions of accessible public forests. The study of the Philippine flora, with particular attention to the flora of Mindanao, was started in 1871 by Forest Engineer Sebastian Vidal, then Chief of the Inspeccion General de Montes. The result of his studies was published in Madrid in 1874.

Shortly after the United States Government took over the Philippine Government from Spain, the forestry bureau was reorganized and placed more or less on a technical or scientific basis rather than a mere timber sales agency as it were. The Division of Forest Investigation was created, manned by a force of American expert consulting foresters and invested with the functions of conducting original scientific studies and investigation of the value and extent of the forest resources of the Islands, of the actual and potential qualities of their products, and their protection and regeneration. There was felt an immediate pressing need for the securing of information and data which must be had before steps can be taken to conserve, improve, and wisely utilize the forests as a permanent public asset.

Botanical collection was intensified to increase the knowledge of the forest flora of the Philippines. With the cooperation of the Bureau of Science which was the custodian of the Philippine herbarium, a large number of arboreal species including nearly all of the principal timbers then found in the market were identified and tests on the strength, hardness and durability of important woods were conducted. Entomological and pathological studies of insects and diseases affecting the forest and timber were carried out.

Forest maps were made of a greater part of central and southern Luzon, the island of Mindoro and the Zamboanga Peninsula of Mindanao. Reconnaissance and timber inventory were conducted in some important forests and timber concessions. With an ecologist from the Bureau of Science, studies were made of Philippine forest types and sub-types, and observations of growth of trees, mostly dipterocarps, based on ecological factors in the Makiling National Park were carried out. Special forests for intensive management and silvicultural studies were established in Northern Negros, Bataan, Arayat (Pampanga) and Makiling (Laguna). Growth measurements of individual trees in natural forests and plantations were compiled and analyzed and data collected on the behaviour of different species.

Forest nurseries were established and initial studies started on the propagation of forest species, exotic and endemic, seed treatment and storage, planting in the nursery and transplanting in permanent locations. Investigation of the character, yield, and proper extraction of the more important minor forest products was attended to.

Among the more useful publications prepared as a result of these early forest researches and studies, the following may be mentioned:

1. Part I — Mechanical Tests, properties and uses of thirty-four Philippine woods.

   Part II — Philippine sawmills, lumber market and prices. By Rolland Gardner (1907).

2. A preliminary working plan for the public forest tract of the Insular Lumber Company, Negros Occidental. By H. D. Everett & H. N. Whitford (1906).
3. A preliminary working plan for the public and forest tract of the Mindoro Lumber and Logging Company, Bongabong, Mindoro. By Melvin L. Merrit and H. N. Whitford (1906)
4. A preliminary check list of the principal commercial timbers of the Philippine Islands. By H. N. Whitford (1907)
5. The forest of Mindoro. By Melvin L. Merrit (1908).
6. The forests of the Philippines. Part I —Forest types and products; Part II — The principal forest trees. By H. N. Whitford (1911).
7. Ipil-ipil — A firewood and reforestation crop. By D. M. Mathew (1015).
8. Commercial woods of the Philippines; their preparation and uses. By E. E. Scheider (1916).
9. Philippine bamboos. By William H. Brown & Arthur F. Fischer (1918).
10. Philippine forest products as sources of paper pulp. By William H. Brown & Arthur F. Fischer (1918).
11. Philippine mangrove swamps. By W. H. Brown & Arthur F. Fischer (1918).
12. Philippine palms and palm products. By William H. Brown & Elmer D. Merrill (1919).
13. Philippine fiber plants. By William H. Brown (1910).
14. Philippine resins, gums, seed oils, and essentiall oils. By Augustus P. West & William H. Brown (1920).
15. Wild food plants of the Philippines By William H. Brown (1920).
16. Minor products of Philippine forest. Three Volumes. By Wiliam H. Brown (1921).
17. A dictionary of names applied to trees of the first, second and third groups. Compiled by the Bureau of Forestry (1923).
18. Philippine woods. By Luis J. Reyes (1938).
19. Useful plants of the Philippines. Vols. I, II, & III. By William H. Brown (1950).
20. Medicinal plants of the Philippines. By Eduardo Quisumbing (1951)
21. Important commercial timbers of the Philippines: their properties and uses. By Florencio Tamesis & Luis Aguilar (1951).
22. The "Philippine Mahogany" and other dipterocarp woods. By Florencio Tamesis & Luis Aguilar (1953).

While much has been learned in the past fifty years about Philippine forests and forest products, brought about by careful scientific studies and observations, it is recognized that the potential field of forest research has yet hardly been scratched. Considering the astonishing diversity of species in the Tropics, and the rapid growth of vines, weeds and secondary forest species, many fundamental problems of forest management in the Philippines still remain unsettled.

At present two government entities are engaged in forestry research. The Forest Products Research Institute of the University of the Philippines at College, Laguna, undertakes studies and investigations of the properties, uses and processing of wood and other forest products. It conducts researches aimed at developing new and profitable forest products industries; improving the chemical processing, seasoning, preservative

(*Continued on page 6*)

The Planting of Commemorative Trees in the Philippines

By N. P. LANSIGAN

The beautiful custom of planting a tree to mark a memorable event has survived the occupation. Memorial trees are again being planted[1] and we shall see more of such plantings as time goes on. Planted with an eye to permanency and given proper care, these trees will grow to become beautiful living memorials, rich in assocation and apt historical markers. They will also bring about such practical benefits as shade and beauty so much wanting in many a home these days. Many lawn and orchard trees were lost during the war and this has left many a lovely home with a bizarre, naked atmosphere. This is especially conspicuous with new buildings and residences mushrooming up in burned areas. These would be more healthful and beautiful with a few trees about.

A VENERABLE OLD CUSTOM

It is not known how the commemorative tree planting idea got started. But as early as 1700 it was required by law in parts of Germany to plant trees to celebrate certain events. No man, for instance, was allowed to marry until he could show he had planted the required number of oaks and fruit trees. In colonial days in America, it was the custom for the bride-to-be to bring a tree from her father's grounds and to plant it at her new home. The practice spread far and wide in various forms until at present in almost all civilized countries commemorative tree planting of a sort is followed.

It is not known if memorial plantings of some kind were practiced in the Philippines during and before the Spanish period. In recent times, the first memorial tree was believed to have been planted in 1907 at the Luneta by William H. Taft during a visit to the Philippines when he was Secretary of War. There is no sign of this tree now. A sort of memorial tree planting has for some time been consistently followed by the School of Forestry at Los Baños. Every graduating class votes for a class tree and has it planted with appropriate ceremonies on graduation day.

The bureau of forestry in its drive to make the nation conservation-minded has made of tree planting a national habit. Before the war at every opportunity it had—whenever an important personage landed on our shores, during anniversaries and significant events — it managed to have a commemorative tree planted. It tagged governors general, President Quezon, American high commissioners and other personages on their inspection trips about the Philippines and had caused them to hold shovels and plant trees at unexpected times and places. The tree planted bears the name of the planter or of the event commemorated.

In 1922, General Leonard Wood, then a member of the Wood-Forbes Mission, visited the School of Forestry. Here he planted three trees, a narra for President Theodore Roosevelt, a banaba for W. Cameron Forbes and a banuyo for himself.

[1] In Manila and in the provinces, a tree planting ceremony was one feature of the Independence Day celebration.

GROWTH TO A NATIONAL PRACTICE

In was really in 1931 that tree planting became somewhat of a fad. It started when W. Cameron Forbes planted an eucalyptus at Camp 7, Cebu on February 21, 1931 on his way to Japan as U.S. Ambassador. U. S. Secretary of War Patrick Hurley planted two Hurley trees to his credit in the Philippines. Today there are in various spots of the Philippines trees bearing the names of Theodore Roosevelt, Leonard Wood, Butler B. Hare, George C. Butte, Frank Murphy, Gen. Parker, Ralston J. Hayden, and others.

An impressive walnut tree planting program was held in Baguio on February 22, 1932 on the occasion of the bicentennial anniversary of George Washington. The walnut seeds were gathered by the Boy Scouts of America from trees growing on the historic grounds at Mt. Vernon. Recently also, Friendship Seeds were received from the United States as another token of Fil-American amity. The seeds, obtained from the General Sherman Tree, the largest and oldest tree in the world, have been planted in Baguio.

The reforestation project of the bureau of forestry at Camp 7, Cebu, was a veritable album. National officials and prominent foreign visitors to the place invariably planted a tree there. There are even group plantings. There is a House of Representatives Grove planted in 1932 by Representtaives Cabahug, Raffiñan, Jose de Leon, Fabian Millar, Arsenio Bonifacio and Vicente Ybiernas. There is also a U.P. Tree planted there in 1932 by Profs. L. Fernandez and Vidal Tan. In Manila there had been planted quite a number of memorial trees by our greats and near-greats and by Boy and Girl Scouts groups. President Quezon, Justice Avanceña and others had trees to remember them by. Of course many of these trees were destroyed during the war and it will be quite a job to locate, identify and mark those which survive.

OFFSPRING OF DR. RIZAL'S TREE

Strictly speaking, a memorial trees is more for sentimental reasons than for utility. This is why a forest tree, rather than a fruit tree, is usually selected for the purpose A favorite one is the. narra. And among the narras, the offspring of the tree which Dr. Jose Rizal planted at Dapitan during his exile had been widely used. Before the war the forestry bureau regularly gathered seeds from this tree, grew them and made them available for arbor and bird day and for memorial tree plantings Many such trees now grace provincial and municipal plaza.s and school grounds.

Following the custom of having a national tree, the Philippines by executive proclamation officially adopted the narra in 1934 as the national tree. Out of the thousands of tree species in the Islands, a committee of four composed of Dr. Leon Ma. Guerrero, Dir. Eulogio B. Rodriguez, Dr. Eduardo Quisumbing and Forester Luis J. Reyes chose narra (the prickly narra) as the most symbolic of the Philippines. It is a beautiful tree, a native of the Islands, graceful strong and of high economic value. It produces a mass of yellow, fragrant flowers very conspicuous in the distance. It gives a hard, durable wood much in demand for furniture making, first class panels and floors.

President Quezon planted a seedling from Dr. Rizal's tree at Malacañan during the first anniversary of the Commonwealth. Three former Misses Philippines also planted one of its seedlings on the U. P. Campus during the National Heroes' Day celebrations in 1932.

SUITING THE PLANTS TO THE OCCASION

Plants, like people, exhibit individual characteristics. There are plants which are suggestive of certain virtues or specific associations. Due care therefore should be exercised in the choise of plants in order that some harmony may exist between the memorial and the person remembered or the

event commemorated. For instance, there are trees suggestive of strength or courage which would be fitting memorials for warrior heroes; some suggest dignity and uprightness fitting for statesmen. Our course the attributing of certain virtues to a particular tree is a matter of opinion and universal agreement cannot be expected.

Again, in planting memorials, a farsighted plan is in order. The trees should be visualized when full grown and efforts made to harmonize them with surrounding scenery. Also, they should be those that have a good chance to grow well in the locality as trees not suited to the place are likely to grow sickly or stunted which make them poor memorials. They should also be planted where there is the least possibility of disturbing them either to give way to buildings and improvements or because they are out of place.

Here is a partial list of the more common plants for commemorative plantings and the attributes the writer believes each possesses:

A. For strength, vigor, courage, etc.—

1. Akle
2. Batitinan
3. Duñgon
4. Ipil
5. Kamagong
6. Kamuning
7. Lanutan
8. Mancono
9. Molave
10. Tambulian
11. Tindalo

B. For beauty, purity, nobleness of purpose, etc.—

1. Alibangbang
2. Anchoan
3. Banaba
4. Bolon
5. Candle tree
6. Champaca
7. Dita
8. Dao
9. Dapdap
10. Dona Aurora
11. Fire tree
12. Golden Shower
13. Kalachuchi
14. Paraiso
15. Pugahan

C .For eminence, leadership, etc.—

1. Agoho
2. Almaciga
3. Amugis
4. Anubing
5. Antipolo
6. Bagtican
7. Bitaog
8. Botong
9. Mahogany
10. Narra*
11. Royal Palm
12. Supa
13. Tañgile
14. Teak
15. White lauan

D. For success, fruitful services, etc.—

1. Acacia (rain tree)
2. Alupag
3. Anahau
4. Avocado
5. Ceara Rubber
6. Chico
7. Duhat
8. Durian
9. Ilang-ilang
10. Kaong
11. Katmon
12. Lumbang
13. Macopa
14. Madre-cacao
15. Malaruhat
16. Mango
17. Pili
81. Santol
19. Tamarind
20. Zapote

E. For exotic atmosphere—

1. Araucaria
2. Amherstia
3. Benguet Pine
4. India rubber
5. Sausage tree
6. Siar
7. Star apple
8. Tulip

FOREST RESEARCH . . .

(*Continued from page 2*)

treatment and other manufacturing processes so that the wood may be converted into final products more efficiently and more profitably; finding profitable use for species not now being used; and determining the use for which our numerous species of Philippine woods are suited.

The Forest Research Division of the Bureau of Forestry takes care of general forestry research. This division has five (5) forest experiment stations. The first is at Los Baños, Laguna, with jurisdiction over Central and Southern Luzon, including Mindoro and Palawan. The second station is in Baguio City to take charge of forestry researches in Northwestern Luzon. The third is at Magat, Nueva Vizcaya, for Northern Luzon. The fourth is in Cebu City covering the Visayas. For Mindanao and Sulu, the station at Malaybalay, Bukidnon has jurisdiction over the whole area.

The Forest Research Division is now almost through with the establishment of permanent sample plots for growth and yield studies of our commercially important tree species. These studies are given priority owing to the urgent needs to implement programs of sustained yield management of our forest resources.

Studies on other forestry fields have also been started, such as: the analyses of forest soils; plant introduction experiments; forest tree improvement studies by seed selection and other techniques; increasing efficiency of forest nursery practices and planting techniques; survival studies of artificial forest plantations; reforestation of denuded areas by direct planting with seeds; propagation by cuttings, marcotting and inarching of economic species; studies on the control or prevention of forest plant pests and diseases; the application of thinnings; regeneration of cut-over areas; and silvical requirements of important forest trees.

Forest grazing sample plots for pasture improvement studies have been established in Luzon. Ways and means to lessen and prevent pasture deterioration are being studied. Seeds of good pasture grasses both local and foreign are planted in special plots to find their merits for extensive use of our promising livestock industry.

Because of the increasing demands for water for domestic uses, power, industry, irrigation and navigation and for recreation, watershed management studies are now being started. Trees are being planted in watersheds in Luzon, Visayas and Mindanao, to restore tree cover at the sources of our rivers, streams and creeks, to lessen soil erosion and minimize disastrous floods and droughts. Other studies on the various modern devices and techniques on watershed management are now being planned and will be undertaken when funds and technical personnel are available.

Considering the importance and magnitude of general forestry research in this country, the present funds and personnel undertaking this work need to be increased. The five forest experiment stations have to be fully staffed with technical men in order that urgent forestry studies could be attended to. Equipment and supplies are badly needed to keep the work going.

Less than four (4) percent of the funds and personnel of the Bureau of Forestry are used for research. Since research involves time, plenty of work and technical men to undertake the studies, enough funds should be given to this important phase of research in our country, or else forestry research will lag behind.

Newsprint From Philippine Cellulosic Materials[1, 2]

By
Manuel R. Monsalud[3]

SUMMARY

Since 1957 to March, 1960, 306 paper machine runs were made at Forest Products Research Institute using pulps produced from different local fibrous raw materials turning out different kinds of experimental papers, 28 of which were of newsprint quality. These experimental newsprints were tested and compared with imported commercial newsprints obtained in Manila which were also tested in the Forest Products Research Institute.

These trials at the Forest Products Research Institute have shown that newsprint papers with strength and other physical characteristics comparable to imported, commercial ones can be made from a variety of Philippine cellulosic raw materials such as wood residues from the logging areas, sawmills, and veneer plants; bamboos, and agricultural wastes.

INTRODUCTION

Since time immemorial, newsprint used in the Philippines has been imported. Up to 1960, there is no newsprint factory installed in this country.

The following table shows the average yearly per capita paper consumption of the important countries in the world together with the percentage of literacy:

Paper Consumption And Literacy (4)

Countries	Average annual consumption per person in lbs.	Literacy Percent
1. United States	438	
2. Canada	250	
North America		92
3. Sweden	200	
4. United Kingdom	156	
5. Switzerland	126	
6. U.S.S.R. & Siberia	26	
7. Spain	20	
Europe		90
8. Australia	130	
Australia & New Zealand		88
9. Brazil	21	
10. Bolivia	2	
South America		62
11. Philippines	10	
12. Israel	8	
13. China	3.5	
14. Pakistan	2	
15. India	1.5	
16. Burma	1.3	
17. North Korea	1.1	
18. Vietnam	0.8	
Asia		38
19. Algeria	11	
20. Egypt	11	
World		59

It is reported that pulp and paper products are among the ten principal imports of the Philippines. In 1958, this country imported ₱34,101,000 worth of paper products from abroad (11).

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[1] This research study was undertaken by the staff, Chemical Investigations Division, Forest Products Research Institute, University of the Philippines, College, Laguna, Philippines.

[2] Presented before the Los Baños Biological Club Meeting held March 24, 1960.

[3] Assistant Director, Forest Products Research Institute, College, Laguna.

The average total Philippine imports of commercial newsprint from 1951-1955 were as follows:

Year	*Metric tons*	*Total cost*
1951	21,389	₱8,138,000
1952	17,599	6,291,000
1953	22,435	6,778,000
1954	24,919	7,586,000
1955	27,571	9,903,000

The newsprint importation of the Philippines, countries of origin, and value in pesos from 1956 to 1959 (Jan. to Oct.) are given below (13):

Country of Origin	1956 Quantity (Kilos)	1956 Value (Pesos)	1957 Quantity (Kilos)	1957 Value (Pesos)
Total Imports	31,050,649	9,485,362	35,937,433	11,030,484
U. S. Atlantic Coast	6,037,253	2,021,770	8,884,830	2,865,354
U. S. Pacific Coast	14,411,607	4,379,604	14,871,438	4,512,578
Guam	11,862	3,952	——	——
Canada	9,701,647	2,815,582	11,347,426	3,342,144
Austria	35,046	13,396	——	——
Finland	65,489	19,288	55,122	17,502
Germany, West	123,220	36,988	20,471	6,898
Great Britain	60,466	21,034	29,354	11,322
Italy	——	——	28,542	10,814
Netherlands	23,852	6,610	——	——
Norway	196,241	68,608	510,498	189,870
Sweden	59,836	20,674	54,263	18,718
Japan	276,476	52,864	135,489	46,284
French Africa	47,714	24,992	——	——

Country of Origin	1958 Quantity (Kilos)	1958 Value (Pesos)	1959 (Jan. to Oct.) Quantity (Kilos)	1959 (Jan. to Oct.) Value (Pesos)
	25,170,861	7,404,603	27,837,220	7,671,777
U. S. Pacific Coast	11,406,831	3,489,823	10,217,697	2,930,176
U. S. Atlantic Coast	8,098,809	2,286,202	9,719,278	2,494,777
Canada	4,858,049	1,399,855	7,206,174	1,979,458
Austria	188,808	57,443	90,600	25,530
Finland	275,758	77,231	63,501	19,109
Germany, West	49,597	15,666	42,871	46,136
Italy	17,077	5,289	——	——
Norway	36,230	12,256	144,751	70,168
Sweden	17,011	4,965	11,829	4,787
Japan	108,493	23,117	325,519	98,613
Other U. S. Insular Possession	23,195	6,566	——	——
Luxemburg	91,004	26,190	——	——
Hongkong	——	——	15,000	3,023

SOURCE: Bureau of the Census and Statistics, Manila
FURNISHED BY: Foreign Trade Promotion Division
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From the above data, for the years 1951 to 1959 (Jan. to Oct.), the average landed cost in Manila of imported newsprint was ₱317.59 per ton.

"Newsprint consist mostly of groundwood pulp, soft-sized and machine finished, used for various printing purposes where permanency is not required, and for cheap tablets. It contains 75 to 90 percent groundwood pulp and 25 to 10 percent unbleached sulphite; the proportion depends on the quality of the pulp and the speed of the machine" (14). Usually light colored coniferous woods, such as spruce, are used.

Newsprint has many uses. Principally it is used in the printing of newspapers, catalogs, telephone directories, bus tickets, and train guides and in the production of school tablets, scratch papers, cheap wrapping, and many other items (16).

A paper, to qualify as commercial newsprint, must be cheap, must have good tensile strength in order to withstand breaking when the paper is being run on a modern fourdrinier paper machine operated at 2,000 f.p.m. or thereabouts, must have high opacity, fair brightness and good ink absorption, and other qualities.

As a rule, the coniferous woods have longer fibers and hence, produce stronger pulps than the broadleaved species.

Since the Philippines is relatively poor in light colored, long fibered coniferous woods but rich in bamboos, agricultural fibrous wastes, and mixed, short fibered hardwoods, it is considered tenable to explore the possibility of using the latter group of cellulosic materials in the production of newsprint.

Unless the Philippines produces her own supply of newsprint, she will continue using yearly a sizeable amount of her dollar reserves for this essential commodity. In a country such as the Philippines, where freedom of the press, among others, is guaranteed by the Constitution, there should be adequate supply of cheap newsprint in order to bring the cost of daily newspaper, weekly magazines, and other media of information within the reach of the masses to encourage them to read so that they can keep abreast of national and international current events. A well informed citizenry is an enligthened, strong pillar of democracy.

Considering the fact that the Philippines has in certain localities abundance of fibrous raw materials which may be manufactured into newsprint, the Chemical Investigations Division of the Forest Products Research Institute has planned a series of studies to determine which species of cellulosic materials are suitable for use in the production of newsprint, either singly or in combination with other species.

The Forest Products Research Institute has departed from the usual way of making newsprint and, instead of using groundwood pulp, has tried cold or hot-soda pulps as well as mechano-chemical pulp. Electric power is costly in the Philippines unlike in Japan, Canada, and other countries blessed with many waterfalls which are harnessed to provide cheap electricity. Therefore groundwood pulping in this country may be more costly.

Pulping of Cellulosic Materials for Newsprint

Chidester wrote (7): "Three main processess used in making pulp for newsprint are the groundwood process, the sulfite process, and the sulfate process. Nearly all newsprint is now made of a mixture of groundwood pulp and either sulfite or sulfate pulp. These pulps are made almost entirely from softwood, largely white and black spruce, balsam and other true firs, western hemlock, and southern pine. Small quantities of harwoods are used".

Standardized pulping processes at the Forest Products Research Institute

In the preparation of pulps for making experimental newsprint in this study, four standardized pulping processess were used, namely, sulfate, hot-soda, cold-soda (12), and mechano-chemical. With softwoods, bamboos, and hardwoods, and also non-woody materials, the sulfate, cold and hot soda pulping processess were employed. The mechano-chemical process was also tried in the case of non-woody materials such as sugar cane bagasse.

a. *Sulfate pulping.*

Fifteen percent NaOH and 5 percent Na_2S, on the oven-dry cellulosic material, were used with a liquor to wood ratio of 4:1, including the moisture present in the wood.

The mixture of chips and chemical solution was digested in an 0.8 cu. ft. stainless steel, steam jacketed, rotary digester. The temperature inside the digester was raised from room temperature to 170 deg. C. in 90 minutes and maintained at this maximum level for another 90 minutes. Then the sulfate pulp was discharged into a screen-box provided with 100-mesh stainless steel wire at the bottom, where it was washed thoroughly with tap water.

b. *Cold-soda pulping.*

The chips were steeped in a solution containing 50 grams of NaOH per liter, under atmospheric pressure and at room temperature with a liquor to wood ratio of 6:1, for 3 hours. Afterwards, the partially softened chips were passed twice thru an attrition mill for the purpose of defiberization. The cold-soda pulp was then washed thoroughly.

In the case of non-woody species pulped under this process, practically the same procedure was followed except that the liquor to oven-dry material ratio employed was 8:1, including the moisture in the fibrous material.

c. *Hot-soda pulping.*

Practically the same procedure as in the cold-soda pulping, described above, was followed in this except that the soaking of the chips or non-woody material was done at 70 deg. C. instead of at room temperature.

d. *Mechano-chemical pulping.*

Aronovsky and Lathrop (5) in 1949 reported a new method evolved by them, for pulping agricultural residues the so-called mechano-chemical process. It consists of steeping non-woody materials such as rice straw, bagasse, etc., in sodium hydroxide solution; subjecting the mixture to rapid mechanical treatment at about the boiling point under normal atmospheric pressure with the use of a special apparatus called a hydrapulper. This was tried in the Forest Products Research Institute.

The solution employed was 9.1 percent NaOH based on the oven-dry material, with an initial consistency of 3.8 percent. The mechano-chemical pulping was carried for 1 hour at boiling temperature under normal atmospheric pressure.

Bleaching the pulps.

It is reported (7) that most commercial newsprint is manufactured from unbleached pulps. However, the sulfate pulps produced in this study were dark in color and had very low brightness. They were therefore subjected to multi-stage bleaching consisting of chlorination, alkaline extraction, and hypochlorite treatment.

The hot and cold-soda, as well as the mechano-chemical, pulps were given single-stage bleach using calcium or sodium hypochlorite.

Production of Newsprint

Experimental newsprints were produced from the different pulps of native cellulosic materials used in this study namely, hardwoods, softwood, bamboo, and agricultural wastes singly or in combination with other species. See Table III.

The pulp furnish was beaten in a 5-lb. Niagara beater to a freeness of from 175 cc. to 505. cc. See Table II. After beating, sulfuric acid was added to reduce the pH of the furnish to about 6.0. Then clay, titanium dioxide, and alum were added. The pulp was then diluted with softened water until its consistency in the machine chest was reduced to 0.5 percent.

Then from the machine chest, the pulp slurry was pumped and fed unto the midget fourdrinier paper machine where experimental newsprints were made.

Physical Tests on the Experimental Newsprints

After each machine run, the paper from the reel was cut and representative samples of each run were placed in the paper testing room of the Institute, maintained at 73 deg. F. and 50 percent relative humidity, until each sheet reached constant weight.

Then physical tests were conducted on these conditioned newsprint samples to determine their relative bursting, tearing, and tensile strength as well as their folding endurance, porosity, opacity, brightness, and density in accordance with TAPPI'S Standard and Suggested Methods (15).

Due to lack of proper apparatus, the ink absorption or castor oil penetration test on these experimental newsprint samples was not determined.

For comparative purposes, samples of imported commercial newsprint obtained from different business firms in Manila were also tested in this Institute in the same way that the experimental newsprints made here were tested.

Discussion of Results

Table I shows the list of most species (wood) dealt with in this study together with their scientific names, fiber lengths, and densities. The softwoods(almaciga, Benguet-pine and Mindoro pines) have the longest fiber lengths. Katmon, toog, and tuai have the longest fiber lengths among the hardwoods. The rest are short-fibered. Boho, the only bamboo species used in this study has long fibers.

Other factors remaining the same, the longer the fiber length of a certain species, the stronger is the pulp produced from it (10).

Table I also shows the comparative densities of the woods used in this study. Ipil-ipil shows the highest density (0.734). It is said that the heavier hardwoods produce groundwood pulps having lower strength than the lower density hardwoods (7). Heavy — 0.600 and up; medium — 0.45 to 0.60; and light — less than 0.45).

Column 2 of table II shows the Canadian standard freeness determined after beating the pulp furnish prior to each machine run following Tappi's methods (15). A pulp furnish must be beaten or mechanically processed before conversion into paper to develop strength.

As a rule, prolonged beating reduces opacity and tearing strength. On the other hand, tensile and burst increase considerably after the first few minutes of beating (10).

Taking into consideration the high speed of modern newsprint paper machine (2,000 f.p.m.), it is essential to have fairly high tensile strength to reduce paper breaking during the machine run, which is costly.

Table III shows the types and percentages of pulps used in the different furnishes together with the physical tests on the experimental newsprints.

Machine Run 106 (100 percent bleached mechano-chemical bagasse) gave the highest bursting and folding strength. Machine run 101, the highest tear factor; Machine run 107, the highest porosity and density; Machine run 156 and 198, the highest opacity; and Machine run 182, the highest brightness.

Table IV shows the physical characteristics of the imported, commercial newsprints obtained in Manila and tested in the Forest Products Research Institute.

Comparing the average physical tests of the experimental newsprints made at the Forest Products Research Institute and of the imported, commercial newsprints tested here (see Tables III and IV), it appears that, on the average, except in opacity and density, the experimental newsprints compare favorably with the imported ones. However, opacity can be further increased up to a certain limit by adding more clay or titanium dioxide to the pulp furnish.

CONCLUSION

The experimental newsprints produced in the Forest Products Research Institute prove that newsprint with strength and other physical characteristics comparable to those of imported, commercial newsprints can be made from a variety of Philippine cellulosic materials, although they can still withstand improvement or modification in commercial production.

Whether or not Philippine hardwoods can largely be used in newsprint production in competition with present sources remains to be determined. In many places in the Philippines there are abundant supplies of hardwoods, bamboos and agricultural wastes. Although Philippine hardwood pulps are generally short-fibered, a proper combination with bamboo and/or some long-fibered agricultural fibrous waste pulps may produce commercial newsprint of desirable quality. This country must, therefore, rely on what she possesses and her industrialists and paper technicians should find ways and means of producing newsprint acceptable in trade and commerce here so as to eliminate or reduce greatly our newsprint importation.

Literature Cited

1. Anonymous, 1957. Pulp and paper industry in the Philippines. p. 45. Industrial Development Center, Manila.
2. Anonymous, 1959. Feasibility of using Lake States hardwoods in newsprint and other pulp and paper products. Forest Service, U.S. Dept. of Agric. Washington, D.C.
3. Anonymous, 1959. Pulp and Paper International. Vol. 1, No. 9 (Aug. 25, 1959). pp. 138-139.
4. Anonymous. 1960. Paper consumption, literacy. Pulp and Paper International. Feb., 1960. pp. 17-19.
5. Aronovky, S. I., and E. C. Lathrop. 1949. A new mechano-chemical process for pulping agricultural residues. TAPPI Vol. 32, No. 4 April, 1949.
6. Calkin, J. B., 1957. Modern Pulp and paper making. 3rd edition. Reinhold Publishing Corporation, New York.
7. Chidester, G. H., 1955. Use of hardwoods in the manufacture of newsprint. Report No. 2027. Forest Products Laboratory, U. S. Forest Services, Madison 5, Wisconsin, U.S.A.
8. Chidester, G. H. and E. R. Schafer. 1955. Experiments in the manufacture of newsprint from cottonwood and willow. Report No. 2028. Forest Products Laboratory, U.S. Forest Services, Madison 5, Wisconsin, U.S.A.
9. Collinge, H. K. 1957. Report to National Economic Council of the Philippines on the pulp, paper, and paperboard industry and its further expansion. Appendices I-IV. Jan. 30, 1957.
10. Emerton, H. W. 1957. Fundamentals of the beating process. British Paper and Board Industry Research Association.
11. Ilustre, Ernesto D. 1960. P. I. industry growth stresses necessity of paper products. Sunday Times, Manila. March 13, 1960 issue.
12. Monsalud, Manuel R. 1958. Standardized pulping evaluation of three wood species, African tulip (*Spathodes campanulata*) Beauv.), almon (*Shorea almon* Foxw.), and paper mulberry (*Broussonetia papyrifera* Vent.). Forestry Leaves, July, 1958. pp. 25-34, 40.
13. Millore, Troadio, 1960. Philippine importation of newsprint from 1955 to 1959 (Jan.—Oct.). Reply letter to inquiry from the Bureau of Commerce, Manila.
14. Stephenson, J. N. 1951. Pulp and paper manufacture. Vol. 2. p. 230. McGraw-Hill Book Co. New York.
15. Technical Association of the Pulp and Paper Industry. TAPPI. Standard and suggested Methods. New York.
16. Witham Sr., G. S. 1942. Modern pulp and paper making. 2nd edition. Reinhold Publishing Corporation. New York.

Talbe I. List of most species dealt with in this study, their scientific names, their fiber lengths, and their densisities, based on their weights when oven-dry and their volumes when wet.

Common name	Scientific name	Fiber length[1]	Density[2]	Remarks
		(mm.)		
1. Acasia	*Samanea saman*	0.87	0.486	
2. Almaciga	*Agathis philippinensis*	5.31	0.441	
3. Anabiong	*Trema orientalis*	1.19	0.313	
4. Balakat-gubat	*Sapium luzonicum*	1.27	0.382	
5. Balsa	*Ochroma pyramidale*	1.59	0.232	
6. Basikong	*Ficus conora*	1.33	0.433	
7. Benguet-pine	*Pinus insularis*	3.45	0.539	
8. Binuang	*Octomeles sumatrana*	1.43	0.227	
9. Boho	*Schizostechyum lumampao*	2.42	——	
10. Dita	*Alstonia scholaris*	1.48	0.376	
11. Dulit	*Canariu hirsutum*	1.06	0.388	
12. Hagimit	*Ficus minahassae*	1.29	0.241	
13. Hamindang	*Macaranga bicolor*	1.37	0.325	
14. Lpil-ipil	*Leucaena glauca*	1.01	0.734	
15. Katmon	*Dillenia philippinensis*	2.68	——	
16. Kupang	*Parkia javanica*	1.02	0.344	
17. Lauan (white)	*Pentacme contorta*	1.37	0.422	
18. Lisak	*Neonauclea bartlingii*	1.40	——	
19. Malakalumpang	*Sterculia ceramica*	1.57	0.286	
20. Mindoro pine	*Pinus merkusii*	4.01	——	
21. Rarang	*Erythrina subumbrans*	1.48	0.239	
22. Toog	*Petersianthus quadrialata*	2.36	0.569	
23. Tuai	*Bischofia javanica*	2.19	0.527	

[1] Fiber length measurements were made by the Wood Technology Division, Forest Products Research Institute.

[2] Density determination was done by the Timber Physics Section of the Forest Products Research Institute.

Table II. Showing the freeness and chemical additives mixed with the pulp furnishes in the production of the experimental newsprints produced in this study.

Machine run No.	C. S. Freeness (m.l.)	Clay (Percent)	Titanox (Percent)	Alum (Percent)
54	255	13	2	2
55	225	15	—	2
76	305	15	—	2
77	300	12	3	2
85	290	12	3	2
96	305	12	3	2
101	305	12	3	2
106	300	12	5	2
107	275	7	(5% $CaCo_3$)	chest pH-7.1
108	250	10	5	2
122	315	15	—	2
130	280	15	—	2
131	320	15	—	2
156	320	12	—	2
172	175	15	—	2
173	280	15	(0.3% separan)	2
176	300	15	—	2
180	310	15	—	2
182	305	20	—	2
198	310	15	(0.3% separan)	2
220	505	20	(0.1%separan)	2
229	360	12	3	2
234	360	14.67	0.4	2
255	305	15	(0.55%-Burtonite)	2
256	300	15	(1% Burtonite)	2
285	310	15	—	2
300	310	15	—	2
302	300	15	—	2

Table III. Showing furnish and physical tests of the experimental newsprint from Philippine cellulosic materials.

Test No.	Machine No.	Furnish: Kind of pulp	Furnish: Amt. (Percent)	Burst factor	factor Tear	Tensile B. L. in meters	Folds (MIT) (double)	Air-resistance (porosity) (sec.)	Opacity (Percent)	Brightness G. E. equiv. (Percent)	Density (Gm./cc.)
52	55	Balakat-gubat, C.S. unbleached	70%	15.7	40.0	3472	6	29	85.3	55.1	0.386
		Boho, sulfate bleached	30%								
63	54	Acacia, C.S. unbleached	70%	21.6	55.8	4044	16	28	81.0	53.6	0.605
		Benguet-pine, sulfate bleached	30%								
66	76	Dulit, hot soda bleached	80%	20.8	52.4	4728	20	18	74.5	56.3	0.602
		Benguet-pine, sulfate bleached	20%								
73	78	Acacia, cold soda bleached	70%	16.4	40.8	3824	8	67	76.0	60.1	0.556
		Bagasse, mechano-chemical bleached	30%								
74	85	Toog, sulfate bleached	20%	13.3	54.6	2949	5	7	78.0	58.0	0.590
		Dita, cold-soda bleached	20%								
		Malakalumpang, cold-soda bleached	20%								
		Hagimit, cold soda bleached	20%								
		White lauan, cold soda bleached	20%								
76	77	Bagasse, cold soda unbleached	80%	19.0	46.5	4360	12	67	85.6	43.2	0.646
		Bagasse, sulfate bleached	20%								
77	80	Bagasse, mechano-chemical bleached	100%	26.3	43.7	5649	70	77	60.1	46.0	0.607
78	81	Bagasse, cold soda unbleached	70%	16.2	49.6	4090	8	13	79.1	40.5	0.467
		Bagasse, sulfate bleached	30%								
93	106	Bagasse, mechano-chemical bleached	100%	33.4	49.2	5494	338	95	76.2	67.2	0.684
102	107	Bagasse, cold soda bleached	50%	26.4	46.6	5050	295	962	43.2	38.4	0.734
		Bagasse, mechano-chemical bleached	50%								
103	108	Bagassefi mechano-chemical soda bl.	100%	11.7	39.5	2650	43	100	52.6	39.6	0.658
107	82	White lauan, cold soda bleached	80%	4.3	53.1	2000	2	1	81.5	55.5	0.431
		Benguet-pine, sulfate bleached	20%								
138	101	Malakalumpang, cold soda bleached	70%	22.1	74.0	4575	17	9	71.5	60.5	0.596
		Toog, sulfate bleached	30%								
139	122	Hamindang)	20%	10.1	54.6	3270	4	2	84.0	51.5	0.485
		Hagimit)	20%								
		Ipil-ipil) cold soda bleached	20%								
		White lauan)	20%								
		Toog, sulfate bleached	10%								
		Tuai, sulfate bleached	10%								

Test No.	Machine No.	Furnish: Kind of pulp	Furnish: Amt. (Percent)	Burst factor	Tear factor	Tensile B. L. in meters	Folds (MIT) (double)	Air-resistance (porosity) (sec.)	Opacity (Percent)	Brightness G. E. equiv. (Percent)	Density (Gm./cc.)
140	130	Katmon, cold soda bleached	80%	6.3	364	1965	2	4	81.5	53.0	0.440
		Lisak, sulfate bleached	10%								
		Toog, sulfate bleached	10%								
141	131	Almaciga, hot soda bleached	80%	4.9	43.5	755	2	4	83.5	43.5	0.494
		Ipil-ipil, hot soda bleached	20%								
158	156	Malakalumpang)	25%	16.0	55.1	3530	7	100	87.0	54.0	0.640
		Dulit)Cold soda bleached	25%								
		Anabiong)	25%								
		Toog, sulfate bleached	25%								
171	172[1]	White lauan, cold soda bleached	75%	9.0	29.7	2520	2	10	79.0	67.4	0.543
		Rarang, sulfate bleached	12.5%								
		Balsa, sulfate bleached	12.5%								
172	173	Balsa, cold soda bleached	70%	19.1	49.5	4260	15	26	74.0	67.0	0.603
		Balsa, sulfate bleached	30%								
175	176	Toog, sulfate bleached	20%	4.9	37.5	210	2	5	82.5	64.0	0.567
		Kupang, cold soda bleached	40%								
		Basikong, cold soda bleached	40%								
179	180	White lauan, cold soda bleached	80%	9.8	60.0	2990	4	5	74.5	63.0	0.408
		Mindoro (Zambales) pine sulfate bleached	20%								
181	182	White lauan, cold soda bleached	80%	3.1	29.0	1870	0	2	84.0	68.0	0.426
		White lauan, sulfate bleached	20%								
197	198	Binuang, cold soda bleached	60%	5.9	41.5	2280	3	7	87.0	60.8	0.552
		Toog, sulfate bleached									
		Rice straw, sulfate bleached	20%								
219	220	White lauan, cold soda bleached	80%	7.2	31.3	1432	1	1	85.3	58.6	0.458
		White lauan, sulffate bleached	20%								
229	229	Rarang, hot soda bleached	80%	2.9	45.3	2713	3	7	87.0	58.0	0.520
		White lauan, sulfate bleached	20%								
232	234	Lamio, cold soda bleached	57.8%	4.6	47.5	525	3	9	93.0	49.3	0.468
		Kupang, cold soda bleached	22.2%								
		Abaca, soda, bleached	20%								
282	285	Albizzie falcata cold soda bleached	40%	20.3	52.1	3567	8	7	75.5	68.4	0.503
		Magabuyo, cold soda bleached	40%								
		White lauan, sulfate bleached	20%								
286	302	Benguet-pine, cold soda bleached	80%	8.0	38.7	1292	2	1	70.9	62.0	0.402
		Benguet-pine, sulfate bleached	20%								
		Average		13.5	46.3	3074	32	56	77.6	55.8	0.538

[1] All the above tests were computed on the oven-dry basis.

Table IV. Showing the physical tests of the imported commercial newsprints obtained in Manila

Test No.	Sample No.	Furnish SOURCE	Burst factor	Tear factor	Tensile B. L. in meters	Folds (MIT)	Air-resistance (porosity)	Opacity	Brightness equiv.	Density
						double	Percent	Percent	Percent	Gm./cc.
74-a	A.	From the Manila Times Publishing Co.								
	1.	a. Rotogravure papers	8.0	18.7	2960	4	51	05.3	57.7	0.644
73-a		b. Newsprint	7.6	21.1	3040	4	25	93.2	56.8	0.539
75-a	2.	"	10.0	24.4	2890	4	19	93.2	49.7	0.542
76-a	3.	"	10.7	21.5	3010	5	23	93.3	56.2	0.570
77-a	4.	"	9.0	28.1	2820	4	12	89.7	55.2	0.580
78-a	5.	"	9.6	30.1	3750	*	22	91.2	55.8	0.591
79-a	6.	Bato from Philippine ground-wood pulp for Bislig Bay Lumber company	6.6	28.6	2260	2	11	91.7	54.8	0.516
	B.	From the Carmelo & Bauerman Printing company.								
90-a	2.	Mustard-yellow for match labels	15.7	44.2	38.70	15	128	91.0	—	0.601
89-a	1.	Orange-colored-for match labels	12.1	51.2	3460	9	19	89.5	—	0.517
91-a	3.	A-white	11.3	52.1	3250	6	37	90.3	57.8	0.584
92-a	4.	B-cream	5.4	26.9	2300	1	24	84.5	—	0.540
93-a	5.	C-buff	7.4	48.2	2490	4	20	93.0	50.5	0.522
94-a	6.	D-straw-yellow	10.4	56.6	3370	10	31	89.1	—	0.675
	C.	From the Manila Chronicle Pub. Co.								
2-a	1.	Rotoprint — for "This Week Magazine	1.1	31.3	2958	4	47	92.9	57.5	0.589
3-a	2.	Newsprint	1.3	40.5	3162	8	27	87.8	53.9	0.573
		Averages	8.4	34.9	3039	6	33	90.8	55.1	0.572

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Some Observations on the Life History and Habits of Heterobostrychus Aequalis Waterhouse

BOSTRICHIDAE: COLEOPTERA

By
MAMERTO L. GARCIA[1]

SUMMARY

Heterobostrychus aequalis Wat. beetles cause extensive losses through damage to seasoned wood and other forest products. Sapwood with 16 to 17 percent moisture content is very susceptible to attack and favorable for development of the insect. Adult beetles bore into the wood and eggs are believed deposited in pores along the sides of the tunnels. Development of the insect from egg to adult stage covers a period ranging from six months to one year. The larval period is the longest and most destructive stage of the insect. Host species of wood are numerous.

INTRODUCTION

A regular pest in houses, sawmills and factories, *Heterobostrychus aequalis* Wat. is one of the many species of powder-post beetles causing serious damage to wood structures and wood products such as plywood, furniture, tool handles, boxes, and lumber in use or in storage. Although not very commonly noticed, it has also been reported infesting rattan and bamboo locally (5). In India, it is considered a major pest of bamboo (4). In Ceylon, it is reportedly the most destructive borer of tea chests made of plywood. The geographical distribution of this species includes India, Ceylon, Indo-China, Federated Malay States, Java, Philippines, New Guineas, Madagascar, and many of the Malayasian Islands. (2)

This beetle belongs to the family Bostrichidae which is considered as one of the most destructive families of the Coleoptera. The propensity of the members of this family to burrow in wood products such as packing cases and articles made of bamboo, has resulted in their being widely distributed through commerce. In general, members of this family are elongate and cylindrical in form, and distinguishable from other coleopterons by their rasplike pronotum, straight antennae with 3 or 4-segmented club, 5-segmented tarsi, and one or more tubercles on the posterior portion of the elytra (3).

Discussions and observations herein reported were based on results obtained from about two years of actual study of the biology of the insect, at the Forest Products Research Institute entomology laboratory from 1957 to 1959. Numerous techniques were tried in studying the oviposition habits of the insect so as to gain an insight into the development of the insect from the egg to adult stage, but none proved successful. The study was discontinued, due to the decline in population of beetle specimens. Only a few informative aspects of the life history and habits of the insect are presented in this report.

[1] Forest Products Technologist, Forest Products Research Institute, College, Laguna.

DESCRIPTION, LIFE HISTORY AND HABITS OF THE INSECT AT DIFFERENT STAGES

Laboratory rearing and observations of the life history of the insect indicated that the development covers a period ranging from 6 months to 1 year, depending on the amount of starch and moisture content present in the wood. The amount of starch favorable for the insect's development has not been determined. Moisture content determination of infested materials showed that 16 to 17 percent moisture in the wood attracts heavy infestation and appears to be a condition favorable for their development. Although observations indicate that beetles occur throughout the year, they were noted to be relatively abundant during the months of March, April, and May. In India, it is reported that emergence of beetles occurs during the monsoon season — June to October-being abundant in July (1).

Adult:

The fully developed and mature adults (Fig. 1) of *Heterobostrychus aequalis Wat.* are elongate and cylindrical in form, moderately shining and uniformly reddish brown to brownish black in color. The palpi, antennae, and tarsi exhibit brownish yellow color, and the dorsal surface of the body is glabrous. The size ranges from 6 to 13 mm. in length and 2.3 to 3.5 mm. in width. The external appearance of both sexes differ in no other aspects except for the presence of large arcuate tubercles on the apical declivities of the elytra in the male.

Callow adults are creamy-white in color, turning to brownish black as they mature. A newly emerged adult stays in the pupal chamber from 3 to 5 days in order to harden, after which it bores its way out of the wood to find a mate and then locate other wood to bore into or re-enter the wood of original emergence through holes of other beetles. This habit appeared to be similar with both sexes. Entrance into the wood is made generally by boring through concealed surfaces or in cracks or crevices. Once inside, the beetle makes a tunnel usually in the general direction of the grain of the wood, extending to depths and lengths dependent on the thickness and breadth of the sapwood.

The male beetle is polygamous in nature. It copulates as many females as it encounters. Copulation is accomplished with the male first trying to stimulate the female by scratching with its forelegs the latter's anal tip of the abdomen. Soon after the female is rendered immobile by such act of stimulation, the male immediately reverses position and places its tip of abdomen in contact with that of the female and effects copulation. After four to five seconds they separate with the male searching for other females to mate. The process of copulation is accomplished within 10 to 15 seconds.

Oviposition by female beetles has never been observed to take place on the surface of the wood although a report (1) states that they lay eggs on the rough surfaces of sawn timber and of logs where bark has been removed. Microscopic examinations of wood surfaces previously exposed to adult female beetles failed to show any deposited eggs to indicate that oviposition really takes place on surfaces of wood. Actual dissection of infested wood, however, showed an indication that eggs are deposited in the pores of wood vessels t aversed by the tunnels of adults, as the initial galleries of larvae were observed to originate from along the areas close to the sides of the tunnels.

Pupa:

The pupa (Figs. 2B and 4) at its early stage is creamy-white in color, gradually turning to yellowish brown as it approaches emergence. The folded wings and legs are prominently visible inside their transparent pupal skin. Pupae are lodged in pupal chambers (Fig. 4) which are clean and devoid of wood dusts, and located at the terminal ends of larval galleries. These pupal chambers are generally located one inch or less beneath the surface of the wood.

This dormant stage of the insect covers

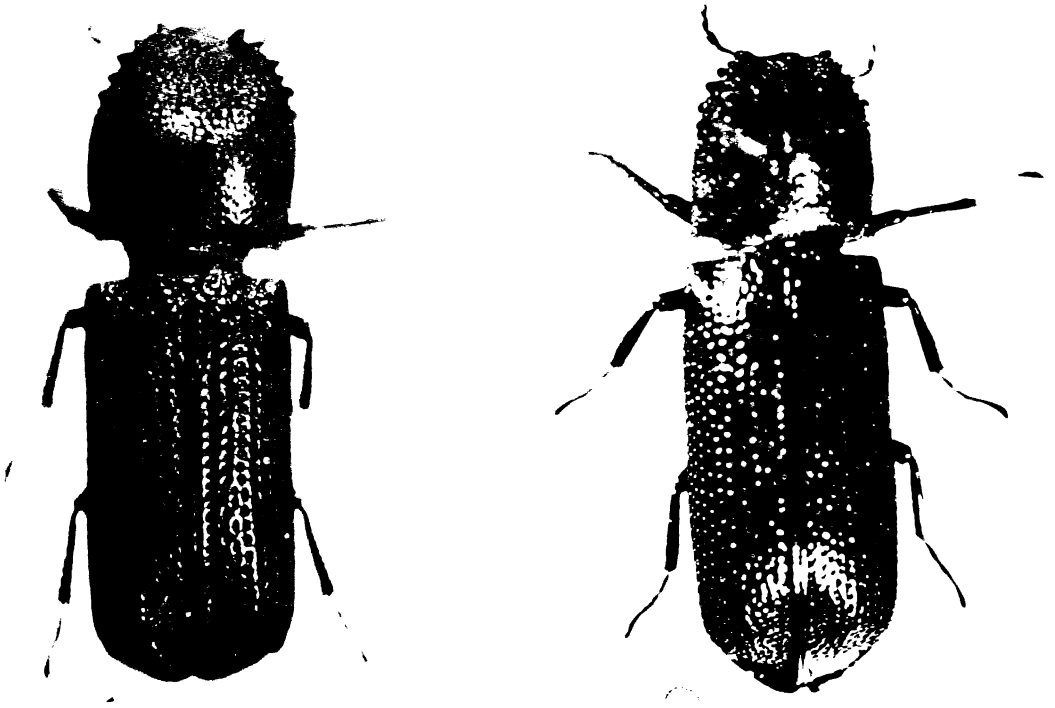

Fig. 1. Adults of Heterobostrychus aequalis **Wat. (a) male, and (b) female (Dorsal view). Normal length ranges from 6 to 13 mm.**

Fig. 2. (A) Larva and (B) pupa of H. aequalis. **Actual length of pupa on the right was 9 mm.**

Fig. 3. Eggs of H. aequalis **extracted from the ovary of a female beetle. The actual size is about 1.0 mm. in length, and o.3 mm. in diameter.**

Fig. 4. Pupa of H. aequalis **in its pupal chamber. Actual length was 9 mm.**

Fig. 5. Typical infestation of H. aequalis **in veneer sheets.**

Fig. 6. Nature of damage of H. aequalis **on a piece of wood. (Note the tightly compacted wood powder produced by the tunneling larvae).**

a period ranging from 7 to 15 days as observed in culture jars in the laboratory.

Larva:

The larva (Fig. 24) is either creamy or pinkish-white in color depending on the color of the host wood; scarabacoid in form, curved, with small head but greatly developed thorax. There are eight prominent pairs of abdominal spiracles, and one pair of slightly bigger thoracic spiracles, all oval in shape. Last instar larvae are about 10 mm. in length, with small but prominent 3-segmented antennae. Under laboratory conditions, last instar larvae pupate in 11 to 26 days. The larval stage in the development of the insects is the longest and most destructive. It takes months of continuous tunneling and voracious feeding on the starchy tissues of the wood before pupation takes place.

Egg:

The eggs (Fig. 3) as observed in the dissected ovaries of female beetles are white, transparent, fusiform, and varying in number from 23 to 102 eggs per female beetle. The average size as observed under the microscope (LP-110x magnification) was 1.05 mm. in length, and 0.29 mm. in diameter. The actual appearance when deposited in the wood has not been observed so far.

NATURE OF DAMAGE TO WOOD

Damage to wood by *H. aequalis beetles* can only be noticed when infestation is already at an advanced stage, as manifested by the presence of heaps of wood dusts dropping out of emergence and exit holes in the wood. In most cases, the entrance of adult beetles is gained at concealed areas of the wood. The holes that appear on the exposed surfaces are exit holes of new generation beetles.

Wood at an advanced stage of infestation becomes honey-combed with irregularly bored tunnels of adults and larvae. These tunnels, which are filled with gritty and tightly compacted wood frass, finally converge into a mass of powder (Fig. 5) held in place only by some residual skeleton or network left undamaged by the insects. When logs are heavily attacked, the wood is reduced to powder to a depth depending on the thickness of the sapwood (Fig. 6).

HOST SPECIES OF WOOD

Observations in the vicinity of the Forest Products Research Institute and in wood-using factories in Manila and neighboring places indicated that the following species of wood are being attacked by *Heterobostrychus aequalis* beetles: Anonang (*Papualthia lanceolata*), anubing (*Artocarpus ovatus*), apitong (*Dipterocarpus grandiflorus*), bagtican (*Parashorea plicata*), bokbok (*Xanthophyllum excelsum*), dita (*Alstonia scholaris*), dulit (*Canarium hirsutum* forma *multipinatum*), gubas (*Endospermum peltatum*), hinlaumo (*Mallotus ricinoides*), ilang-ilang (*Cananga odorata*), ipil-ipil (*Lucaena glauca*), katurai (*Sesbania grandiflora*), lanutan-bagyo (*Conystylus macrophyllus*), malabulak (*Cossampinus malabarica*), manggis (*Koomposia excelsa*), *marang* (*Litsea perrottetti*), mayapis (*Shorea squamata*), palosapis (*Anisoptera thurifera*), panau (*Dipterocarpus gracillis*), para rubber (*Hevea brasilliensis*), red lauan (*Shorea negrosensis*), taluto (*Pterocymbium tinctorium*), tangile (*Shorea polysperma*), white lauan (*Pentacme contorta*), and yakal (*Shorea astylosa*). Undoubtedly many other species are also attacked.

LITERATURE CITED

(1) Beeson, C.F.C. and B.M. Bhatia. 1937. On the biology of the Bostrychidae. Indian Forest Records (New Series) Entomology, Vol. 2, No. 12, pp. 257-262.

(2) Fisher, W.S. 1950. A revision of the North American species belonging to the family Bostrichidae. U.S.D.A. Misc. Publication No. 698, pp. 85-87.

(3) Cadd, C. H. 1944. Report of the Entomologist for 1943. Bull. Tea. Res. Inst. Ceylon. No. 25, pp. 32-37. [Rev. Appl. Ent., Vol. 41, Ser. A, p. 356 (1954)]

(4) Gardner, J.C.M. 1945. A note on the insect borers of bamboos and their control. Indian Forest Bull. No. 125.

(5) Morril Jr., A.W. 1953. Army insect control in the Far East. Jour. Econ. Ent., Vol. 46, No. 2, pp. 270-276. [Rev. Appl. Ent. Vol. 41, Ser. A, P. 356 (1954)]

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The Role of the Farmer-Cooperators in the Cooperative Reforestation Movement

By PACIANO R. RIMANDO

Before attempting to mention the role of the farmer-cooperators in the new approach of large scale reforestation work, I wish to mention the significant purposes and objectives of the movement. First, to establish cooperative reforestation demonstration forests with the active participation of land owners. Second, to reclaim private idle grasslands or submarginal lands for the production of firewood and construction materials and third, to provide training grounds for the farmer-cooperators, farmer extension clubs, youth and adult civic organizations, etc. on actual reforestation work.

Reforestation on impoverished soil, grass and open land, and on areas submarginal in character requires long years of persistent efforts. While this fact is true, the government has established man made forests on areas formerly considered by the skeptic minds as useless. On the barren lands of Cebu, Siquijor, Bohol and the Ilocos regions, to mention a few, man made forests were established which are sufficient proofs that idle unproductive lands can be made useful through reforestation work.

The area of denuded open grasslands under government forest management reforestation program is estimated at 1,390,600 hectares. This area is very wide and at the present rate of reforestation work 300 years is not sufficient to reclaim. The work is very slow and requires tremendous amount of money to finished the job.

There are areas claimed as private property idle and submarginal in character. These areas are problems to the owners, to the local and provincial government. The land produces no tangible income. In forest depleted provinces like the Ilocos, Cebu, Siquijor and Bohol, private idle lands are common sites along the roads.

The Bureau of Forestry has started the cooperative movement in the province of La Union for the purpose of helping the people establish forest cover on their idle lands through reforestation work. As the work is cooperative in nature, a practical workable relationship of the cooperators and the Bureau of Forestry was formulated. The basic relationship is the mutual understanding of both parties, that is, the success of the project means a credit to both, and the failure is a misjudgment and lack of confidence by either party. The positive approach is the proper concept in the cooperative reforestation demonstration movement.

The role of the farmer-cooperators or any individual and organized group who will undertake planting work, should adhere to a norm of conduct, positive active participation. The cooperator should contribute his skill and labor in actual planting work should contribute his skill and labor in actual planting work on the area to be planted. His share in the cooperative project extends beyond planting. It requires that areas planted are provided with adequate protection against fires, animals and diseases. Labor in carrying protection work should be contributed by the cooperator. Replanting on failed areas are carried under the same relationship, maybe on modified technique.

Another share of the cooperators which is

much desired go with their willingness to accept delivery of planting materials from distributing centers or nurseries. The schedule of distribution will be prepared by the Bureau of Forestry. On scheduled days the cooperators are expected to get delivery of their planting materials with their own transportation and labor. The cooperators are given instruction as to the care necessary for the planting materials in transit. They have to observe carefully the instruction to maintain the vigor and life of the young transplants.

Similar instruction will be given to the farmer cooperators on the right time and method of planting or sowing seeds. The cooperators' share requires them to follow instruction. There are planting instructions specific for certain species. These should be followed for successful regeneration of the area to be planted.

The protection of areas planted against forest fires, animals, plant pests and diseases is of special interest in the cooperative reforestation demonstration movement. Taking for granted that all steps and procedures are strictly observed and the young plantations show encouraging results, yet the occurrence of grass fires, diseases and pests may stop entirely the expected progress of the work. This is another aspect of the cooperative reforestation movement where the cooperators' attention shall focus and take active positive interest to check fire and diseases occurence. The people in the community where plantations are found should also take similar attitude as they should if the plantations were their own.

In the management of young plantations for optimum and highest results, the cooperators' share in the project is to furnish labor for the removal of noxious weeds, undesirable species, excess number of trees in the stand, harvesting of firewod, etc. The improvement of the plantation rests on the supervisions furnished by the Bureau of Forestry.

The cooperative reforestation movement is a joint private-government undertaking. Each party has a definite share of responsibility. The government shares at the initial stage of a cooperative reforestation project are divided into two groups. First, to provide planting materials, and second, the technical "know-how."

The procurement of planting materials (seeds and nursery raised seedlings) is a share of the Bureau to encourage the farmer-cooperators to furnish their share in the cooperative reforestation movement. Seeds are collected from fruiting trees in the reforestation projects. The newly opened cooperative reforestation nurseries will raise adequate number of seedlings of reforestation species. Seeds of species that could be grown by direct seeding are also collected. There may not be enough planting materials for the first planting season because of insufficient and inadequate nursery facilities and funds for the purpose. This problem is considered temporary in anticipation of the release of the NEC-ICA Counterpart Fund — Special Account recently requested by the Bureau of Forestry.

The share, classified under "technical know-how" are divided into various categories, namely: A. *Nursery* — (1) Proper collection, storage and handling of seeds, (2) Preparation of seed and transplant beds, (3) Sowing of seeds, (4) Care of germinations, (5) Transplanting (heeling-in); B. Care of young transplants in transit; C. Preparation of planting sites; D. Proper planting technique, E. Protection against fire, animals, pests and diseases, F. Care and improvement of young planttaions; G. Management and harvest of firewood plantations; and H. Care and management of areas planted to timber producing species. Lectures, demonstration and orientation shall be conducted as the opportunity arises to acquaint the farmer-cooperators on the proper technique or steps under the foregoing categories. In the advance progressive cooperative reforestation demonstration program,

(*Continued on page* 42)

Benguet Pine (Pinus insularis Endl.) as a Reforestation Crop in Cebu

By
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Officer in Charge
Cebu Reforestation Project

INTRODUCTION

Cebu province lies centrally in the Visayan Islands. This province is a long and narrow island, measuring about 220 kilometers long and 36 kilometers at its widest portion (Asturias-Danao). Because of its geographical location, Cebu is the biggest trading center in the Visayas. Before the discovery of the island by Magellan in 1521, commerce was already flourishing with some Asiatic countries. As the trade progressed, population increased. Thus began the indescriminate destruction of trees and other kinds of vegetation in order to open lands for agriculture for the growing population and to supply lumber greatly demanded by the towns and the city. (1) The continued growth of population came in geometric figure so that today Cebu is the most thickly populated area in the archipelago. To sustain such a great number of inhabitants, extensive cultivation of land for the production of foodstuffs has to be done. Although the island is predominantly hilly to mountainous with a few coastal plains, cultivation penetrated to the step hills and hinterlands. This practice, coupled with crude farming methods, specially the "Kaingin" system of farming, is the very cause of the present deforested condition of the island. Today, the soil cover of the province is estimated by the Bureau of Forestry as follows: *(14)*

	Hectares	Per cent
Commercial Forest	19,046 —	3.91
Non-Commercial Forest ...	20,933 —	4.31
Brush land	18,465 —	3.79
Open land	48,185 —	9.90
Swamps	3,379 —	0.69
Cultivated	376,843 —	77.40
Total Area of Prov. ..	486,851 —	100.00

One of the attendant ills of a deforested country is soil erosion. In Cebu, soil erosion is extremely serious. A soil survey conducted by the Bureau of Soils in 1956, revealed that "91.7% of the area is affected by erosion of varying degrees; about 62.76% of the province had lost 3/4 or more of original surface; 18.5% had lost 1/4 of top soil; only 18.7% had slight to no apparent erosion." *(7)*

In order to minimize the catastrophe of erosion playing havoc in the province, the Bureau of Forestry, as early as 1916, started a program of reforestation. The forest nursery in Camp 7 was opened in 1921. The forest nursery in Camp 2, Talisay, Cebu raised the seedlings of teak, ipil, lumbang, langil and molave. These were planted in the vicinities of Camp 2, Tapul, within the municipality of Talisay, Cebu and Buad. The seedlings of lumbang, molave, langil bitaog, narra and ipil were raised and planted in the vicinity. About 1924, seedlings of Benguet pines were brought from Los Baños and planted in Camp 7. *(2)* This first introduction of a mossy type of species in the

Project did not fare well, undoubtedly due to the failure to recognize the silvicultural requirements of the species. One of the original seedlings planted in front of the gate to the nursery in Camp 7, which pine survived till liberation, had attained a diameter of 48 centimeters, DBH, and height of about 18 meters.

Mahoganies in Camp 7 were introduced about 1928. They responded wonderfully to the condition of the site.

On October 5, 1937, an area of 2,706.9978 hectares of the Talisay-Minglanilla Friar Land Estate in the towns of Talisay and Minglanilla was set aside, and proclaimed by the late President Manuel L. Quezon as "Talisay-Minglanilla Forest Reserve", devoted exclusively to the planting of forest trees. The same year, the introduction of Benguet Pine was again made. Credit for the present showy Benguet pines trees now dotting the forest plantation of the Cebu Reforestation Project should be given to Forestry Supervisor II Carlos Cunanan of the Bureau of Forestry, then Officer in Charge of the Project. At the outbreak of World War II in December 1941, no less than 30,000 seedlings of Benguet Pine in the transplant beds of the forest nursery at Camp 7, were left to grow by themselves in view of the impending military operation. The reforestation work was later abandoned because the concern of each member of the personnel was the safety of his family and himself.

After liberation three species, Benguet Pines, Mahogany and Teak were the species mostly propagated and planted in the plantations. *(11)*

As of October, 1959, a total of 1,474,65 hectares in the Talisay-Minglanilla Forest Reserve was planted to about 3,686,625 forest trees. *(11)*

During 1958 and 1959, the Cebu Forest Experiment Station introduced and cared for other exotic species of pines from Taiwan, Japan, Australia and United States, namely:

1. *Pinus elliotii*
2. P. *luchuensis*
3. P. *caribasas*
4. P. *taiwanensis*
5. P. *radiata*
6. P. *formosana*
7. P. *armandi*
8. P. *masoniana*

It is observed that *Pinus caribacae,* commonly known as the Slash Pine, is faring well, while the other species are still trying to acclimatize themselves to the region.

OBJECT OF THE PAPER

The object of this paper is to show:

1. Benguet Pine as one of the successful reforestation crops in the Cebu Reforestation Project although the elevation of the plantation (1,700 to 2,100 feet above sea level) is below the altitudinal range of the species;

2. Nursery activities in raising the Benguet Pine seedlings, preparation of field planting, care of the plantation during the first two years;

3. Cost data of the different nursery and plantation activities;

4. Outlook of the species in the Province of Cebu.

Description of the Species

Benguet Pine (*Pinus insularis* Endl.) is the dominant species in Mountain Province and the Provinces of Pangasinan, the Ilocos and Nueva Ecija and in the Cordillera Mountain ranges. Though the species is believed to be indigenous, it is reported to exist also in Indo-China and Burma. (4)

The leaves are needle-like, fascicled or grouped in bunch of three, sometimes two. The bark is 10 to 25 millimeters in thickness, yellowish or reddish brown in color and broken into sections by vertical and horizontal fissure. (8)

The tree is medium to large, reaching a diameter of 140 centimeters and a height of 40 meters with a clear, straight, cylindrical trunk about 15 meters long. It has tendency to send out numerous thick persistent branches if light is received from its side. (6)

The wood is light reddish yellow to reddish in color; grain straight; texture rather coarse, moderately soft to hard, being hardest in the slow-grown individual that are loaded with resin .(9) Pine is generally used for house construction, mine timbers, telephone and telegraph poles, box boards and fuelwood. It has also great possibilities as a source of pulp and paper materials and possibly veneer and pencil stock, and the bark as source of tanning materials. (10)

The local name of Benguet Pine in the Philippines is Al-al, blibo, bel-bel, ol-ol, pine, saleng in Igorot; bariat, bata, batang, saleng in Bontoc; polompino in Ibanag, sahing in Tagalog; tapulaw in Southern Bicol; talang, talong in Gadang. (4,9,10)

Silviculture of the Species

Nursery Activities:

Some prewar planted Benguet Pines in Camp 7, as well as those planted in 1948 and 1949 which are now big, are observed to produce flowers but seemingly infertile because very few cones are formed, and if ever formed, are found to be very undeveloped, inhibited and small. Thus seeds of pines still come from Baguio for propagation in the nursery. (4)

Preparation of soil & sowing: — A mixture of 1/2 garden soil gathered from the forest floor of broad-leaf species is thus prepared. The gathered soil from the base of the pine tree has the peculiar smell of resin and contains plenty of mychorriza, tiny whitish particle visible to the naked eye whereas the garden soil is loamy and contains rich humus. The two soils are cleaned of foreign matter, thoroughly pulverized and placed under the shed, sometimes one to two months. While under the shed the mixed soil is, once in a while, moistened and turned upside down in order to kill the biotic elements, such as small earthworms, bugs, beetles, etc.

The mixed soil is then placed in a seedbox, 11 feet long, 2 feet wide and 8 inches deep, supported by six permanent posts. (Please see the pictures in the appendices). This kind of seedbox is locally known as *"landahan"*. The top soil in the *landahan* should be finely pulverized. Furrows, 1 to 2 millimeters deep, distanced 7 centimeters from each other is then drawn parallel to the width of the box. Pine seeds are evenly sown over these furrows and covered with soil from the mixtures above described, about 1-1/2 millimeters thick. It has been found from experience that very fine soil used as cover of the sown seeds become sticky when wet and compact when dry, thereby making it difficult for the small germinated seedlings to come out easily. Thus, it is important that the soil used for covering the sown seeds must be of the size of a small grain of palay. After sowing, the seedbox is covered with galvanized iron roofing, the covering supported at least 1-1/2 feet from the surface of the soil or from the top side of the seedbox. Watering of the seedboxes is controlled. The soil in the seedbox must be only moist to slightly wet.

Germination and "dumping-off": Germination starts on the 8th day after sowing. It is at its peak on the 11th day, although sometime up to the 16th day, late germination can still be observed. From the 14th to the 28th day, the germinated seedlings will experience the most critical period. This is the time when "damping off" will be prevalent and malignant. This can, however, be checked immediately by removing the affected seedlings; exposing the seedboxes to full sunshine early morning; covering the seedlings at noontime; and seeing to it that the soil is only moist to dry.

Pottings: Potting of the seedlings takes place when the germinated Benguet Pine seedlings are from 40 to 50 days old. At this age, the stem is turgid and brownish, and

the root system is almost the same height as the stem. Potting materials such as tin cans and mixed soil, the same kind of mixture used in the seedboxes, are usually prepared before the potting operation. The evaporated milk tin can is prepared by heating one end and removing the round cover. Then slits are made on the side and bottom using chisel. The can is then filled with 1/3 of the soil prepared. Pines seedlings are removed from the seedboxes and placed in sardine cans with roots dipped in water. Potting is accomplished by holding one seedling erect inside the tin can at its center and filling the can with finely pulverized soil around the plan. Then the soil is thumped gently around the potted plant with the use of the forefinger or the thumb, whichever is convenient. The potted stock is then watered and brought to the transplant bed. Partial shade is constructed over these transplant beds, the shade being used during the first two or three weeks only. Watering of the transplant bed is carried on as condition may require. These potted stocks on the transplant beds will be ready for field planting, from four to six months after. This completes the nursery activities.

Under Cebu condition, the best time to sow Benguet Pines is in January or February. Seeds received from Baguio during these months are usually fresh and contain very high viability. Besides, seedlings raised out of seeds sown in January and February will be ready for field planting from August to November of the same year.

In the Cebu Reforestation Project, an average of 14,000 to 15,000 seedlings are germinated out of 1 liter of seeds. According to the Forester in Charge of the Cebu Forest Experiment Station, who was the Officer in Charge of the Projects in 1950, they were able during that year to produce or germinate 17,000 seedlings out of one liter of fresh seeds received from Baguio.

Evaporated milk tin can is the most commonly used potting container in Cebu because of the abundance of supply in the City: cheap, easy to prepare, handy for carrying the seedlings to the field; and easy to remove the seedlings. Sometimes good tin cans are used twice in the operation above described.

COST DATA IN THE NURSERY

The following is the different cost data during the nursery operation:

1. Cost of preparing soil for seed boxes, including fixing of same, which can accommodate 1 liter of seeds to be sown	₱ 6.00
2. Cost of 1000 tin cans, including preparation (Making slits on side & bottom)	6.50
3. Cost of potting seedlings per 1000	12.00
4. Cost of maintenance of potted stocks per 1000 for four months in the transplant beds in time for setting out to the field	2.48

PLANTATION ACTIVITIES

Climate:

Benguet Pines grow naturally well between altitude of 500 to 2,500 meters (2,500 to 7,000 feet) above sea level but is best developed at elevation ranging from 900 to 1,500 meters. (13) The climate in which Benguet pine grows may generally be classified under the first Philippine climatic type — two pronounced seasons, the dry season which occurs from October to April, and the wet season from May to September. (12) The region has average rainfall of 177 inches and the mean monhtly temperature is 64°F. (15).

In Camp 7, Minglanilla, Cebu, where Benguet Pines are successfully introduced, the elevation ranges from 1,700 to 2,100 feet above sea level. The climate falls under the third type, characterized by no very pronounced maximum rain period, but with short dry season lasting from one to three months. The heaviest rainfall is observed to be in Oc-

tober due to depression, typhoons, and is also the start of northeasterly moonsons. (7) The best planting season in Camp 7 is during the latter part of May to June, October and November. This may be extended to December when there are sporadic rains.

Preparation of the site:

The beginning of plantation activities is the preparation of the site to be planted. The area is first determined or chosen and, at least, two weeks before the actual planting of seedlings, holes are prepared as follows: with the use of a trench shovel, a spot about 50 cm. diameter is cleaned of cogon and other weeds. The cleaned area is then pulverized. A hole 5 to 6 inches deep is made at the center of the cleaned and pulverized spot. The idea is to make the soil moist to wet when downpour occurs. These cleaned spots are distanced 2 x 2 meters or 2 x 4, meters, usually following contour. This distance corresponds to the spacing of the trees. In the case of Christmas lot 7 x 1 meter spacing is used since the trees are cut when 8 to 12 feet tall, for sale to the public.

Planting:

After the cleaning and pulverizing of the soil in the area to be planted, potted stocks in tin cans are brought to the individual hole previously prepared. The seedling are usually 4 to 6 months old. After a sufficient rain or when a heavy overcast foretells of coming rain, planting is started. This is done by holding the tin can at the bottom and then knocked or tapped gently on the sides. The can is then immediately inverted, that is, turned upside down: and the seedling with the soil thus removed is caught compact. The seedling with the soil is planted in the hole. Fertile soil on the upper slope of the hole is sometimes added around the plant to facilitate fast growth.

Under favorable climatic condition on gentle terrain, a laborer working eight hours a day can plant 300 to 500 seedlings, provided these seedlings are already distributed to each hole.

Follow-up and Protection:—

After three to four months new cogon shoots will be noted around the Benguet pine seedling, and sometimes constricting vines twine and bend the plant. Here "ring weeding" is applied to the process of cultivating around the plant, removing the cogon and other weeds competing with the young Benguet Pine. At least three of this plantation activity is recommended for better results in growth and percent of survival.

Firelines are necessary for protective measures especially when the Benguet pine plantation is adjacent or bordering on large areas of cogonal or open land privately owned. Fireline construction consists of cleaning strips of eight to twenty meters wide, running around the plantation, over ridges or sides of slopes, slicing the plantation into compartments. In the clean strips, cogon and other weeds were cut flush to the ground and removed with the use of rakes. Firelines have to be this wide to be really effective.

During summer, a round-the-clock patrol of the plantation is maintained in order to detect the outbreak of cogon fires. Element of time is important in order to readily hold the forest fire in check. The location of watch towers at strategic places should not be overlooked. Patrol trails to facilitate the movement of the fire fighting crew with their equipments should be kept always in shipshape condition.

COST DATA

The different cost data involved in the different plantation activities is summarized as follows:

1. Cost of hauling potted seedlings per 1000, 3 to 5 kms. distance to the planting area. ..... ₱25.00
2. Cost of preparing holes per thousand 13.33
3. Cost of planting seedlings per thousand 20.00
4. Cost of constructing firelines per km. 8 to 12 meters wide .. 46.86
5. Cost of "ring weeding" per hectare 32.00

OUTLOOK OF THE BENGUET PINES IN THE PROJECT

Although Benguet Pine is successfully introduced in Camp 7, and vicinities, this species is not the ultimate crop. The Benguet pine does not produce coppice after the trunk is cut. It has no regenerative capacity. As already stated, pre-war trees and some of those planted just after liberation which are now big were observed to flower but never developed into fruits. Fertilized seed of Benguet pine is yet to be found in the Cebu Reforestation Project. Natural regeneration, therefore, cannot be expected.

The Benguet Pine is found to be a good nurse crop. Under the pine plantation, Hambabalud and Batino are growing in quantity. These species could hardly thrive before the introduction of the Benguet Pine in the area. Underplanting the plantation with Dipterocarps conducted by the Forest Experiment Station personnel has proven successful so far. The dipterocarps are observed to be growing vigorously. Teak, observed to be slow when growing in the open, grows faster and produces straight boles when mixed planted with the pines.

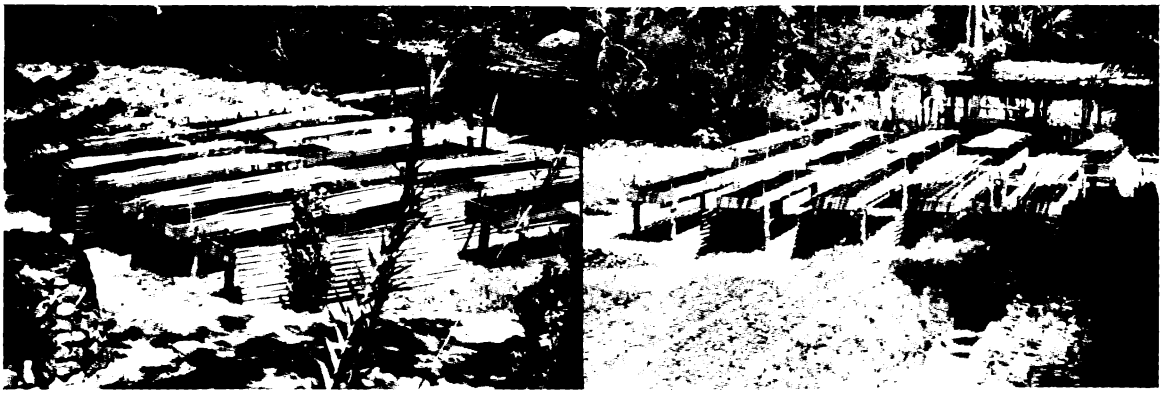
Besides its value as a nurse crop, Benguet pine can be a good source of paper pulp. In Cebu City and neighboring provinces of Negros Oriental and Occidental, pines are readily sold for Christmas trees during the yuletide season. Prices of Christmas trees as sold by the Cebu Reforestation Projects are as follows:

1 meter tall, symmetrical and bushy ..... ₱2.00
1-2 meters tall ..... 2.00 to 3.00
2-3 meters tall ..... 3.00 to 5.00

The use of Benguet pine as mine props is not yet very popular in Cebu, but the Experiment Station is planning to conduct studies along this line so that pine poles removed from the plantation during intermediate cutting, can be made available for the use of the coal miners. In Baguio and vicinities the Benguet Pine lumber is for all general construction purposes.

REFERENCES

1. CERNA, P. DE LA 1951 Reforestation work in Cebu province Forestry leaves V (2): 33-35
2. CERNA, P. DE LA & CORALES, J. 1950 Cebu reforestation project Philippine Journal of Forestry 7(1-4): 5-22
3. CLAVERIA, J.R. 1953 Growing Benguet pines in Cebu. Philippine Journal of Forestry 9(1-4).
4. JACALNE, D.V.: LIZARDO, L. 1959 Benguet pines. Silvical Leaflet No. 2. Bureau of Forestry
5. LIZARDO, L. 1950 Benguet pine as a reforestation crop. Philippine Journal of Forestry 7(1-4): 43-60
6. MERRILL, E.D. 1923 An enumeration of Philippine flowering plants. 4 volumes, Bureau of Printing, Manila
7. ———— 1954. Soil survey of Cebu province. Bureau of Printing, Manila
8. ———— 1911. The forest of the Philippines. Part I, Forest types and products. Part II, the principal forest trees. Forestry Bulletin, No. 10. Bureau of Printing, Manila
9. ———— 1938. Philippine woods. Technical bulletin No. 7. Bureau of Printing, Manila
10. ———— 1938. Philippine flora from a dendrological point of view. Philippine Journal of Forestry 1(3): 335-338.
11. ———— 1950-59 Annual reports of the Cebu Reforestation Projects Bureau of Forestry (unpublished)
12. ———— 1954. The Philippine pine forest (Sent to FAO, Rome) (Unpublished)
13. ———— 1955. Natural regeneration of pine forest in the Philippines. The Filipino Forest 7:40-50. Phil. Journal of Forestry 11(3-4): 211-248
14. ———— 1957. Bureau of Forestry Soil Cover of the Philippines as of June, 1957. (Unpublished)

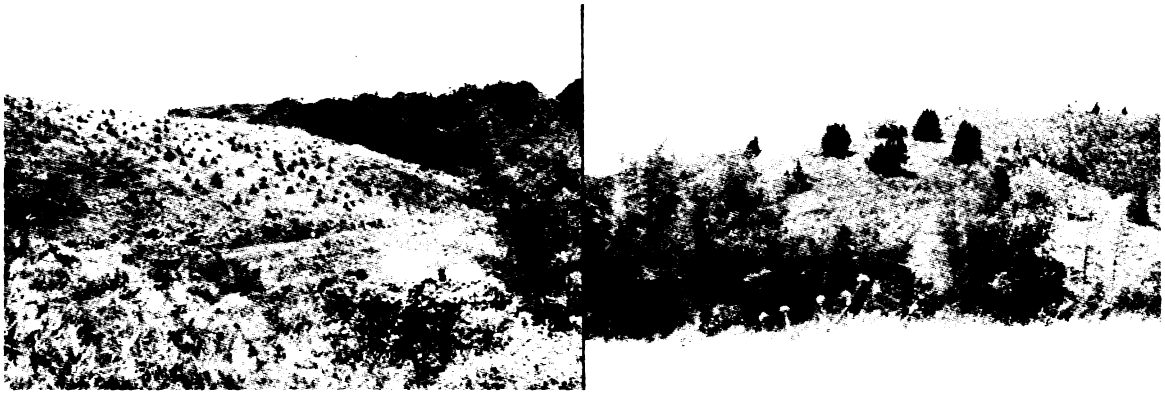


"Landahan" or seed boxes with bamboo and G.I. sheets for partial shading.

"Landahan" and potted stocks of Benguet pine in transplant beds.

One year old pine being compared to cogon in height. Note the pine seedling struggling for existence with the dense cogon and other weeds.

Pinus formosana beginning to acclimatize itself to the new habitat. Firelines along the contour of and between new plantations. Seedlings beginning to control cogon.



Fireliness along the contour of and between new plantations. Seedlings beginning to control cogon.

One year old pines forcing their way up to overtop the cogon. Trees in groups are pines planted by direct seeding.

3 1/2 month-old pine seedlings. Pot containing an average of 1,7000 seedlings per sq. meter.

3 1/2 month-old seedlings growing vigorously.

Average spot is 2 meters wide by 3 meters long.

Location of spots. The spot at the upper right corner is identical to No. 2.

Spot devoid of "mala tanglad" grass has very few seedlings.

Over a year old seedlings thriving vigorously. They were transplanted to their permanent site last September.

Area to be planted next planting season from May to November 1960, with pine seedlings from the various spots.

Spot Planting Of Benguet Pine In The Salinas Reforestation Project

By
FLORENTINO FONTANILLA
Forestry Supervisor I

Introduction: — In the year 1951, when the daily rate of the laborers was raised from ₱2.00 to ₱4.00, the personnel of the Salinas Reforestation Project began its search for the cheapest and most practical method of raising Benguet pine (*Pinus insularis* Endl). They tried to raise seedlings in the nursery but due to the attack of rodents on the seeds and the effect of damping-off on the newly germinated seedlings, there remained after five (5) months a few thousands of seedlings, suffering dormancy of growth thereby rendering them incapable of transplanting. Thus the raising of seedlings in the nursery was a failure, and was given up for direct field planting.

As indicated by its natural vegetation, the Salinas Plantation is adapted to Benguet pine. Its north and north-west ridges are approximately 300 meters in horizontal distance, and is about 2,000 feet above sea level. It lies between the 1st and 3rd types of season. The rainy season under these types starts from May to November, but rarely starts in June to December.

Trials of various procedures of direct field sowing were extensively done during the planting season in 1951 and thereafter. The personnel were very much convinced in employing this method because by examination they found thousands of wildlings of the species under natural mother trees. Laborers Pastor Peria and his deceased brother, Vicente discovered spot planting treated with the "MALA TANGLAD" grass as mulching material and protection from rodents. This particular discovery had been greatly improved and the project now employs it extensively for the species. The encouraging result of the procedure immensely reduces the nursery operation cost and the amount thus saved is invested in the actual planting work and protection.

Procedure:— At the time the mountain surfaces become sufficiently moist the laborers construct the spots. The spots should have even surfaces. Level surfaces are protected from the washing of the fertile surface soil and the sown pine seeds by run-off water during heavy rain. Also, a canal like drainage is constructed around each spot to assure the safety of the surface soil from erosion. The presence of deep clay soil determines the size and shape of the spots. The spots are usually exposed towards the east so that they are free from the effect of the drying west wind during summer days.

A crew of five (5) laborers headed by a skilled one constructs the spots. Each crew can finish daily five (5) spots each containing nine (9) square meters or 45 square meters. Also, the crew can mulch and sow four (4) liters of pine seeds on them or 0.09 of a liter to a square meter. At the rate of 22,400 seeds per liter, there will be 2,016 seeds per square meter. The surface of each spot is cultivated by the use of mattock, spade and rake. It appears like the ordinary beds in the nursery. The actual expenses incurred in preparing and sowing the spots per 45,000 square meters is as follows:

COST OF LABOR IN CONSTRUCTING 45.00 SQ. METERS AND MATERIALS

Number of Laborers	Daily rate	Total	No. of liters	Rate per liter	Total
(x) 1 NFS	₱7.16	₱ 7.16	4	₱4.50	₱18.00
1 skilled laborer	4.80	4.80	(y)	0.40	1.20
4 emergency laborers	4.00	16.00			
T o t a l		₱27.90			₱19.20

(x) The monthly salary of the Nursery Farm Supervisor is ₱215.00. At 30 days a month his daily rate is ₱7.16.

(y) This is the approximate freight of seeds coming from Manila to to the project per liter.

Grand Total		No. of sq. meters	Cost per sq.m.
Labor	₱27.90	45.00	₱1.05
Materials ...	19.20		
Totals ...	₱47.10	45.00	

From the foregoing computation, the cost per square meter is ₱1.05. This amount is identical to the nursery operation cost in preparing nursery beds and sowing them to seeds.

The seeds sown in the above computation were not chemically and physically treated. Usually, they come from the Manila Office contained in muslin bags each of two (2) liters capacity. Also, the bags of seed were stored in petroleum cans under the ordinary temperature in the locality. They were received in January and stored for six (6) months before they were sown.

Each spot is sown to seeds under appropriate timing. It has been discovered to sow advantageously the seed when rains become intermittent. The rats at this period hesitate to roam around because everywhere is wet. However, only the very very hungry ones seeks for food irrespective of the inclement weather.

Shortly after the spots are sown to seeds, the entire cultivated surface must be covered with an inch thick of pulverized soil, and above it is a layer of the "Mala Tanglad' grass which abounds in the plantation, also about an inch thick covering completely the surface of each spot. The leaves of this grass are so arranged that the tip portion of some lies on the basal portion of the other in approximately equal proportion. This arrangement makes it possible for the trichomes of the leaves to be with and against in a given direction of alignment of the leaves on the spots.

The Mala Tanglad grass becomes mulching material and rodent protection for both the seeds and seedlings. The leaves are provided from the base to the tip with trichomes. The trichomes are dense at the base and become proportionately less to the apex. They are found in all parts of the leaves naturally protruding 30 degrees in slanting position pointing upward. Each trichome is about 5 millimeters long, crystaline in appearance, and having a needle-like point. The human skin pricked by the trichomes becomes itchy, and persons allergic to this grass when pricked have their skin swell for some time. The skin is pricked only when it is rubbed against the trichomes, and the same is not pricked when rubbed with the trichomes. Likewise, each leaf has razor sharp blade capable of bruising the skin. Both the trichomes and the razor-sharp blade under the proper arrangement heretofore discussed are its pictures show the seedlings growing on the spots. The seed were sown on the spots last September and October, 1959. From the germination until the

time of inspection on January 26, 1960, there were no treatment given them. They were not affected by any disease nor damaged by wild animals. The seedlings have an average height of 7.5 centimeters at the age of three and one-half months.

The seeds were not sown in drill. There were sown approximately 2,016 seeds to a square meter. On the foregoing date of inspection, there was found an average of 1,700 seedlings per square meter or a difference of 316 seeds that did not germinate. The causes of the failure of germination were that not all the seeds were viable and some spots were slightly attacked by rodents. At the above rate of germination, there are 76,500 seedlings or 76.5 thousands (m) on each 45.00 square meters covered by the previous computation for labor and material at ₱47.00.

The Mala Tanglad grass still serves as mulching material, and the same was penetrated by the germinated seedlings. It will remain on the spots until the seedling therefrom will be transplanted to their permanent sites next planting season.

Unfortunately, a portion of the spot surface was devoid of the Mala Tanglad as shown in picture No. 5. The grass was wind blown after the spot was sown to seeds. On the same surface, there appeared few seedlings because the seeds sown thereon were partly devoured by rodents indicated by the presence of the shells of the seed on the surface.

It was also observed that the dense seedlings are growing vigorously. The seedlings on the sparsely sown surface do not grow as robust as those crowded ones. The seedlings do not need weeding about them. They should grow side by side with any weed growing thereon. However, there is few weed on every spot because the spot were properly cultivated before they were sown to seeds. The harmful effect of the removal of the weed is wilting. It may be that their root system as well as the development of the mychorriza were disturbed. The few weed provided the seedlings protection against the effect of strong drying wind. Again, it was observed that by cleaning around them, they developed spiral stems and their succulent tips bent. They formed these deformities for their protection, however, they overcome these deformities as soon as the grass around them become tall. Picture No. 6 shows a year old seedling which was not cleaned of its surroundings yet it thrives vigorously. Weeding, therefore, can be dispensed with.

Again, the construction of shade over the seedlings on the spots for the purpose of reducing the intensity of heat during summer days was found harmful to the seedlings. Approximately 20% of them wilted. The dead seedlings when examined stood up right on the spot, and their stem and root system had no indication of destruction. Likely, the presence of shade intercepted the needed droplets of rain during the night time, thus the seedlings were deprived of the much needed moisture. The seedlings were not artificially watered as it is impractical to bring water to the high mountain everyday.

The losses of seedlings due to rodent and wild hog were negligible. There was no sign of disease on the 12 spots at Sitio Tuping of the Salinas Plantation on January 26, 1960.

Method of Transplanting the Seedlings: —The seedlings on the spot will be transplanted during the rainy season beginning May to October this year. They will be earth-balled singly or with more seedlings depending upon their density in a group. The separation of the very congested seedlings from each other in the process of earth-balling entails difficulties because their root system are interwoven. In solving this problem, a group of congested seedlings is buried in a hole. This causes extravagance on the seedlings, however, some of them will be thinned after three years for Christmas trees for sale by the project.

It was found that the most practical tools to be used in lifting the seedlings are the U.S. Army entrenching shovels and spades

and the commercial long blade trowel. The commercial shovel will do but it must be used with care as its blade is too wide to occupy more space covered by seedlings, thereby increasing the number of seedlings to be earth-balled per hole.

A crew of five laborers headed by a skilled one transplants the earth-balled seedlings to the immediate surroundings of the spots. All the members of the crew dig holes at the distance of 1 meter by 2 meters preferably from the morning to about 2:00 o'clock in the afternoon. In digging the holes the grass surrounding them is preserved. At this hours of the day, the intensity of heat begins to diminish, and the seedlings are lifted and transplanted.

The head of the crew strictly supervises his men in the lifting and transplanting. Each laborer has a basket of bamboo with a capacity of 15 earth-balled seedlings to fill, after which he plants them. All the laborers plant at the same time in any four adjacent rows, per accompanying diagram, each planting a row towards one direction to simplify the supervision by the skilled laborer. This process is repeated until all the desired seedlings from a spot are transplanted. Few seedlings are left to grow permanently on the spot.

After a hole is planted, the laborer forms an arc-like crown from the tall grass over the seedling. This grass crown remain until it dries and wind blown. In most cases after a year the crown is exceeded by the seedlings in height. The grass serves as competitor of the seedlings in attaining height growth. The three years told seedlings under this condition are very much taller than the grass.

Results: — The encouraging result of spot planting minimizes tremendously the nuresry operation cost. On the previous computation, the cost of raising per thousand seedlings is ₱0.62. There is great saving in the allotment of the project to be invested in the actual planting work. Again, the mortality of the earth-balled seedlings is reduced due to handling and the proximity of their final site. The long, rought and ungraded trial over which the seedlings were transported is eliminated consequently the risk hereto is minimized. The proximity of the permanent sites made possible for earth-balling the seedlings. Seedlings transplanted thru this process recuperate in a fast rate.

A year-old seedlings are hardened before they are set out in their permanent site. They are very much acclimatized in their final sites.

In the employment of spot planting there were some disadvantages of less serious degree as follows:

There is extravagance in the planting of more than one seedling in a hole. This is due to the fact that the closely grown seedlings can not be easily separated. This extravagance is partly offset by cutting the excess seedlings during Christmas time for sale.

2. During dry spell, the seedlings can not be watered, and for this reason they have stunted growth or they may wilt if the dry spell may be prolonged. However, extreme dry spell never had occurred in the locality since spot planting was employed.

3. The hastening of growth of the seedlings on the spot is impractical. The application of fertilizer and tending the seedlings were never done because it will be costly. By experience, seedlings that do not have tender tips suffer less mortality in the transplanting.

The improved spot planting will be extensively used in planting the Salinas Plantation. The result is very encouraging, and the project boast for a new and extensive plantation every planting season.

REFERENCES

1. The Anual Report of the Officer in Charge, Salinas Reforestation Project, FY 1958-59.
2. The letter of instruction of the Director Forestry, Manila, dated January 25,

(*Continued on page* 42)

Terminal Report on the Observation of Reforestation, Erosion Control and Other Forestry Practices in Taiwan, Korea and Japan *

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The itinerary of our travel in Taiwan had been so planned as to enable us to see conditions obtaining from the northern to the southern tip of the island for a period of twenty one days. Taiwan is primarily a rugged country with a central mountain range which runs from north to south. On the east, rugged mountain range runs parallel to the coastline and drops abruptly into the ocean; on the west, the terrain slopes into broad alluvial plains extending along the coast. The forest is 1,969,500 hectares or 55.1% of the total land area. The national government owns 1,409,000 hectares which is under the management of the Taiwan Forest Administration. The remainder although owned by the government is administered by the Land Bureau of the Provincial Department of Civil Affairs and Hsien Governments.

The importance of the forest is not only measured in terms of timber, fuel and other forest products, but also on its effect on the conservation of water and soil. Before 1952, there had been vast areas of open-grasslands brought about by (1) indescreminate cutting of timber for construction purposes and destruction of the forest to obtain fuelwood, (2) clearing the forest to give way for the raising of tea which is a principal export product, (3) growing of Citronella, *Cymbopogon* sp. which is also the source of Citronella essential oil of commerce, (4) the cultivation of bananas, one of the principal exports of Taiwan to Korea and Japan. Forest destruction was aggravated by the big rate of increase in population which calls for the expansion of agricultural activities. During the last world war, a great amount of timber was cut to support war efforts. In 1952, an aggressive program of reforestation and erosion control was launched and the activities of different units of the government were synchronized for the proper and effective execution of the program. Different units of the government, the Joint Commission on Rural Reconstruction (JCRR), ICA Mutual Security Mission to China, Taiwan Forest Research Institute, the Taiwan Forest Administration and others all cooperate together in the effective implementation of big scale reforestation program. The work is greatly enhanced by the favorable response of the people through Forestry Cooperative Associations which are backed up and encouraged by the government.

Nurseries. There are two kinds of forest nurseries (1) government owned nurseries where the seedlings raised are principally used by the government for planting on the national forest lands, and where excess planting material is distributed free of charge to farmers through the Forestry Cooperative Association, and (2) semi-private forest nurseries operated by the For-

* May 17, 1960 to July 11, 1960.

estry Cooperative Associations which produce seedlings for distribution to farmers through the associations. These forest nurseries are located on private lands which are rented by the JCRR. Nurseries are accessible to good roads and located near the areas to be planted. Seedbeds are raised, and adequately provided with water systems. The beds are each about a meter in width and range from five to twenty-five meters in length. Low shade made of bamboo slats is common. Transplanting in nurseries is practiced and 1-1 and 1-2 transplants are produced.

In southern Taiwan, seeds of Mahogany, *Swietenia macrophylla* King are sown in a section of a nursery together with other species. The seeds were sown twenty centimeters apart. The seedlings were allowed to grow for one year and then cut about twenty centimeters above the ground level. The tops that were removed were cut into sections of about twenty five centimeters and planted as hardwood cuttings. The stumps were allowed to produce sprouts which in turn became sources of cuttings.

Fertilizer is used generously in all nurseries that we have visited. Laborers are paid from ₱0.70 to ₱0.90 per day depending on experience and efficiency. Female laborers receive slightly less wages than male laborers. Minors are often hired to do work in nurseries. Some nurseries are provided with nursery houses of strong materials.

Plantations. There are two kinds of plantations in Taiwan. One is government owned where the plantation is on national forest land; the other consist of plantations on privately-owned lands or lands leased from the government by private individuals. In either case, the planting material comes from private and government nurseries. The seedlings are distributed free of charge to cooperative private entities through government and JCRR subsidies. There seems to be preference of conifers over broad leave species. *Acacia confusa* Merr. is the most popular species planted for fuel and charcoal, and coniferous species on the better sites for saw timber and pulpwood. We were shown excellent young plantations of both hard and softwood throughout the country.

An interesting plantation is that in Suao, where a primary school leased some 24 hectares of national forest land adjacent to the school grounds. The area was originally open and covered mostly by *Miscanthus* sp. grass. The school children planted *Acacia confusa* Merr. after securing the lease. Now the whole area is completely covered with trees. The school realizes substantial return from the wood sold as firewood and charcoal. The money is used to finance the construction of additional unit of the school buildings. We understood that the government obtain only a nominal amount (not exceeding 20%) of the cash return for the use of the land.

The average annual planting program in Taiwan since 1952 is more than 40,000 hectares of which 3/4 are established through cooperative efforts.

Sand dune. Sand dune fixation procedure along the coast consist of first sticking bamboo branches in rows at right angle to the direction of the wind. The bamboo branches are usually two meters high. When the sand has piled at the lee of the barrier of bamboo branches, *Miscanthus* sp. grass is planted in rows parallel to it. After one year when the grass has gained a foot-hold in the sand, seedlings of *Casuarina* spp. are planted in rows two meters apart and spaced about one meter from each other in the row. Young plantations of *Casuarina* spp. are now found in Tatan along the coast. Because of the consistent windbreak plantings along the west coast of the island, the sand is caught before it moves inland, and the coastline actually extending outward by 100-200 meters annually, thus continually adding new farmland behind the shelterbelt planting.

in cooperation with JCRR, has performed studies on all phases of forestry problems. The result is an awakening of the people to the appreciation of trees their products, beauty and use. The findings of the Institute are made available to the masses through the medium of newspapers, posters, lecturers and pamphlets.

Other reasons why the Chinese people are sold to the idea of tree planting are: (1) the government extends financial and technical aid to the people; (2) there are favorable markets for the products that are raised; and (3) the varied uses of trees in protecting their farms from strong winds, amelioration of the extremes of weather conditions, preventing excessive soil erosion, etc. are widely recognized. The slogan of "Make Taiwan Green" is now a reality. Conditions obtaining on the hills of Taiwan is in strong contrast to those in Korea and northern part of the Philippines, Cebu and Bohol.

OBSERVATIONS IN KOREA

In his 1957 report, "Forestry Activities in Korea", the Chief of the Bureau of Forestry in the Ministry of Agriculture and Forestry said in part:

> "South Korea, south of the armistice line consist of 6,747,550 chungbo of forest land, which amounts to 72% of the total land area. However, when we look at the forest land as it is now, 51.7% of the forest land is wooded lands, and the rest, 48.3% is treeless land, young stands of trees or areas not directly under forest management. In the latter, 686,230 chungbo of denuded forest land need erosion control works.... our forestry program is of great importance in our national land planning and in the development of national industries, from the viewpoint that forest land occupies a huge area almost amounting to three quarters of the total national land; and that our forests today are very poor and denuded."

"Korean forestry faces the following urgent programs, which are being carried out on the ground now:

1. Protection of the present forest from deterioration.
2. Working out erosion control activities for denuded forest lands.
3. Increasing the production of useful products and development of new and better uses of forest products.
4. Solving the fuel problem, which has an indirect effect on forestry development and making the best use of forest lands. The 21,540 Village Forestry Associations in our country not only cooperate in forest protection of their homeland by self control, but also carry out the activities of reforestation and erosion control under the profit sharing basis."

"Since forestry management is not only a long term program, but also a large enterprise depending upon nature, it is quite difficult to expect quick success in forestry activities. However, it is surely possible to be a perfect forestry country by continuous efforts and investments."

The statement of the Chief of the Bureau of Forestry depicts the magnitude of the forestry problem of the Republic of Korea. Can it be that Korea has been treeless since time immemorial? It is possible that in the distant past, this country had magnificent forests of high quality timber. Evidence of his is seen in the presence of many historic temples, the wooden parts of which are made up of large-sized pieces of wood that have stood for over three centuries. As a result of forest destruction in the past, the upland soils have deteriorated to the extent that they scarcely produce any kind of vegetation without liming and fertilization.

The effort of the Korean people to reforest their barren mountains is rendered more difficult by the climate. During the cold season, tremendous volumes of firewood are needed to heat the houses. People have to cut small-sized trees and even go to the extent of raking leaves from the forest floor and dry grass from the barren mountain sides to meet the need for fuel.

The reforestation program in Korea is immense, totalling well over 100,000 hectares annually of actual forest planting and erosion control planting, primarily through cooperation by the numerous so called Village Forestry Associations.

The concerted efforts of the Korean government, the OEC (ICA) Office and the people at large in solving the forestry problems of the country merits the sending of Filipino Foresters to observe what is being done there. In Korea the participants were given every opportunity to visit nurseries and plantations in Chungchong, Chungchong Pukto, Pusan, Osan, Kyonggi-Do, Seoul and other places. We were shown some stream channel improvements, erosion control works, minor forest products utilization and reforestation plantations. The activities of Village Forestry Associations together with their nurseries and plantations were shown to us.

In erosion control works, studies are being conducted on the kind of species, amount of fertilizers, liming of the soil, methods of planting and the mixture of species. There is an apparent tendency to mix black locust, grass, pines and *Quercus* spp. on the same area. The grass and black locust (*Robinia* spp.) are intended for immediate erosion control by providing a quick covering for the soil, whereas the pines are to serve as the final crop if and when satisfactory condition for growth are established on the area. Contour planting with the use of grass in gully beds give very satisfactory results. The use of spot planting is still being studied. While spot planting has its merits, the urgency of holding the soil in place at once is better accomplished by close contour planting.

As early as in 1953 through the leadership of Dr. Sin Kyu Hyun, tree improvement studies were initiated. The breeding studies were carried out in connection with the research program of the School of Forestry, Seoul National University in Suwan. In 1956, the Institute of Forest Genetics became a branch of the Central Forest Experiment Station of Korea. The station operates on a 200 hectare experimental forest. Salient activities of the research station are as follows:

1. Breeding of pine through hybridization.
   a. Large scale controlled pollination.
   b. Establishment of a hybrid pine seed orchard.
2. Breeding of poplars.
3. Induction of polyploidy.
4. Selecting elite trees and establishment of seed orchards.
5. Plant introduction.
6. Land and water research
   a. Most promising plant species for ercsion control fuelwood and green manure production
   b. Most successful methods of vegetation establishment including use of inoculant, lime and fertilizer as required.

This program is well organized and evidently very successful.

OBSERVATIONS IN JAPAN

On the three countries visited, Japan appears to have been the first to develop programs of forest management, reforestation and erosion control. What is very characteristic of the Japanese people that I observed is their industry and great respect for the laws affecting the forest. We were brought to an area which was declared protection forest by the Forestry Agency. There were areas along the river which could have been

converted to agricultural land. But to our surprise, there was no cutting of trees and the whole area was not distributed. This is just an instance of how forest laws and regulations are being respected in this country. The exploitation of virgin stands in the country is under government control and under strict forest management plans. A part of the management plan is a provision for the replacement of stands clearcut by the planting of seedlings raised in nurseries maintained and operated by the government.

The urgency of forest conservation in Japan is brought about by the following conditions:

1. Japan has heavy precipitation with average annual rainfall amounting to 2,000mm. on 30% of the area and 3,000 mm. or more on seven per cent of the area.
2. The geological structure is complex and unstable. There are many volcanoes with ejectas liable to collapse. Topography is steep and streams drain from areas 2,000 to 3,000 meters high
3. Japan has a large population in relation to the land area and compared with the rest of Asia, a relatively high average per capita wood consumption. This would require forcible and high land use.
4. The security of water resources for irrigation in rice cultivation and for hydraulic power generation is of paramount importance. Stability of water resource for these purposes depends on the health and composition of the forest cover.

All forests in Japan which are important to the national economy are designated as "Protection Forests" and managed by the government, particularly those affecting water reservoirs, land slides and soil erosion. Other protection forests are those that affect shifting sand, wind, flood, tide, drought, snow, fire, recreation, landslide and scenic areas.

The first erosion control program started in 1911 and the second in 1937. In 1953 the denuded land (consisting of eroded, bare land and landslides) covered 330,000 cho (1 cho=0.99 hectares). This included land under denudation totalling 122,000 cho and seashore sand dunes amounting to 29,000 cho. The land denuded annually by typhoons and other causes is about 12,000 cho. The types of erosion control operations are divided into hillsides and ravine works. According to the degree of bareness, soil and slope, the methods adapted consist in grading, sodding, terracing, masonry construction, log terracing, covering work and drainage. On comparatively level topography, check dams are constructed to protect farms, cities, seashores, and reclaimed lands. In connection with erosion control work, 16,000 cho were planted annually before 1940. Since 1952, the area planted annually under the ten year program of reforestation and erosion control is approximately 45,000 cho.

An area of land near Osaka was observed the slopes of which were first graded and then terraced. After planting grass and tree seedlings, the entire terraced slope was sodded with rice straw. The sod was kept in place by rice straw ropes pegged at intervals of one to five meters. The seedlings and grasses planted were fertilized. The method was very successful as shown by the presence now of three year-old stands of conifers and *Alnus* spp. The cost as we were informed was about ten million yen (₱50,000.00) per hectare. The cost of this kind of work is of secondary consideration when the life and property of the people is affected. This instance would show the seriousness with which reforestation and erosion control work is done in Japan.

Erosion control and reforestation go hand in hand. It was shown that the stability of engineering erosion control work downstream is dependent upon the extent of the forest cover of the headwaters. Some embankments along the river courses were washed away by floods and the farmers were seen building thicker and higher rock and soil piles to protect their farms from destruction by flood.

We were shown large sawmills, plywood plants and other wood using industries in Japan and were astonished with the way in which they utilize the logs. The slabs and sawdust that are just wasted in the Philippines are used for manufacture of something useful.

The units of the government concerned with experimentation and research are very active. There are those that are parts of universities, the National Experiment Station and some privately maintained research institutions. The experiment stations conduct research and various phases of forestry including silviculture, protection, management, forest growth, soil, climate and wood uses and structure. The results of studies and experiments are distributed to the masses through bulletins, posters, brochures, convocations, and even the radio and television.

Because of the great need for wood and wood products and the indirect benefits of forest through their influence on climate, soil and water, the people of Japan are sold to the idea of forest production and care. There is, indeed, a great respect among the people for forests and for the forester and his work!

SPECIAL COMMENTS ON THE TRAINING PROGRAM

1. That the ICA or NEC should provide funds to cover medical treatment of participants who get sick or injured during their tour of study. When I was in Taiwan, I sustained an injury to my back when a boulder fell on the roof of the car in which we were riding in connection with our trip to Yilan. This injury became worse after I reached Japan, and when I asked help from ICA in Tokyo to treat the injury, I was told that I could not be treated at ICA's expense because there is no fund set aside for this purpose. Some provision should be made to furnish medical care for those who suffer accidents during the course of their training abroad.

2. The training period in Taiwan, Korea and Japan is rather too short. I would suggest that it should be at least one month for each country so that participants will have a chance to observe at first hand how the different activities in their field of interest are accomplished.

3. A Forestry representative of the ICA should accompany the participants during the course of their field observation and training. Participants usually get a great deal more out of the training when an ICA representative is present chiefly because the latter is able to speak English and thus make himself well understood and because he is more aware of the needs and objectives of the training program. The value of this was amply demonstrated in Korea when Mr. Beveridge of the ICA accompanied the participants throughout their stay in that country. I learned much more there and better understood what was being done than I did in either Taiwan or Japan where no ICA representative was available on field tours.

REMARKS AND RECOMMENDATIONS

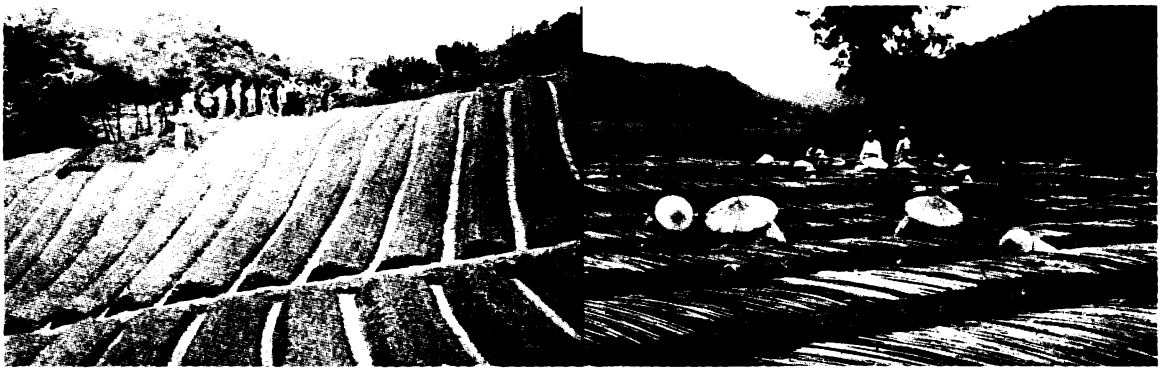
The following remarks and recommendations are made as a result of my observations in Taiwan, Korea and Japan. There are a number of things which were observed that can be applied in the Philippines under some modifications and additional appropriations.

C. A. Duncan, OEC on severely eroded land near Taejon, Chungchong, Kamlo.

Reforestation Area, grasses and seedlings.

Erosion Control Work in Korea.

Shih-pai Pine Nursery in Yilan Hshien. This nursery is about 35,000 m_2 producing more than 2,000,000 seedlings each year for extension reforestation program.



Mulching in a nursery in Tai-Taiwan, Formosa.

Low shade in a nursery in Taiwan.

2-year-old seacoast wind-break planting in Taoyuon Hsien.

Short term recommendations, where the implementation could be immediate without additional appropriations.

1. The rules and regulations of the Philippines "Tree Farm Lease" should be modified in order to give the greatest benefit to the nation and the farmers. As it is now, it is being used in many instances to circumvent the law to acquire rights to public lands for purposes other than the growing of trees of economic value. A system similar to the one in vogue in Taiwan and Korea should be adapted under which part of the public forest lands that are unproductive are leased to the farmers through village forestry associations that are willing to plant trees. The government furnishes the technical knowhow and planting material free of charge. A long term loan with low rate of interest to finance the project should be granted to the associations.

When the crop is ripe and harvested, the government should charge only a small fraction of the return (say 20%) from the harvest for the use of the land. This can very well be tried in the Ilocos region where the demand for firewood is great. Ipil-ipil, *Leucaena glauca* (L) Benth which becomes merchantable at an early age could be used. As most of the hills in the Ilocos region are privately owned, the government may assist the private owners by furnishing the planting materials free of charge. The system can be popularized by different agencies such as the Boy Scouts, public and private schools, Community Development Workers, the Department of Agriculture and Natural Resources Employees Associations, etc.

2. Enhance the training of technical personnel in the Bureau of Forestry by a form of In-Service Training in which officers in charge of reforestation and research projects will have an annual conference (on wheels) to observe new methods and get new ideas. Funds for this purpose may be taken from the actual appropriations for traveling expenses. This is done in Japan where a unit of the government is maintained for the sole purpose of giving a refresher course to deserving field personnel.

Long term recommendations. The long term recommendations would require some time to attain and would involve additional appropriations.

1. Tree improvement research. A section in the College of Forestry be created to conduct studies on the different phases of tree improvement. This would mean sending a member of the faculty to either Syracuse, Yale or Berkeley, U.S.A. to specialize in Forest Genetics. This trainee should be allowed to observe the work being done in forest genetics in Korea and Japan on his way home to the Philippines. This phase of forestry education is sadly lacking in the Philippines today. If this arrangement could not be handled by the University of the Philippines because of budgetary considerations, the Bureau of Forestry should take the initiative through its Forest Research Division.

2. Delineation of forest boundaries. One of the great handicap in our efforts of forest protection today is the indefinite boundaries of our forests. It was observed in Taiwan, Korea and Japan that the problem of squatting in public forest lands is insignificant if not entirely lacking.

3. Training of more forestry technicians. This can be done by expanding the facilities of the College of Forestry. The number of graduates with the degree of Bachelor of Science in Forestry from our college is at present inadequate to supply the demand of government and industry for technically trained foresters. In Japan, there are about thirty schools and colleges that offer forestry education in their curricula.

4. In connection with the expanded school of forestry education, a greater number of deserving young foresters should be sent abroad to learn and observe modern methods and techniques of handling the forest and forest problems.

(*Continued on page* 42)

THE ROLE . . .

(*Continued from page* 24)

the preparation of technical instruction on the different aspect of reforestation work are included.

The province of La Union was chosen where to start the pilot cooperative reforestation demonstration movement. The principal reasons for the choice are: (1) the province is heavily depleted of natural forests, (2) the need for adequate supply of firewood for the Virginia Tobacco industry, (3) the growing consciousness of the people to plant trees, and (4) the presence of organized farmers extension clubs who are willing to participate in actual reforestation work on their barren unproductive idle lands. The program in this province is still in the initial stage. The future will show what the farmer-cooperators and the government can do in the reforestation and reclamation of private idle and submarginal areas, under the system Cooperative Reforestation Demonstration Program.

TERMINAL REPORT

(*Continued from page* 41)

ACKNOWLEDGEMENTS

The writer wishes to acknowledge with sincere thanks the help and many courtesies and aid of all the personnel and men in Taiwan, Korea and Japan and in the Philippines who made the trip possible, instructive and fruitful.

SPOT PLANTING . . .

(*Continued from page* 34)

1955, designated "Forest Planting" to all Officers in Charge of Reforestation Projects.

3. Personal observation of NFS Canuto Marquez, Salinas Ref. Project.
4. Personal observation of NFF Toribio Marzan, Salinas Ref. Project.
5. Personal observation of Laborer Pastor Peria, and that of his deceased brother, Vicente — discovery on the use of the "Mala Tanglad" grass, and
6. The author's personal findings in the plantation on January 16 and January 26, 1960.
7. Personal observation of Assistant District Forester Domingo P. Ramel.
8. Personal observation of NFS Pedro Milan, Consuelo Ref. Project.
9. Personal observation of NFS Cornelio Abergas, Magat Ref. Project.
10. Personal observation of NFF Cesario A. Ypear, Dupax Ref. Project.

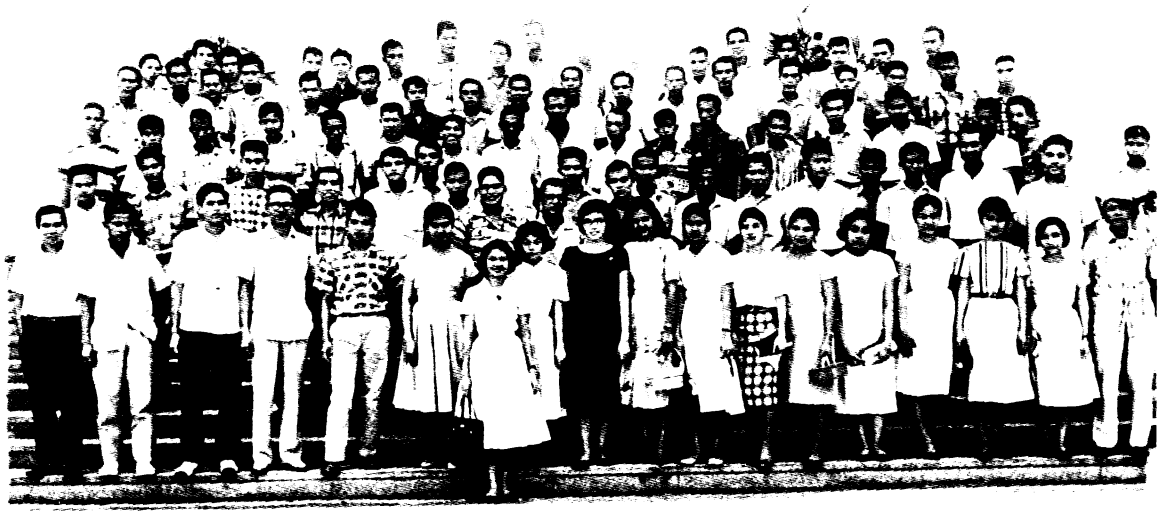
Here and There

Dean Zamuco presents a cane and salakot **as gifts to Dr. Knapp at the convocation.**

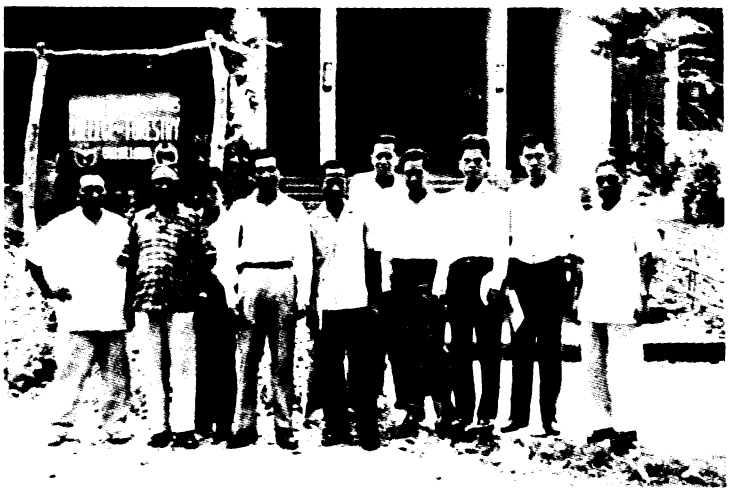
Dr. Halsey B. Knapp, ICA-NEC (Cornell-UP) Contract and Project Leader, guest speaker, at the FSBO convocation and despedida **for him and Mrs. Knapp and Mrs. de Zheeuw and children.**

Dr. Knapp tries his hand at carving the lechon, **as Mrs. Knapp smilingly looks on.**

Dean and Mrs. Zamuco play host at a despedida **party tendered in honor of Dr. and Mrs. Knapp and Mrs. de Zheeuw and Children. Among the guests were: Dr. and Mrs. Larson, Dr. and Mrs. Hunt, Dr. and Mrs. de Zheeuw, Dir. and Mrs. E. de la Cruz, Dean Santos, the Faculty and Forestry Songbirds.**



Acting Dean A. Manza and Prof. Blando with the "Circulo Hispanista de Verano" composed of students from the Colleges of Agriculture and Forestry, taking Spanish 12 & 13, in the College of Forestry, in the summer (1960).



Forest Research Division Chief, B. F., Florencio Asiddao and Prof. Domingo Jacalne with a group of Cambodian Foresters on a visit to the Forestry Campus.

Anastacio Sison, topnotcher in the last Forester Examination given by the Bur. of Civil Service. He is the fourth alumnus from Pangasinan to top the C.S. Examination.

The FSBO Election Board: E. Dixon, A. Requina, A. Revilla jr. Mr. Valera and C. Glori.

This is no free for all. Only a handshaking leaders of rival candidates at the start of the F.S.B.O. Elections.

City, Provincial and National Employees and Civic groups at the Arbor Week Planting at Fort San Pedro, Iloilo City, July 29, 1960.

Acting Governor G. C. Masqueda and some government officials and employees at the Arbor Tree Planting at Fort San Pedro.

Principal Laurena Tuboro assisted by For. Arizabal plants an agoho seedling at the Virac Central School, Catanduanes.

Iloilo Forestry Force, headed by Dist. Forester Atmosfera and For. Paa, honor successful C. S. Examinees at a party.

First Regional Convention of Officers in Charge of Reforestation in the Visayas, Cebu Reforestation Project, Camp 7, Minglanilla, Cebu, April 25-29, '60.

Iloilo Forestry Force employees during a "blowout" for the 35 per cent Salary differential recipients and successful C. S. examinations.

• Campus Notes •

SUMMER SPANISH CLASSES IN THE COLLEGE OF FORESTRY

Spanish classes were held in the College of Forestry last summer, under Prof. Jose B. Blando. Among the summerians were coeds from the U.P. College of Agriculture, who crowded the corridors of the College of Forestry building during the rush for registration.

In order to promote brotherhood and oneness among the members, the students organized themselves into the "Circulo Hispanista de Verano" club. The club was organized through the initiative of Prof. Jose B. Blando and the students.

To free the students from too much mental work, the club took an educational trip to some historical places and industrial plants in Manila. The places visited were Fort Santiago, National Museum, UST Museum, the V-milk and the pepsi-cola bottling plants. Everyone enjoyed the trip as shown by the enthusiasm on the faces of the members. The students were accompanied by Dr. Artemio V. Manza, then acting Dean of the U.P. College of Forestry, and Prof. Jose B. Blando.

The summer Spanish classes formally closed with a literary and musical program attended by many students. Gold and silver medals, valuable books and other handsome prizes were awarded to the winners of the different contests.

I. V. Barongan

* * *

FRESHMAN ENGLISH & APTITUDE TESTS.

An aptitude and English comprehension test was given to College of Forestry entrance students on June 4, 1960, at the college hall.

The purpose of the examination was twofold: first, to determine the number of Freshmen that would be allowed to take the Regular English Course and, second, to determine those that will take the Intensive Training Course.

Prof. Basilisa Manhit of the U.P. college of education staff who conducted the test said that the upper 30 percent of the examinees based on grades obtained would fall under the first category, whereas those below would undergo a drill in English grammar anad composition eight hours a week.

U.P. authorities have found that the main cause of failures among first year students is poor preparation in the high school. Majority of the Fresnmen cannot express what they have in mind, and they do not understand instructions or explanations by instructors. All these are mainly due to their poor background in English.

Given to all colleges under the U.P., this examination is intended to help those who are poor in English by giving them more hours of instruction on the subject.

E. V. Cortes

* * *

MAIN CAUSE OF SCHOLASTIC DELINQUENCY

Lack of preparation for college work is the main cause of failures of first year students.

This is the conclusion made by the guidance and counselling staff of this College as a result of the poor showing the students had in the aptitude test given during the early part of the semester.

The counsellors said that the reason most first year students find themselves under probation or dismissal list is because they have a hard time understanding the instructor's explanations. Also, they could hardly express what they had in mind.

Other causes of failures are attributed to the following: lack of interest in the course, wrong study habits, wrong & sometimes too much extra-curricular activities, sudden change of invironment and disturbances in the students' quarters.

Extra classes in high school English is being given eight hours a week as the first step towards helping these deficient Freshmen.

The counselling department, initiated two years ago, is exerting every effort to solve these problems. Students are given instructions on proper study habits. They are also discouraged from doing "illegal extra-curricular activities." The problem of sudden change in environment can be helped by more relaxation on the part of the student, altho he should follow a properly prepared study schedule.

J.R.

* * *

OPPORTUNITY FOR FORESTRY GRADUATES

by

GREGORIO P. PRINCIPE

". . . The more well trained foresters we have, the brighter are the opportunities opened for them today . . ." so said Director Eugenior de la Cruz of the Forest Products Research Institute in an interview at his office by this writer the other day. This certainly is a very encouraging statement particularly to "fresh" forestry students who are not so certain what the future has in store for them. This is not surprising when we take a look on other careers and use them as examples, for there are innumerable college graduates today who are included in the group of the unemployed.

This is not, however, true in forestry. Whereas most graduates in other professional fields are finding it hard to land a stable job, varied demands for foresters have sprung up faster than the College of Forestry could train them. This was brought about by the awakening of the public on the manifold benefits that forests give to man. Director de la Cruz had this to say: "Years ago, the Bureau of Forestry could not convince any lumberman to place his concession under forest management in order to replenish what had been on the area. Every concessionaire when asked to do so protested using many excuses. Forestry was then unknown and the demand for the services of the forester was limited. In 1935-36, no employment was available for B.S.F. graduates so much so that they were left stranded after graduation. Today, however, almost all concessions are placed under 'selective logging' and sound forest management. Well trained foresters are needed to implement this program successfully, thus the demand for more foresters."

The increase in the number of wood-using industries have also increased the demand for foresters. Director de la Cruz cited that there were several private companies which had requested him for specially trained foresters, but he was not able to recommend any for lack of foresters trained on those lines so specified. A pulp and paper mill, for example, had requested for foresters who specialize on bamboos, but he could not recommend anyone for nobody had made a complete study on the different kinds of bamboos. A wood laminating mill was offering a managerial job to a forester well trained in wood technology in order to assure them of the right species for their laminating plant. Many plywood and veneer mills are seeking the services of foresters trained in the manufacture of plywood and veneer. All these and many more are the tangible indications that forestry students after graduation will still have plenty of opportunities to exercise their chosen profession.

For a young graduate intending to specialize in a given field of forestry, he must give primary consideration to his real interest and inclination. He must observe and study carefully the various phases of forestry work before selecting the one he knows he is best fitted for. As Director de la Cruz stated: "When a boy graduates, his mind is blank. A boy that goes to school is like a boy that enters a store. He enters the store, not knowing what to buy. It is only after going out of the store, when he had observed all the thinks he would like to buy, that he finally makes up his mind on what he really wants to buy. Specialization can only come about after a long while—when the young graduate shall have surveyed and learned the various fields of forestry."

SCHOLASTIC DELINQUENCY REPORT

Of the 331 students enrolled in this College last semester, a total of 107 or 32.3% of the total population were under the categories of *warning, probation, dismissal,* or *permanent* disqualification at the end of the term. Of these 107 delinquent students, 54 were under warning, 21 were under probation, 30 were under dismissal, and 2 were under permanent disqualifications.

In terms of percentages and classifications, 60% of the total number of delinquents were freshmen, 27% were sophomores, 11% were juniors, and 2% were seniors.

The categories of delinquency as shown above are: a student is said to be under "warning" when he obtains grades of less than "3" in 25% of the total number of academic units in which he is registered; a student is under "probation" when he fails in 50% to 75% of the total number of academic units in which he is registered; a student is said to be a candidate for "dismissal" when he obtains grades of less than "3" in at least 76% of the total academic units in which he is registered. In this case, the student must remove his grades of "4" and must improve sufficiently, or else, his dismissal shall be final. If a student fails in 100% of the total academic units he is enrolled in, he shall be a candidate for "permanent disqualification."

JunRev

* * *

MNP, MECCA OF EXCURSIONISTS

People from all walks of life can be seen in the Makiling National Park at Los Baños during Saturdays and Sundays all the year round. Oftentimes the milling crowd of excursionists were mistaken for celebrants of a petit carnival or a fiesta celebration.

National Park personnel said that there were 65,740 excurtionists to the park last year, a great percentage of which are Filipinos and the rest Chinese, Americans, Japanese, Spaniards, Koreans, Australians and others.

Filipino excursionists come from as far as Ilocos Norte in the north and as far as Cotabato in the south. These people can be seen sauntering around the park, pool, dancing and holding programs in the pavilion.

A gross income of ₱6,554.05 was derived last year from the excursionists. This includes the fees for the use of the dancing hall, the swimming pool, toll gate fees and others for the use of the park.

Barongan, I. V.

(*Continued on page* 77)

• FPRI Techical Notes •

CHEMICAL ANALYSIS OF WOOD

Chemically, wood is a complicated material. It consists mainly of two principal chemical groups, cellulose and lignin, but along with these are a great many other materials in small amounts, including hemicelluloses, gums, resins, waxes, fats, tannins and an endless variety of other organic and mineral compounds. In its natural condition, wood also contains large amounts of water. In the standing tree, for example, there may be more water than wood substance. In the air-dry condition, the water may constitute only 1/6 to 1/8 of the total weight. In discussing the chemical composition, however, all percentages are based on the moisture-free wood.

The principal ingredient of wood, the cellulose group, usually constitutes about two thirds of the total weight of the moisture-free wood but varies considerably among different species. The cellulose of wood is fibrous in character and is the principal souce of the world's supply of paper roducts. pIt is also made into rayon and can readily be converted into films certain kinds of sugar, explosives, and other derivatives.

Lignin makes up about one fourth of the weight of wood. This appears to be the cementing substance that holds the cellulose together. In producing most kinds of paper the lignin is largely removed and usually is wasted or burned as fuel. In a small way, however, some lignin is converted into the flavoring compound, vanilla and other chemicals. Many chemists are searching constantly for profitable ways to use lignin but, thus far, with very limited success. It is expected, however, that eventually lignin will prove commercially valuable on a large scale.

When wood is burned, most of it is converted into gaseous compounds and disappears, leaving behind what is called ash. The ash contains all the non-volatile, inorganic ingredients of the wood, including compounds of silica, potassium, calcium, manganese, and many others, some in exceedingly small amounts. In early times the potassium salts in wood ashes were used with animal fats in the home production of soap.

The remaining portion of wood (in addition to the celluloses, lignin and ash) is made up of a wide variety of compounds, usually in small amounts individually but they can, together, amount to as much as 1/5 of the weight of the wood. They are sometimes collectively called extractives because most of them can be extracted from the wood with solvents. They may also be called "extraneous" materials because they are not a part of the basic wood structure but are merely deposited in it. Some species of wood are relatively low in extractives and some are high but all species contain some extractives that can be dissolved in water or organic solvents. Occasionally a species is found from which commercially useful products may be extracted. Examples are the quebracho of South America, which produces important quantities of tannin, and pine stumpwood in the southeastern United States from which commercial quantities of turpentine and rosin are obtained. In general, although the extractives of most species are not commercially valuable or present in sufficient quantity to be recovered profitably, they are largely responsible for the color, odor, taste, decay resistance, and certain other characteristics of wood. In some instances these characteristics may serve as means of distinguishing one species of wood from another.

No one has ever made a complete analysis of a piece of wood and determined the character and quantity of every chemical compound in it. The compounds are so numerous, so complicated and so difficult to isolate in an unchanged condition that a lifetime could be spent in such an effort without success. Many analyses of wood have been made, however, in which the principal groups of wood constituents have been determined. It is common practice, for example, to determine the amounts of (1) cellulose, (2) lignin, (3) ash, (4) amount soluble in a standard mixture of alcohol and benzene, and (5) amount subsequently soluble in hot water. In the preliminary survey analyses being made at the Forest Products Research Institute, direct determinations are made of numbers 2, 3, 4, and 5 in the list above and the total amount of celluloses is estimated by subtracting the total percentage of these compounds from 100 percent. When more accu-

rate information is needed on the cellulose content, it is analysed for directly. In addition to the foregoing, the survey study includes determinations of the amount of pentosans (a non-cellulosic group of complex carbohydrates), the amount soluble in hot water without prior leaching with alcohol and benzene, and the amount soluble in one percent caustic soda solution. When the ash content seems high, the amount of silica it contains is also determined. The data from these survey analyses are useful in comparing the general chemical characteristics of different species and in searching for species with sufficiently outstanding or unusual characteristics to justify more thorough study. To date, more than 170 species of wood have been analysed at the Institute in this preliminary survey. Data from 32 more or less common species are given in the accompanying table, which shows the range of percentages of the different ingredients thus far found in the survey.

A number of species in the table show ash contents of about 0.5 percent or below. The highest ash content, 3.96 percent, is shown for liusin and it is interesting to note that most of this is silica. There is some evidence that high silica content increases the resistance of wood to certain marine borers. High silica content has been suggested as a reason for rapid dulling of saws in sawing some species but there is no evidence indicating the amount of silica required to affect the sawing properties noticeably. It seems probable that other factors than silica content have an equally important effect on saws and possibly also on marine-borer resistance.

The alcohol-benzene extractive contents of manggachapui and narig are the highest shown in the table. Examples of low extractive content, using alcohol-benzene mixture as a solvent, are liusin and tuai. In hot-water-soluble content, katmon and taluto can be considered high while liusin and Benguet pine are low.

From the papermaking point of view, the low lignin contents of African tulip, taluto, and Moluccan sau seem favorable. There are many other factors to consider in this regard, but low lignin content is an advantage since less chemicals would be needed for its removal.

The pentosan content of hardwoods is generally higher than that of the softwoods. The high content of alkali-resistant pentosans in ordinary hardwood sulfate pulps reduces their suitability for manufacture into alpha pulp. However, considerable interest has been shown in the development of high-alpha pulp from hardwoods by the sulfate process, using a pre-hydrolysis step in order to remove the hemicelluloses in the form of sugars.

TABLE I

Philippine Broadleaved and Coniferous Woods Used for the Analyses in Table II

Common name	*Scientific name*	*Status*
Broadleaved:		
African tulip	*Spathodea campanulata* Beauv.	Plantation
Almon	*Shorea almon* Foxw.	Commercial
Apitong	*Dipterocarpus grandiflorus* Blanco	Commercial
Apitong, round-leaved	*Dipterocarpus orbicularis* Foxw.	Commercial
Bagtikan	*Parashorea plicata* Brandis	Commercial
Binuang	*Octomeles sumatrana* Miq.	Non-commercial
Guijo	*Shorea guiso* (Blanco) Blume	Commercial
Ipil	*Intsia bijuga* (Colebr.) O. Ktze.	Commercial
Ipil-ipil	*Leucaena glauca* (L.) Benth.	Plantation
Katmon	*Dillenia philippinensis* Rolfe	Commercial
Lauan, red	*Shorea negrosensis* Foxw.	Commercial
Lauan, white	*Pentacme contorta* (Vid.) Merr. & Rolfe	Commercial
Liusin	*Parinarium corymbosum* (Blume) Miq.	Non-commercial
Malapanau	*Dipterocarpus kerrii* King	Commercial
Malugai	*Pometia pinnata* Forst.	Commercial
Manggachapui	*Hopea acuminata* Merr.	Commercial
Manggasinoro	*Shorea philippinensis* Brandis	Commercial
Mayapis	*Shorea squamata* (Turcz.) Dyer	Commercial
Molave	*Vitex parviflora* Juss.	Commercial
Moluccan sau	*Albizzia falcata* (L.) Back.	Plantation
Narig	*Vatica mangachapoi* Blanco	Commercial
Narra	*Pterocarpus indicus* Willd	Commercial
Panau	*Dipterocarpus gracilis* Blume	Commercial
Paper mulberry	*Broussonetia papyrifera* (L.) Vent.	Plantation

Raintree	*Samanea saman* (Jacq.) Merr.	Plantation
Taluto	*Pterocymbium tinctorium* (Blanco) Merr.	Non-commercial
Tañgile	*Shorea polysperma* (Blanco) Merr.	Commercial
Toog	*Combretodendrom quadrialatum* (Merr.) Merr.	Commercial
Tuai	*Bischofia javanica* Blume	Non-commercial
Coniferous:		
Almaciga	*Agathis philippinensis* Warb.	Commercial
Pine, Benguet	*Pinus insularis* Endl.	Commercial
Pine, Mindoro	*Pinus merkusii* Jungh. & De Vr.	Commercial

TABLE II

Proximate Chemical Analysis of Some Philippine Woods
(Results in percentages of weight of moisture-free wood)

Common name	Ash	Solubility in:				Lignin	Holocellulose (by diff.)	Pentosans	Silica
		Alcohol benzene	Hot-water (leached)	Hot-water (unleached)	One percent NaOH				
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Broadleaved:									
African tulip (a)	1.71	3.7	4.4	8.3	17.7	17.6	72.6	16.1	0.07
Almon	0.31	5.2	2.0	4.3	14.6	29.9	62.6	13.7	—
Apitong	1.52	8.2	2.1	6.3	21.1	28.9	60.3	16.5	1.02
Apitong, round-leaved (a)	0.89	3.5	1.9	3.5	13.1	29.3	64.4	15.2	—
Bagtikan (b)	1.23	3.1	1.5	2.9	11.9	27.7	66.5	15.2	—
Binuang	1.76	1.8	4.5	5.0	19.6	33.0	58.5	16.6	0.05
Guijo (b)	1.19	4.2	1.7	3.7	14.3	28.8	64.0	14.2	0.10
Ipil (a)	1.25	5.4	3.9	7.4	21.2	22.0	67.5	18.4	0.00
Ipil-ipil (b)	0.75	5.9	2.7	6.2	20.5	26.4	64.2	20.6	—
Katmon (a)	1.94	4.1	6.0	9.8	26.1	25.2	62.8	13.6	0.54
Lauan, red (b)	0.31	3.9	2.2	4.3	16.0	33.7	59.9	10.7	—
Lauan, white (b)	0.84	3.9	1.7	2.8	13.2	28.6	65.0	15.0	—
Liusin (a)	3.96	1.6	1.2	1.9	19.9	27.8	65.4	13.6	3.38
Malapanau (a)	0.77	4.0	2.6	4.4	15.2	25.7	64.5	15.7	—
Malugai (a)	1.17	2.4	3.4	5.8	14.4	26.7	66.3	14.9	—
Manggachapui	0.54	10.7	—	5.7	17.9	36.0	—	12.2	—
Manggasinoro (a)	1.25	3.3	1.0	2.4	12.1	26.6	67.9	15.6	0.91
Mayapis (a)	0.35	4.5	2.3	4.3	14.8	32.8	60.0	11.9	—
Molave	1.39	9.4	3.4	9.1	16.5	32.6	53.2	10.1	—
Moluccan sau	0.93	3.0	1.7	2.9	13.6	16.6	77.8	13.5	—
Narig (b)	0.77	10.7	2.1	5.8	23.2	20.8	65.6	14.7	—
Narra	1.37	4.3	3.5	5.9	15.9	29.1	61.7	15.3	—
Panau (b)	0.54	5.2	1.7	3.0	16.0	27.5	65.1	14.9	—
Paper mulberry (a)	1.53	3.5	2.4	5.1	21.1	22.7	70.0	20.0	0.21
Raintree (a)	1.94	7.1	4.6	8.6	26.7	25.3	61.1	17.9	1.19
Taluto (a)	2.50	2.2	9.8	11.0	23.9	18.2	67.3	17.6	0.09
Tañgile (a)	0.27	3.7	1.3	2.5	13.1	35.2	59.5	10.7	—
Toog	2.48	3.5	0.9	2.5	17.9	37.4	55.7	12.7	1.76
Tuai	1.07	1.4	4.2	5.8	29.4	42.0	51.3	9.7	—
Coniferous:									
Almaciga	0.30	1.5	1.4	2.1	14.3	34.2	62.2	8.4	—
Pine, Benguet	0.28	2.0	1.4	1.5	11.4	33.3	63.0	12.0	—
Pine, Mindoro	0.48	4.5	2.5	3.0	17.5	28.5	64.0	11.3	—

(a) Average from 2 trees.
(b) Average from 3trees.
Note: All others are results from a single tree.

VENEER CUTTING

Veneer is a thin sheet of wood of uniform thickness. It is commonly cut into thickness from 1/64 to 3/16 inch, although thicknesses outside this range are sometimes cut for special uses. The principal use of veneer is in the production of plywood which is made by gluing together several sheets of veneer, usually an odd number, with the grain direction of adjacent sheets at right angles to each other.

Veneer may be cut in several ways. Sawing, the oldest method, is now used for only a very few species which cannot be cut satisfactorily by better methods. It is slow and wastes a large volume of the wood in the saw kerf. Slicing, the second method, is used to cut expensive veneer for decorative applications and to cut low grade veneer for such uses as containers and battery separators. Slicing is relatively slow and a relatively large part of the wood is lost in flitch preparation. Rotary cutting, the third method, is used for about 90 percent of all veneer that is cut. The production rate with rotary cutting is high and waste is less than by other methods. Variations of rotary cutting are back-cut and half-round stay-log cutting. They use the rotary lathe to simulate slicing. Their greatest use is in cutting decorative veneer when matching is desired.

Since almost all veneer in the Philippines is rotary cut, this discussion will apply to that method, although the principles involved apply in general to slicing also.

Species of wood that are of high density or contain hard knots or hard non-woody material must usually be heated before they can be cut into satisfactory quality veneer. Heated veneer bolts cause additional problems in the cutting operation. Production costs increase, certain parts of the lathe warp because of uneven heating from contact with the heated bolt, heart checks and ring shakes in the veneer bolt increase in size with heating, and more accurate lathe set-up and operation are necessary. Most commercial Philippine species fall into a second group which can be cut with the wood unheated. The species in this group can be further divided into two subgroups. The larger subgroup contains species whose veneer quality can be improved more or less by heating veneer bolt. The smaller subgroup contains species whose veneer quality is lowered more or less by heating the veneer bolt. Most of the species in this smaller subgroup have low specific gravity and strength and tend to have fuzzy surface after most machining operations on the wood.

Veneer quality is affected greatly by the quality of the bolt from which it is cut and by the lathe condition, set-up, and operation. Lathe set-up is the factor which can be controlled more precisely. Important parts of the set-up are: 1) the conditions of the knife and nosebar; 2) the position of the knife; and 3) the horizontal and vertical distances between the knife and nosebar edges. These parts of the lathe set-up are illustrated in drawings at the end of this Technical Note.

The condition of the knife and nosebar depends on their sharpness angles and the condition of their edges. Commonly used sharpness angles are 20 degrees for the knife and 85 degrees for the nosebar. The 20 degrees is a compromise between a smaller angle which would give more efficient cutting action and a larger angle which would reduce damage to the knife edge and increase its life between grindings. Research work at the Canadian Forest Products Laboratory (see reference 1) has shown that a micro-bevel about 0.015 inch wide with a sharpness angle of 30 degrees (see drawing), hand-honed on a newly ground knife edge, increases the useful life of the knife edge. The best sharpness angle for the nosebar is not known; it is generally agreed that the edge should be sharp when thin veneer is cut, and more or less rounded when thick veneer is cut. The condition of the knife and nosebar depends on the care and skill of the grinder and lathe operators. The edges should be perfectly straight, with the knife edge as sharp as possible.

The knife should be set in the knife carriage so that the centers of the chucking spindles are in the plane determined by the movement of the knife edge during cutting. This plane will be horizontal if the lathe has been set on a level base. The knife edge is sometimes set slightly above this position to allow for the small lowering of the edge which occurs as it is honed at intervals during its use. Also, spindle bearings which are loose from wear will allow the spindles to raise slightly when cutting starts; setting the knife edge a little high will compensate for this movement.

The angle between the beveled face of the knife and the plane determined by the movement of the knife edge during cutting is the knife angle. This is a critical lathe adjustment; there is an optimum angle (which varies somewhat with species and veneer thickness) at which the best quality veneer can be cut, and a range of angles at which good quality veneer can be cut. The optimum angle is usually between 89 and 91 degrees; the range of angles is usually about one degree. With the optimum knife-angle setting, the forces acting on the knife edge during cutting are balanced and the edge is stable. If the forces are unbalanced by a knife angle which is too small the knife edge will move during cutting and the veneer thickness will vary regularly in waves one to six feet long. If the knife angle is too large, the unbalanced condi-

tion will result in veneer whose thickness varies in waves about 3/4 inch long. These are known as thick-and-thin veneer and corrugated veneer, respectively; either condition is unsatisfactory for making high quality plywood.

The knife can be set in place and its angle adjusted with fair accuracy by using ordinary machinist's tools. A good spirit level and a block of wood whose thickness is equal to the lathe spindle radius are adequate for setting the knife edge at the proper height. An accurate protractor and the spirit level can be used to set the knife angle. A special instrument for direct reading of the knife angle can be manufactured and attached to some types of lathes without much trouble.

The position of the nosebar edge in relation to the knife edge is critical. The action of the knife by itself would be a combination of cutting and wedging-splitting. Splitting of the wood ahead of the knife edge is undesirable, since a split will follow the grain of the wood and produce a rough surface. The nosebar controls splitting by compressing the wood at the knife edge. The location and amount of this compression are important, and are determined by the vertical and horizontal distances, respectively, between the knife and nosebar edges.

The adjustment of the vertical distance (opening) is not critical, since the force exerted by the nosebar is not confined to a single line, but is distributed in the wood in a fan-shaped pattern. The vertical opening should be about 20 to 30 percent of the veneer thickness.

The horizontal distance is a critical adjustment. The optimum opening varies with veneer thickness and the density and hardness of the wood. An opening which is too large will not give enough compression and the veneer will be rough and loose cut (see tightness below). An opening which is too small will over-compress and crush the wood to produce veneer which is too thin and will increase the wear on and power consumption by the lathe.

The vertical and horizontal knife-nosebar openings (VNB and HNB in diagrams) can be set accurately with a set of machinist's leaf-type feeler gauges used in conjunction with an ordinary carpenter's square. A special instrument for setting the horizontal opening to an accuracy of 0.0001 inch was designed at the U. S. Forest Products Laboratory and is available commercially.

The effective distance between knife and nosebar edges is the resultant of the vertical and horizontal openings. It is commonly called the *nosebar opening* (or clearance) and may be expressed in terms of the veneer thickness being cut. The percent *nosebar compression* is the difference between veneer thickness and nosebar opening expressed as a percent of veneer thickness. Acceptable nosebar compressions are about 12 to 22 percent.

Veneer quality is evaluated by thickness, thickness uniformity, smoothness, and depth of the lathe checks in the veneer (tightness). Other important quality factors, which cannot be controlled by the lathe operator, are the color, figure, and presence of natural defects in the veneer.

The thickness of the veneer as it comes from the lathe should be the one at which the knife carriage feed gears are set, if the gears operate correctly. A smaller thickness would indicate that the nosebar compression was too great. Variations in veneer thickness, which should not exceed about plus and minus four percent of the average thickness, are usually caused by an incorrect knife angle.

Tightness of the veneer and the smoothness of its surface can be estimated visually with good accuracy by an experienced lathe operator. The lathe check depths (an inverse measure of tightness) in well-cut veneer should not exceed 30 to 50 percent of the veneer thickness. Thin veneer can be cut smoother and tighter than thick veneer.

Finally, high quality plywood cannot be made from poorly cut veneer. Plywood quality can be improved at the cost of extra care and time in the operations which follow cutting, but the quality increase which can be brought about is limited.

REFERENCES

1. Feihl, A. O. 1959. Improved profiles for veneer knives. Canadian Woodworker, August, 1959.
2. Fleischer, H. O. 1949. Experiments in rotary veneer cutting. Annual Proceedings of Forest Products Research Society III: 137-155, illus.
3. Perry, T. D. 1942. Modern plywood. Pitman Publishing Corporation, New York, N. Y.
4. Saraos, R. P. Dec., 1958-Jan., 1959. Rotary cutting of red and white lauan veneer. The Lumberman (Phil.) IV (6): 24, 26, 28, 30, illus.

* * *

PULP AND PAPER MAKING FROM HARDWOODS

The principal source of pulp is wood, which, according to common usage, is classified into softwoods or conifers and hardwoods or broadleaved species.

Conifers now account for 85 to 90 percent of world pulp production. The rest comes from hardwoods and other cellulosic raw materials. The dominance of conifers arises, in part at least, from their longer fibers which make for strong pulp.[1] Hardwoods generally have shorter fibers than conifers and produce pulps which have lower tearing resistance and folding endurance, but possess good burst and tensile strength. The addition of hard-

[1] Bamboos, abaca and ramie also have long fibers and make strong pulps.

wood pulps to the fiber constituents of the paper will often improve the formation, smoothness and printing qualities of the paper from softwood pulps.

In manufacturing pulp in the Philippines, the scarcity of conifers makes it necessary to utilize the hardwoods, which are available in abundance. A common feature of tropical hardwood forests is the lack of homogeneity. The number of wood species in the Philippines is estimated to be more than 3,500 although the majority of these are not commercially important. In any Philippine forest, therefore, there are likely to be many species of wood standing together. It is seldom that a natural hardwood stand of any size is found consisting of one or two species only. This makes it imperative that any process to be considered for pulping such hardwoods should be able to use them in mixtures, with a minimum or absence of sorting out of the various species.

The wood may be brought to the mill by water, rail, trucks or tractors. After storage in the yards or ponds, the logs are cut to suitable lengths and the bark is removed. Except for wood which is to be ground, the logs must be further reduced in size by chippers.

Several processes are available for converting hardwoods to pulp. Brief descriptions, together with the uses of the corresponding pulps, are given below.

Groundwood or mechanical process:—This is the simplest and, where the cost of power is low, the cheapest process of all. In principle, it consists of pressing the wood (by hydraulic or other means) against a revolving grindstone. A stream of water softens the wood and cools the stone at the same time. The pulp yield is up to 95 percent of the weight of the wood.

For this process the most suitable woods are light colored and of low or medium density. High extractive content, high density, and dark color are objectionable.

Groundwood pulp is used in newsprint and other printing papers. For newsprint, the normal groundwood-pulp portion is 80 to 85 percent when coniferous wood is used and the remainder is chemical pulp. When using groundwood pulp from hardwoods the proportion of chemical pulp must be increased because of the lower strength characteristics of hardwood pulp.

Chemical methods:—The wood chips are digested or "cooked" with chemicals under pressure and high temperature in rotary or stationary digesters, in order to release the fibers by removing all or most of the non-cellulosic materials, principally lignin. Different chemicals are used in the different chemical processes.

a. *Sulfite or acid process.*—The cooking liquor consists of a mixture of calcium, or magnesium, or ammonium bisulfite and sulfurous acid. The resulting pulp is relatively light colored and easily bleached in comparison with pulps produced by the other processes. The strength is sufficient for such purposes as newsprint, magazine paper, greaseproof, glassine and fine papers. This process is widely used also to produce dissolving pulps, such as are employed in the manufacture of rayon and cellulose films of various kinds.

Hardwoods containing appreciable amounts of resins and tannins are not suited for this process. It is not usually feasible to digest mixtures of various species by this method. Also, it is not usually practical to recover the chemicals from the spent liquor of the calcium-base process, the most common of the sulfite processes. This makes a serious waste-disposal problem.

b. *Soda process.*—Caustic soda in solution is used as the digesting chemical. Soda pulp is commonly used in the manufacture of printing and writing papers because of its desirable qualities of softness, absorbence, smoothness, opacity and bulk. The pulp yield is lower and the strength is less than that of sulfate pulp from the same wood. The chemicals in the spent pulp liquor can be recovered, greatly reducing the problem of waste disposal.

c. *Sulfate process.*—Caustic soda and sodium sulfide are used in the cooking liquor. Yields up to 55 percent are obtained. The pulp has exceptional strength and the unbleached pulp is used in the production of wrapping and bag papers and linerboards for fiber boxes. The dark-colored pulp produced by this process requires multi-stage bleaching if light-colored paper is required.

With this process it is generally possible to pulp mixtures of species. A chemical recovery system, as in soda mills, makes it possible to recover the chemicals in spent liquor for reuse and to generate steam during their recovery. Without recovery, the cost of chemicals in the soda and sulfate processes would be excessive. Recovery also greatly reduces the waste-disposal problem.

Semichemical methods:—The raw material is subjected to relatively mild chemical action using one of the chemicals mentioned previously. This softens the wood but does not defiberize it. The chemical treatment is followed by mechanical fiberizing in an attrition mill or otherwise. The yield and quality of these pulps lie between those of the mechanical and the chemical pulps. The waste-disposal problem depends in large part on the chemicals used.

a. *Chemigroundwood process.*—The debarked logs are impregnated with a neutral sulfite liquor (mixture of sodium sulfite and sodium bicarbonate) by vacuum and pressure treatment in a closed vessel. Then the chemically treated logs are ground in the same manner as in the normal groundwood process.

The pulp yield is up to 90 percent. The advantages of the chemigroundwood over the conventional groundwood process include greater production, less power consumption, and excellent pulp strength. The color of the pulp is likely to be darker but it is usually readily lightened by use of a small amount of bleaching agent. The pulp can be used in the manufacture of newsprint, book, toweling, tissue, and corrugating grades.

b. *Cold caustic soda.*—The chips are soaked in caustic soda solution at normal atmospheric pressure and temperature for a few hours after which they are fiberized in disc mills. Yields of up to 80 percent are attained. The pulp is yellowish. Among its uses are for newsprint toweling, corrugating, and insulating papers and building boards. Both high and low density hardwoods can be handled by this method. Another attractive feature is its relative simplicity as compared with other semichemical processes. Recently this method has been shortened by the use of hydrostatic pressure, which effects quick chemical impregnation of the chips in seconds or in a few minutes, instead of hours. The process is adaptable to continuous operation.

c. *Neutral sulfite semichemical.*—The chips are partially digested with a neutral sulfite liquor (mixture of sodium sulfite and sodium bicarbonate) under pressure and high temperature in rotary, vertical, or continuous digesters, after which they are fiberized in disc refiners. The yield is from 70 to 85 percent. The unbleached pulp has a tensile strength close to that of the corresponding sulfate pulp and is used in corrugating boards. The bleached pulp is suitable for glassine, greaseproof, printing and fine papers.

Before pulp can be used for paper making, it must undergo several treatments. The pulp must be screened to remove coarse particles and washed to remove adhering chemical solutions. To develop the required paper strength properties, the pulp is beaten or refined in beaters, jordans, or conical or disc refiners. Chemical additives like dyes, rosin, alum, and fillers are usually added in the beater to impart their special desired properties to the pulp.

REFERENCES

Much information about the manufacture of pulp and paper can be found in the numerous books on the subject, including the following:

1. Anonymous, 1953. Raw materials for more paper. Published by the Food and Agriculture Organization, United Nations, Rome, Italy.
2. Calkin, John B., 1957. Modern pulp and paper making, 3rd edition. Reinhold Publishing Corp., New York.
3. Stephenson, J. Newell, 1951. Pulp and paper manufacture, Vol. 2, McGraw-Hill Book Co., New York.

TANNIN CONTEST OF PHILLIPPINE BARKS

Tannins are complex organic compounds found in varying amounts in the bark of trees, in wood and in the leaves, roots, fruits, flowers or stems of many other plants. They are found in all parts of the world but only plants with reasonably high tanning content are used commercially for tannin production. In general, tannins are amorphous substances with astringent taste that have the property of precipitating gelatin from solution and of forming strongly colored solutions and precipitates with iron salts. The tannins consist largely of polyphenols and are of two main groups, the hydrolyzable tannins (pyrogallol group) and the condensed tannins (catechol group). They can be distinguished from each other by their reaction with formaldehyde-hydrochloric acid solution forming condensation products. They are thus potential raw materials for the production of waterproof adhesives, if and when it becomes possible to control the reaction in a commercially acceptable manner. The pyrogallol tannins form little or no condensation products with formaldehyde but do form colored compounds with iron salts. Most sources of tannin contain both groups but usually one group predominates.

Tannins are ordinarily obtained from barks by leaching with cold or hot water. The solution thus formed, at suitable concentration, can be used directly for tanning hides and skins into leather. However, tannins at present are chiefly produced in extract form and extract factories exist in most countries where suitable raw materials are available in sufficient quantity. Extracts are produced in the form of concentrated liquids containing about 40 percent tanning, in the form of solid blocks, or as a powder containing about 60 percent tannin. Tannin also appears in commerce in the form of dried bark, leaves, or fruits, according to the source from which it is obtained.

The principal use of tannins is in the tanning of hides and skins into leather, using water solutions obtained by extraction from the original plant source. These extracts contain both groups of tannins. Tannins of different origins serve to produce different types of leather such as light or dark-colored or hard or soft leather. In most cases, tannins from different sources are blended to produce the type of leather desired. The tannins from kamachile bark and from mangrove barks have been used extensively in the Philippines. The tannin from kalumpit bark has been used in leather tanning but is not popular.

Mangrove is the general name given to trees and shrubs growing in tidal forests. The most commonly used mangrove species in the Philippines are bakauan and tañgal (*Rhizophora* and *Ceriops*).

Only a few tanners in the Philippines are at present using mangrove bark but, since there are such large quantities of mangrove bark available, it is desirable that this local material should be fully utilized. The disadvantage of mangrove bark is that it produces a dark reddish color in the finished leather, but by blending it with other tanning materials, including synthetics, this can be overcome. Mangrove bark extract is now being imported into the Philippines from other countries.

Among the uses to which tannins are put, other than for tanning hides and skins or possible preparation of wood adhesives, are: (a) in deep oil-well drilling, in combination with caustic soda, to reduce the viscosity of the drill mud; (b) for the preservation of fishing nets; (c) for boiler-water treatment; (d) as mordants for dyes in paper and textile manufacture; (e) in ink manufacture; (f) in certain rust preventives; and (g) as nicotine tannate in insecticides.

No Philippine wood has been found thus far that contains a substantial amount of tannin, but it is possible that such woods exist among the 3,500 or more tree species found in the Islands. The barks of many Philippine trees, however, contain tannin in commercial quantities, including not only kamachile, the mangrove group, and kalumpit, but many others, among them even the common red lauan and white lauan barks. Not all of these tannins, however, would be acceptable to the leather tanners or could be produced cheaply.

One of the projects of the Forest Products Research Institute is to survey the tannin content and character of the barks of Philippine woods, in the hope of finding some that have commercial usefulness. In studying the possible usefulness of a bark as a source of tannin, the first step is to make the following qualitative tests to indicate whether there is enough tannin present to be interesting and whether it is mainly pyrogallol tannin or catechol tannin.

Gelatin test.—This is made by mixing into the bark extract solution a few drops of a one percent gelatin solution, containing 10 percent sodium chloride. This forms a precipitate with the tannin and the amount of the precipitate gives a rough approximation of the tannin content.

Stiasny reaction.—The reaction between the tannin solution and formaldehyde-hydrochloric acid solution gives a tannin-formaldehyde precipitate, the amount of which is a direct measure of the amount of tannins that could react with formaldehyde to form a thermosetting-resin adhesive.

Pyrogallol test.—This is made by adding a one percent solution of ferric ammonium sulfate to a bark extract solution. A resulting blue-black color indicates the presence of pyrogallol tannins.

There is no accurate, convenient method for determining the exact amount of tannins present but a good approximation is obtained by removing the tannins from solution with hide powder. This is the official method of the American Leather Chemists' Association and is the method generally used. Actually the amount of tannin in bark is variable and widely different values may be obtained from different samples of bark from the same species. No single analysis can be depended upon to represent any species correctly and the result of different chemists may vary considerably, depending in part on the quality of the samples analysed. Nevertheless, the analytical data, if obtained on truly representative samples, indicate the general magnitude of tannin content to be expected from a species under normal conditions.

The yield of tannin from barks can be greatly decreased if the barks are taken from logs that have been a long time in water or if the bark has been dried slowly and allowed to ferment or become moldy.

Qualitative tests for tannins have been made at the Institute on barks from about 185 wood species. Quantitative analyses have been made on 25 of the species with higher yields, with the results shown in the attached table. The species of the mangrove group show tannin contents ranging from less than 10 percent to more than 30 percent. Commercial mangrove bark is usually a mixture from several species and its tannin can vary accordingly. The table also shows that considerable amounts of tannin could be produced from some of the other species listed but, before commercial production would be practicable, it would have to be shown that they can be marketed in sufficient quantities and at prices high enough to make the operation profitable.

REFERENCES

1. Howes, F. N., 1953. Vegetable tanning materials. Butterworths Scientific Publication, London, pp. 1-23.
2. Mariam, J. E., and A. Wissing, 1959. The utilization of bark, Part 3. The utilization of polyphenols in spruce bark extractives in adhesives. Svensk Paperstidning No. 6. March, 1959, pp. 187-193.
3. Rogers, Jerome S., 1950-1951. Native sources of tanning materials. U.S.D.A. Yearbook of Agriculture, pp. 709-715.
4. Wilson, J. A., 1941. Modern practice in leather manufacture. Reinhold Publishing Corp., N.Y., pp. 272-304.

CHARCOAL FROM WOOD

When wood is heated sufficiently in the presence of air, it will ignite and burn to ashes. In the absence of air, however, if the wood is heated above 270 deg. C(518 deg. F), water and other volatile

materials will be driven from the wood without burning, and charcoal will remain. This process is called destructive distillation. If the escaping volatiles are passed through a condenser, a crude liquor containing water, tars, oils, acetic acid, methyl alcohol and numerous other chemical compounds may be recovered but a substantial portion will remain uncondensed and may, if desired, be burned as fuel for heating additional wood. Unfortunately, the cost of saving and refining the chemicals from wood decomposition is usually more than the products can be sold for and it is seldom that these by-products can be recovered profitably. The general custom is to allow them to go to waste but the uncondensed combustible gases are sometimes burned to provide heat for charring. The principal product and usually the only profitable commercial product of destructive distillation is charcoal.

Wood charcoal has been produced and used by man from prehistoric times and has long been an article of commerce in practically all countries. There are many ways to produce charcoal. Small quantities can be obtained, of course, by merely picking off the charred portion of partly burned wood after a fire has died out.

The pit method.—Charcoal is made in some countries by the pit method in which a pile of wood is thoroughly ignited and, when judged sufficiently hot, is covered with leaves or sod and then with soil to exclude practically all air, leaving openings for the escape of smoke and for the entrance of controlled small quantities of air. When, in the judgment of the operator, the charring is complete, all openings are tightly closed and the pile is allowed to cool. By this method, some of the wood is burned to produce the heat required to get the charring started and keep it going and the charcoal may contain considerable quantities of dirt from the soil cover.

The kiln method.—This is a refinement of the pit method in that the charring is done in some form of kiln or oven, of which there are many varieties and sizes. For example, an ordinary oil

Tannin Content of Some Philippine Barks
As Determined by F.P.R.I

SPECIES	Relative amounts of gelatin precipitate	Tannin-formaldehyde precipitate Percent[2]	Tannin content Percent[3]	Pyrogallol test
1. Agoho (*Casuarina equisetifolia*)	medium	16.7	14.4	negative
2. Anabiong (*Trema orientalis*)	medium	13.4	8.1	negative
3. Bakauan-babae (*Rhizophora mucronata*)[1]	medium	12.0	8.8	negative
4. Benguet pine (*Pinus insularis*)	medium	10.8	12.1	negative
5. Bolong-eta (*Diospyros pilosanthera*)	medium	6.3	4.8	negative
6. Busaing (*Bruguiera gymnorrhiza*)[1]	large	20.6	13.0	negative
7. Buta-buta (*Excoecaria agallocha*)[1]	trace	13.4	6.9	negative
8. Gapas-gapas (*Camptostemon philippinense*)[1]	small	12.4	6.7	negative
9. Guijo (*Shorea guiso*)	medium	11.3	4.3	negative
10. Kalumpit (*Terminalia microcarpa*)	large	5.2	20.0	positive
11. Kamachile (*Pithecellobium dulce*)	large	30.5	31.8	negative
12. Kupang (*Parkia javanica*)	medium	15.9	9.2	negative
13. Langarai (*Bruguiera parviflora*)[1]	large	19.0	8.4	negative
14. Lanutan-bagyo (*Gonystylus macrophyllus*)	small	10.1	11.8	negative
15. Lauan, red (*Shorea negrosensis*)	large	14.8	4.2	negative
16. Lauan, white (*Pentacme contorta*)	medium	11.3	7.0	negative
17. Mahogany (*Swietenia macrophylla*)	medium	15.1	17.4	negative
18. Manggasinoro (*Shorea philippinensis*)	trace	15.5	10.1	negative
19. Pagatpat (*Sonneratia alba*)[1]	large	20.5	18.6	negative
20. Pototan (*Bruguiera sexangula*)[1]	small	19.3	19.8	negative
21. Saging-saging (*Aegiceras corniculatum*)[1]	large	22.6	12.9	negative
22. Sakat (*Terminalia nitens*)	medium	1.9	26.6	positive
23. Tabau (*Lumnitzera littorea*)[1]	large	23.5	14.5	negative
24. Tabigi (*Xylocarpus granatum*)[1]	large	26.1	21.9	negative
25. Tangal (*Ceriops tagal*)[1]	large	25.0	31.3	negative

[1] Species so marked belong to the mangrove group.
[2] Percentage tannin-formaldehyde precipitate on the basis of oven-dry unextracted bark.
[3] Percentage tannin based on oven-dry bark. These are averages of duplicate determinations by the hide-powder method on bark from a single tree.

drum, set in a bank of earth or a hillside, can be used, if provided with a means of covering the top and leaving an outlet for smoke, and a means of letting air into the bottom, under control. Larger kilns of metal in various designs are used, some portable and some not. Kilns of clay, brick, or concrete blocks are also common, some of which will hold very large quantities of wood. All these kilns are operated on the same principle as the charcoal pits, namely, burning part of the wood to heat the rest and closing all vents when charring is complete, to let the mass cool before opening to the air.

The yield of charcoal by this general method of production varies with the skill of the operator, the kind, size, and condition of the equipment, and the dryness of the wood but, with good equipment and good operation, yields equivalent to about one third of the original weight of the wood (on the moisture-free basis) may be obtained. Unskilled operation may burn too much of the wood or leave too much uncharred. Uninsulated sheet metal kilns allow rapid loss of heat and require more wood to be burned to maintain the high temperature required. Leaky kilns allow air to enter after the kiln is closed and this consumes charcoal. In charring green wood, more heat is required to drive off excess water than when seasoned wood is used and more of the wood is consumed to provide it.

The retort or oven method.—By this method, the wood is placed in a large steel cylinder or retort with a tightly closing door and means for the escape of tar and gases. This is heated from outside without admitting air. The wood is loaded on cars which run on a track thus making it easy to move the charge into and out of the retort. With this method, the temperature can be controlled more closely than by the other methods and none of the charge is consumed to furnish carbonization heat. When the charge has been heated to the right temperature a chemical reaction begins that gives off heat (exothermic reaction). In general, very little additional heat from outside is necessary to complete the charring. It is possible, therefore, when using the retort method, to give the charge a preliminary drying and warming in a separate chamber, using the waste heat of the flue gases from the oven furnaces. This shortens the time and reduces the exterior heating required in the charring retort.

The volatiles given off during the charring process are usually passed through a condenser which separates the condensable portion containing chiefly water, methyl alcohol, acetic acid, oils and tars. These may be separated further and refined into salable products but usually that is not profitable. The non-condensable gases may be burned under the ovens for heating the wood to the charring temperature or for the preliminary drying process.

There are numerous variations in details of the retort process and equipment, some of which are patented. Several processes have been developed which operate continuously. In one such process, a vertical retort is filled with short pieces of wood. Then the charring process is started by heating the wood from below until it begins to produce its own heat. The carbonization temperature is maintained by recycling the hot wood gases. As the charring proceeds, more wood is fed slowly into the top and charcoal is gradually removed through grates at the bottom and placed in large cans for cooling. Such retort processes are effective, but require rather high initial investment.

Since the retort cannot be moved at reasonable cost, it should be located within reach of an adequate supply of wood as well as in a place convenient for shipping the charcoal to market.

The hardness, density and shipping or handling properties of charcoal depend in part upon the nature of the wood charred. Heavy, dense woods usually produce hard, heavy charcoal that does not break up badly or develop too much fine powder in handling and shipping. The lighter woods generally produce the softer and more friable charcoals that break up easily when handled or shipped and produce much fine powder that is largely wasted. By chrushing the charcoal, mixing with binder (such as starch), and pressing in rotating or reciprocating molds, fine or soft charcoal or mixed charcoals can be made into briquettes of more or less uniform quality and good salability.

Sawdust cannot be made into charcoal by the ordinary methods because heat cannot be made to penetrate rapidly into a large mass of sawdust. Many attempts have been made to devise methods for charring sawdust by keeping it moving in small quantities through a heated zone in a pipe or other closed container. Two or three methods of this kind have been demonstrated in the pilot-plant stage recently. It is hoped that such a method may eventually prove practical so that large tonnages of sawdust that now are little used may find profitable utilization.

Sawdust charcoal would probably have to be converted into briquettes before it could be marketed in large quantities.

Wood charcoal finds use for domestic heating and cooking, recreation (picnic) cooking, in metal smelting, in chemical manufacturing processes and for various other uses. In the Philippines, several hundred tons of charcoal are consumed each month in the manufacture of calcium carbide.

The quality of charcoal for industrial use depends in part on the percentage of volatile materials it contains, its hardness or crushing strength and the impurities it may contain such as ash and dirt. The ash content depends on the basic ash con-

tent of the wood and bark from which it is made Charcoal produced at high temperatures will be lower in volatile matter and higher in fixed carbon content than charcoal produced at lower temperatures. For some uses, the percentage of volatile matter permitted in the charcoal is limited by the user's specification.

The crushing strength of wood charcoal parallel to the fiber direction of the original wood is much higher than that perpendicular to the fiber direction, and both values vary considerably among charcoals produced from different wood species. High-volatile charcoal generally tends to be harder, stronger, heavier, and much easier to ignite than low-volatile charcoal. Generally the yield for low-volatile charcoal is less, partly because the weight of the volatile portion is lost and, in the kiln method, because some fixed carbon is consumed in driving off the excess volatile matter. Charcoal hardness decreases with a rise in moisture content but it recovers its original hardness after drying. It can absorb up to about three times its own weight of water, so that it is advisable to protect charcoal from rain.

Fresh charcoal from the kiln or retort may ignite spontaneously due to the rapid absorption of oxygen by the charcoal, which is an exothermic reaction. It is always a good practice to allow the fresh charcoal to stabilize before storing it.

Wood charcoal made at low temperature is a poor conductor of heat. Its conductivity increases with the temperature at which the charcoal is made.

The equilibrium moisture content of wood charcoal varies with the prevailing relative humidity in any given locality. For relative humidities between 80 and 90 percent, its equilibrium moisture content varies from about 10 to 14 percent.

Additional information about charcoal production and uses may be found in the numerous publications on the subject, including:

1. Anonymous, 1950, "Charcoal from portable kilns and fixed installations," Food and Agriculture Organization of the United Nations, Rome, Italy.
2. Beglinger, E., 1957, "Charcoal production in kilns," Report No. 1277, U.S. Dept. Agri., Forest Service, Forest Products Laboratory.
3. Stamm, A. J. and E. E. Harris, 1953, "Chemical processing of wood," pp. 440-468, Chemical Publishing Co., Inc., New York, N.Y.
4. Wise, L. E. and E. C. Jahn (Ed.), 1952, Wood Chemistry, second edition, Vol. 2 (826-851).

VENEER DRYING

The water present in the fresh-cut heartwood veneer of Philippine woods usually amounts to between 35 and 60 percent of the total weight of the green veneer. This is equivalent to moisture contents of 54 to 150 percent based on the oven dry weight of the wood. In some woods, higher or lower moisture contents may be found. Excess water is undesirable and most of it must be removed before the veneer is satisfactory for most uses. Wet veneer cannot be glued properly with most glues and is easily attacked by insects, fungi and staining organisms; the shrinkage which will take place in wet veneer as it dries out during service can cause serious warping in the glued product.

Moisture will move naturally from green or wet wood to the surrounding air, up to a certain limit.[1] The rate of this movement can be increased greatly by increasing the temperature of the wood and the temperature and rate of circulation of the air. Accelerating and controlling this moisture movement are the basic aims in veneer drying.

The three methods most used in drying veneer are air drying, drying in kilns which have been designed primarily for lumber, and drying in mechanical veneer dryers.

Air drying is the least efficient of these three methods because of the relatively low temperature, the eratic air circulation, and the varying weather conditions. Its use is limited to situations in which other drying facilities are inadequate.

Kiln drying is more efficient because of the higher temperature and rate of air ciculation, and because the air temperature and relative humidity can be controlled fairly well. However, as is the case with air drying, kiln drying is used normally only to supplement standard veneer-drying equipment.

Mechanical veneer dryers are the most efficient because of the high air temperatures and circulation velocities that can be maintained, and because they utilize a continuous process as opposed to a batch process. Furthermore, veneer dried in a mechanical dryer generally has less buckle than air-dried or kiln-dried veneer. Mechanical dryers are of three types: the platen type (e.g., Merrit-Solem), the screen type (James), and the roller type (Coe). The roller type is most common in the Philippines and the following discussion will apply to it.

The drying time of veneer may be divided into two distinct periods. The location of the dividing line between the two periods varies, but it is usually somewhere between 25 and 40 percent moisture content. During the first period the moisture content is high enough that no shrinkage occurs; drying in this period causes problems only in unusual species. Shrinkage does occur during the second period, and it is this shrinkage that causes drying defects such as checks, splits, and end waviness.

Water loss from the end grain of wood is much faster than the loss from tangential and radial sur-

[1] See FPRI Technical Note No. 1. (*For. Lvs. 12*:1).

faces. Therefore, in veneer drying, the ends of the veneer sheet enter the second period sooner than the center of the sheet, and shrinkage occurs at the ends before it does at the center. This difference sets up stresses in the veneer which are relieved in one or both of two ways. The ends of the veneer will split when the stress exceeds the strength of the wood, or the wood at the ends of the sheet will acquire a tension set[2] when its strength is not exceeded. Subsequent drying of the unchecked veneer will bring the ends and center of the veneer sheet to the same moisture content. The shrinkage of the ends is then less because the tension set has produced a sheet whose ends are slightly wider than its center. The result is usually waviness on the ends to accommodate this extra width.

The shrinkage of wood varies greatly with the grain direction in the wood, somewhat with species, and slightly with drying conditions. Shrinkage parallel to the grain of the wood is negligible; radial shrinkage averages about 80 percent of the tangential[3] shrinkage, and both are very much greater than shrinkage parallel to the grain. In drying rotary-cut veneer to about eight percent moisture content, the length will not decrease a significant amount, the thickness will decrease about four percent, and the width will decrease about five percent, but these values differ somewhat with different species. These shrinkage differences contribute to the formation of the drying defects warping and checking. Because grain direction variations from place to place within a single sheet of veneer are the usual condition, and because shrinkage varies with grain direction, shrinkage also varies within the sheet. The result may be warping and checking.

Drying defects are much less troublesome in thick (1/10-inch) than in thin 1/20-inch) lauan veneers, because the thicker veneer has greater strength and stiffness. The strength is generally greater than the stresses which tend to cause splitting and checking; the stiffness is generally great enough to overcome the tendency to warping and end waviness.

The aim of the veneer dryer operator is to dry the largest possible volume of veneer to the desired moisture content in a given time, and at the same time to minimize the number of drying defects. In general, these two objectives are in opposition; drying defects are usually more numerous in veneer which has been dried faster. Then, to dry veneer in which the occurrence of drying defects must be minimized, volume must be sacrificed. For cases in which drying defects are not so important, or are not so likely to occur, production volume can be emphasized. The volume can be increased in several ways.

First, the drying temperature can be increased. It has been found that increasing the dryer temperature by 20 degrees F. (11 degrees C.) will increase the dryer capacity by 10 to 15 percent. This capacity increase would be greater for temperatures which were low before the temperature increase. The relationship was found to be logarithmic. However, the dryer temperature is limited by the available boiler pressure, or by the safe working pressure of the steam distribution lines.

Second, the air velocity within the dryer can be increased. This is fixed in most dryers, but in cases in which it can be varied, doubling the air velocity would decrease the drying time some 10 to 20 percent.

Third, the opening in the dryer venting stack may be increased. This allows a greater volume of moisture-laden air to leave the dryer and be replaced by relatively moisture-free air, which may cause faster drying. This new air must of course be heated to the drying temperature. If the dryer is operating near its maximum temperature, as limited by the available steam pressure, then an increase in the opening of the venting stack will tend to reduce the maximum temperature.

Proper control in the veneer drying operation requires considerable skill and experience. The average moisture content at which the veneer should be when it comes from the dryer is established by gluing requirements and the intended use of the product; it is usually between 6 and 12 percent. Moisture content variations about this average are always present but the smaller the variations the better.

In general, the time required to dry veneer depends on the rate of drying and the total amount of water which must be removed from the veneer for it to reach the desired moisture content. The total to be removed depends on the thickness and the green and dry moisture contents of the veneer; the rate of removal depends on the drying temperature, the air velocity, the amount of moisture in the drying air, and the drying characteristics of the species. The total amount increases with veneer thickness and green moisture content, and the rate increases with the temperature and velocity of the drying air.

The drying time, of course, must be such that the veneer comes out of the machine at the desired moisture content.

In order to work effectively, the dryer operator must have accurate information on the drying characteristics of the veneer, the dryer temperature, the

(*Continued on page* 78)

[2] Tension set is the setting or "fixing" of the fibers of the wood in an expanded condition (i.e., less than normal shrinkage will accompany subsequent drying).

[3] Radial and tangential refer to the corresponding directions in the round tree or log.

B. F. Notes

FILIPINO FORESTER TO MUNICH, GERMANY

By
Carlos Cunanan

Tomas J. Manalo of the Philippine Forest Service is scheduled to leave by plane for Munich, Germany on July 30, 1960 as a recipient of one year Traineeship in Photogrammetry awarded by the Federal Republic of Germany. He will first take up a course in German Language to facilitate his studies in aerial photogrammetry.

Manalo, a father of nine children, finished on the top of his Ranger Course Class in 1930 at the School of Forestry, U.P., College, Laguna. He finished his B.S.F. degree in 1938, as a government pensionado again.

The recipient passed the following Civil Service Examinations:

Forester
Private Land Surveyor
Deputy Public Land Surveyor
Mineral Land Surveyor

After graduation he served in the Forestry Bureau as Ranger, Forest Surveyor, instructor in the School of Forestry and Forest Supervisor.

He saw action in Bataan during World War II. After the war he tried his hand in various companies. Manalo returned to the Bureau of Forestry in 1954, as a member of Land Classification Party and steadily rose therefrom to his present position as Regional Inspector.

* * *

MAKILING REFORESTATION PROJECT NOT MOVING TO MONTALBAN, RIZAL

By
Carlos Cunanan

The Makiling Reforestation Project at College, Laguna is not moving to Montalban, Rizal. A Plan is afoot however, to close the Makiling Reforestation Project, because of the proposed transfer of the administration, supervision and control of the Makiling National Park from the Parks and Wildlife Office to the College of Forestry, U.P. This change in status of the Makiling National Park excludes her from the areas to be reforested under Republic Act No. 115.

If the plan to close the Makiling Reforestation Project materializes, it will be gradual. All properties, including existing buildings and other facilities, belonging to the Makiling Reforestation Project will be taken for the use of the other projects.

The Makiling Reforestation Project has 30 appointed personnel with an annual outlay of about ₱49,000.00 for salaries. During the Fiscal Year 1959-1960, the Project has spent a total of ₱24,250.00 for the payment of the wages of the emergency laborers alone. The Project is over-manned. The transfer of the surplus personnel is now under the serious consideration of the Manila Office. If the Project will not be abandoned, a sufficient number of personnel will be left conducive to its efficient operation.

The College of Forestry will need all the moral and financial support of her alumni and friends on her new venture.

* * *

ARBOR WEEK PROGRAM

Acting forestry director Tiburcio S. Serevo today released the schedule of activities during the Arbor Week as follows:

July 24—Church participation, government (provincial and municipal) officials and barrio councils.

July 25—Tree planting in Public and Private Schools with technical assistance of the forestry bureau.

July 26—Tree planting by all private factories.

July 27—Observance by Civic Organizations. Tree planting in watersheds supervised by the National Power Corporation, NAWASA, and forestry bureau officials.

July 28—Literary Programs in public schools with forestry officials as speakers.

July 29—Open House—Bureau of Forestry in Manila and Forestry District Offices.

July 30—Evaluation Day. Follow-up progress of tree-planting.

The theme of this year's Arbor Week celebration (July 24-30) is "Plant Trees Today For Tomorrow's Prosperity." As usual, the field offices of the forestry bureau were given instructions to distribute planting materials, posters and brochures and to extend full cooperation to all civic organizations and agencies concerned.

SEREVO GUEST SPEAKER OF NLSSL

Acting forestry director Tiburcio S. Serevo was guest speaker of the first Northern Luzon Seminar on Selective Logging which was attended by district foresters and provincial officials. He appealed to lumber concessionaires to strictly observe the selective logging practice of the bureau to insure continuous supply of timber in the areas. The seminar was held at Claveria, Cagayan under the auspices of the Bureau of Forestry with the cooperation of Taggat Sawmills, Inc.

Accompanied by forestry chief training officer Teofilo A. Santos, director Serevo also visited Ilocor Sur, Ilocos Norte, Abra and Cagayan during his one week field trip. While there he enjoined local officials and the general public to cooperate with the forest officers and other government agents in detecting illegal kaiñgins and timber smugglings and explained to them the economic, social and climatic importance of forests to our daily life. He reminded the people that thousands died in the recent floods in Manila and Bicol provinces and millions worth of properties were damaged the havoc all due to the people's disregard of our forests.

Serevo said that he would soon visit other forestry offices in order to bring the cause of forestry closer to the people and attain maximum efficiency on good government service.—acg

* * *

PROPOSED MONTALBAN REFORESTATION PROJECT

The Reforestation Administration will soon open a project in Montalban, Rizal. The town mayor has offered to donate five hectares of land as nursery site.

Proposed as Montalban reforestation project, its main objective is to reforest the Marikina river water shed and all barren areas within the town and vicinities.

It will be recalled that one of the worst floods that struck Manila and suburbs recently was caused by surging waters coming from denuded areas of Montalban and Marikina.

In the meantime, steps are being taken to effect the transfer of ownership of the five-hectare land from the municipal government of Montalban to the reforestation administration.

C. Cunanan

* * *

REFORESTATION GETS NEW IMPETUS

Reforestation was given a new shot in the arm when Congress passed House Bill No. 4921 which became Republic Act No. 2706 upon the approval of the President on June 18, 1960.

Under this law, the Reforestation administration was created as a new separate government agency under the Department of Agriculture and Natural Resources, taking over the function of the then Reclamation and Reforestation Division of the Bureau of Forestry.

The new agency was created with the purpose of stepping up reforestation work which according to conscensus is lagging behind. Under the new setup, all reforestation funds collected from timber licensees by virtue of Republic Act No. 115, will be spent solely for production reforestation of our barren, denuded and logged over areas.

This step is in keeping with the public clamor for reforestation of our treeless regions, as a result of the havoc brought by the recent floods and typhoons.

by Carlos Cunanan

* * *

FUNDS FOR FORESTRY CLINIC

In order to devise ways of raising funds for the maintenance of the Forestry Clinic, the board of directors, Forestry Circle, Inc. met on July 7, 1960 at the Inventory Section of the Bureau of Forestry, Manila.

On motion of Forester Carlos Cunanan, the Circle president appointed Mr. Modesto Tobias and Mrs. Brilliantes to form the committee to draft rules and regulations for the fund raising campaign. The president is also empowered to name other members of the committee who may or may not be with the Bureau of Forestry.

C. Cunanan

* * *

SUCCESSFUL CANDIDATES IN THE FORESTER EXAMINATION

1.	Anastacio Sison	86.97
2.	Candido T. Agbisit	81.42
3.	Alfredo V. Sanchez	78.14
4.	Carmelo D. Cortez	76.45
5.	Florencio B. Mina	75.82
6.	Anacleto B. Bernardo	75.51
7.	Gregorio P. Principe	75.50
8.	Sotero A. de Ocampo	75.02
9.	Emerson B. Abraham	74.56
10.	Armando A. Villaflor	74.16
11.	Geronimo Falloran	73.96
12.	Aquiles G. Esber	73.60
13.	Hipolito Estoque	73.49
14.	Leonardo D. Angeles	73.26
15.	Rogelio B. Baggayan	72.92
16.	Jessie B. Amihan	72.86
17.	Douglas L. Ingosan	72.42
18.	Feliciano V. Barrer	71.70
19.	Melito T. Battad	71.53
20.	Francisco D. Milan	71.53
21.	Modesto T. Tobias	70.97
22.	Delfin Ganapin	70.70
23.	Angelo Moderno	70.55
24.	Pedro Revilleza	70.42
25.	Conrado P. Quejas	70.01
26.	Emilio A. Rosario	70.00
27.	Policarpo M. Narciso, Jr.	70.00

• Forestry in the News •

FLOODS BARE NEGLECT

By Macario T. Vicencio

The annual observance of Arbor Week which ends today did not so much as merit a filler in the newspapers.

Certainly, a school child's declamation of Joyce Kilmer's "Trees" cannot draw as much reader attention as would a politician's denunciation of the latest in official skulduggery. Nor could the sight of the same child planting a tree evoke the interest of photographers as would a glittering fashion show or a couple traipsing to the altar.

It is only when flood waters go on a rampage or a long drought grips a region that public attention is focused on the need for conserving the forests. In the wake of such calamities, there is much ado over reforestation and the wise and proper exploitation of the woodlands. Interest in these subjects however, ebbs as quickly as the receding flood waters.

A few years back, a devastating flood killed hundreds in Pangasinan. Crops were destroyed and farm animals by the thousands drowned. The thriving town of Mabini disappeared overnight as if swept by a giant's mighty hand. All agreed that the flood waters could have been stayed but for the denuded mountains of the province. All saw the need for reforesting the barren highlands which years before were covered by a thick mantle of trees.

But enthusiasm for the undertaking waned even before it could be started. And with the Virginia leaf boom, the need for firewood to feed tobacco-drying kilns spurred the entire farm population into a frenzy of unregulated tree-cutting. Today, the province of Pangasinan is one vast treeless region.

The same is true in La Union and the rest of the Ilocos region. In the Visayas, the provinces of Cebu, Bohol, Iloilo and Capiz have been subjected to excessive deforestation. Only nine provinces are left in the country with substantial forests. These provinces are Quezon, Samar, Lanao, Leyte, Zamboanga del Sur, Surigao, Cagayan, Isabela and Agusan. Even these provinces face the danger of losing their forests, what with *kaingineros* and irresponsible lumbermen moving in relentlessly with axe and machine.

In most of the provinces where mountains have been denuded of their forest covers, recurrent floods during the rainy season have exacted a heavy toll in human lives and farm crops. During the dry months, these provinces suffer long droughts, killing work animals, stunting plant growth, and leaving the farmer and his family hungry and destitute.

Forest conserves water. Destroy forests and the slightest rain sends volumes of water cascading down into the lowlands. Eventually soil erosion follows. River beds become shallow as the silt deposit increases. In no time at all the river is gone. The silt spreads and soon the land becomes a vast wasteland.

Forest destruction on a prodigious scale was on the main responsible for the disappearance of many a great civilization of the ancient world. Babylon seat of a mighty empire, withstood the repeated on-slaughts of her enemies, only to be wiped out by the flood waters of the Tigris and Euphrates rivers. The Maya civilization which flowered in the Guatemalan highlands vanished in ruins; and Mexico, once a country of unusual fertility, vainly strives today to reclaim half of her entire land area, all because the Mexicans, once upon a time, denuded their forests.

Where timberlands have been laid waste by indiscriminate logging, reforestation has become a major government effort and a primary concern of all the people. In Japan, Korea, Thailand and Formosa, to mention only a few of our neighbors, forest conservation and reforestation is a massive and continuous undertaking.

In the Philippines where the forests face complete annihilation, attempts to ward off the holocaust that must inevitably follow have been sadly wanting in drive and purpose. Government interest in forest conservation and reforestation is tepid. As a matter of fact, several government officials are in league with unscrupulous lumbermen, all hell-bent on extracting all the possible timber from our forests without regard for the future. The task of conservation and reforestation has been left to a handful of well-meaning forestry officials who even from the beginning must have realized they were waging a losing battle. Lack of funds, unreasonable political interference, and a lenient policy on forest violators have made the task doubly difficult.

Visiting forestry officials are aghast at the rate we are destroying our forests. They have made the frightening observation that it is only in the Philippines where deforestation moves at an alarming pace, and yet nothing effective has been done to check the destruction. One such forestry official, Tom Gil who came to the Philippines recently at the invitation of the National Economic Council, after a two-month survey, made the following dis-

"Today, with the present attitude of government concerting observation:

and the apathy of the public, no part of the permanent forest is safe from alienation and clearing. Even areas under forest management are doomed if pressure is strong enough... Here then in this failure to deal with the rising tide of destruction lies the greatest danger to the Philippine forests and industries. It is not a question of what may happen if forest land are denuded — it already has happened over large areas." — *Manila Times,* July 27, 1960.

THE PERILS OF DEFORESTATION

By Macario T. Vicencio

Most Filipinos, including government officials, are of the belief that our forest resources are vast and inexhaustible. This erroneous belief perhaps explains why there has been little interest in forest conservation and reforestation.

Already, we are far below so-called safe balance which is 58 per cent open or agricultural land and 52 per cent forest land. This balance or safety margin, according to forestry experts, should be maintained if the land is to be protected and if it is to provide ample timber supply.

In 37 provinces, however, this safety balance has long been upset by destructive logging and the *kaingin* system. Forest acreage in these stricken areas has been reduced to as low as 20 per cent, or even much lower as in Cebu, Bohol, Cavite, Iloilo, and Ilocos Sur where only eight per cent of the land area remains, with a thin forest cover.

Only nine provinces have forests still within the satefy margin. (The nine were mentioned in an earlier installment.) Eight provinces now teeter dangerously on the balance. But even these eight provinces, at the alarming pace of deforestation, will soon fall below the safety ratio.

It is the consensus among forestry officials that at the speed our forests are being destroyed, the entire country will have to face a critical timber shortage within the next 10 or 15 years.

But more than the disconcerting prospect of being forced to import lumber, recurrent floods and droughts will blight the land. Irrigation will become impossible, hydroelectric plants will fail, riverbeds will go dry because by then, watersheds feeding these systems shall have been completely wrecked beyond possible reclamation.

The Ambuklao hydroelectric dam in Bokod, Benguet, Mt. Province, is endangered by severe silting and an inadequate water supply. During the last dry season, several power failures were reported due to deforestation of the upper regions. Every year, the enormous silt deposit is making the dam shallower. Unless the dam is dredged and the mountain area reforested, Ambuklao will have to be abandoned some 30 years from now.

To date, a total 3.5 million hectares of our forests have been destroyed. This enormous barren area, representing the accumulated destruction through *kaingins* and indiscriminate tree-cutting, was for a time planted to farm crops. But they soon lost their fertility and had to be abandoned.

Today, cogon, talahib and other shrubs have taken over. Indeed, it will require years of effort and millions in public funds before these desolate areas can be reclaimed.

Of the 3.5 million hectares of forest land destroyed, 1.4 million hectares form part of the country's main watersheds. These denuded watersheds require immediate reforestation, if destructive floods are to be stayed.

So far, the reforestation effort has been puny, and forestry men clamoring for adequate government aid and public support have been like "voices crying in the wilderness."

While it is true that the government has undertaken a program of reforestation which began in 1910, the undertaking at best has been desultory and limited. Abandoned completely during the Japanese occupation. Reforestation work was resumed in 1946. As of last year, close to 29,000 hectares had been reforested which of course is very slow considering that 3.5 million hectares await reforestation not to mention the additional 30,000 hectares lost to kaingineros annually.

With the limited funds doled out for the program, forestry officials have been able to reforestation average of 7,000 hectares yearly since 1957. Considering that 30,000 hectares are destroyed annually, reforestation is losing out to deforestation. For every hectare reforested four hectares are lost to deforestation.

This situation can be remedied only through a more comprehensive and intensified reforestation program, backed of course, by sufficient funds. Hand in hand with this effort must go a determined drive against *kaingineros* and illegal logging activities. Unless these are eliminated, reforestation efforts will simply be a waste of time, money and effort. At most, reforestation becomes a futile rearguard action.

Take the case of the Salinas reforestation project, high in Cordilleras in Nueva Vizcaya province. Laid waste by *kaingineros,* the denuded mountain ranges formed part of an important watershed of the Magat and Cagayan rivers.

The reforestation job started way back in 1931. Miraculously, the project consisting of over a thousand hectares escaped destruction during the war years. The years that followed saw a vast spread of new trees.

And then in 1956 kaingineros who perhaps had mistaken the "Land for the Landless" policy as the signal to occupy government land, whether or not the area was a forest reserve moved in.

In less than three months the work of almost 30 years lay in ruins. There was no one to stop the kaingineros. As a matter of fact the government even abetted the destruction by declaring portions of the area as agricultural land.

Today, three years after the destruction, the land has been abandoned. Cogon and other shrubs dot the area and except for a few decaying stumps, there is nothing left to indicate that a forest once stood there.

Aside from destroying this reforested watershed, the *kaingineros* also wrecked the thriving salt industry of Nueva Vizcaya. During the occupation, thousands of people depended upon the salt springs of Salinas for a living. With the trees gone, there is difficulty in securing firewood so the industry has been abandoned. It will take time, if ever, before this industry can be revived. — *Manila Times, August* 2, 1960.

KAINGINERO, THE VILLAIN
By MACARIO T. VICENCIO

Widespread destruction of Philippine forests has been primarily caused by the *kaingin* system, a nomadic method of agriculture whereby patches of timberland have been opened to the cultivation of temporary crops.

The *kaingin* or clearings, after two or three plantings, are abandoned, and the *kaingineros* move to open other forest areas, only to move again after the land ceases to accept any form of growing vegetation. This is so because mountainside clearings are easily eroded of their top soil, leaving only bare rock and stone. Through the years, this destructive type of "shifting" agriculture has wrecked millions of hectares of virgin forests.

Everyday new *kaingins* are hewn out of the forests. At night, the burning patches of valuable timberland light the whole countryside. During the day, they are smudges of blackened earth dotting mountain slopes and hillsides. In a year or two, the mountains and hills, with forest cover gone, will go the same way as the highlands, earlier denuded of their forests. They will become solid rock and boulders where reforestation would simply be impossible. One can have an idea of the extent of damage wrought by *kaingineros* by a forestry survey conducted three years ago. The survey revealed a total of 58,365 *kaingin* patches during 1957.

Statistics also show that the *kaingin* destroys a yearly average of 30,000 hectares of forests. The loss in timber and forest products through this destructive system averages from ₱10 to ₱15 million annually. The country's lumber industry which ranks third in export value, and upon which some one million people are directly dependent for a living, is in grave danger of being wiped out, unless the *kaingin* system is stopped once and for all. From lumber exportation, the country realizes annually ₱100 million in foreign exchange. From the domestic sale of timber alone, ₱130 million goes yearly to the national wealth. All these will be lost, if the government stupidly adheres to a policy of leniency for *kaingineros* who have violated and who continue to violate forest laws with impunity.

While it is true that land must be given to the landless, this should not be construed to mean that any one can feel free to squat on government land, destroy the forest, and get away with it. But this seems to be the vogue today. Instead of trying to stop the *kainginero,* the majority of our local officials, both provincial and municipal, abets his illegal activity. Either because of ignorance or political reasons, the defiant *kaingineros* is given protection by these officials.

And so he goes farther into the hinterlands, leaving behind him a trail of ruin, while the forest official or guard who tried to do his duty by arresting him, either finds himself under fire or transferred to some other province. Records show that the incidence of *kaingin* invariably rises during an election year. Certainly, the vote of the *kaingineros* and some two or three members of his family can be most valuable. This protection coming no less from responsible officials has had a demoralizing effect on forestry men, so much so that arrests are seldom made, if at all.

Another major factor which has contributed to the widespread degradation of our forests stems from destructive logging operations. Driven by greed and the urge to make quick profits, logging operators have gone on a cutting spree, felling both mature and young trees alike. Most of these operators belong to the small concessionaires group who do not care a whit what happens with our forests. Selective logging or the sustained-yield system are strange to them. Left alone, they have destroyed their concessions in the span of a few years. In this connection, Nicolas P. Lansigan of the National Economic Council, has made the following observation:

"To many, it is inconceivable why widespread destructive logging has been tolerated for so long. Except for a few areas being put under selective logging and where there are men to mark trees for felling and supervising the felling, most of the logging operators are left to their own devices, with little or no regard to destructtion of the young trees."

Lansigan pointed out that due to lack of supervision, many of the small logging operators merely skim the forest, removing only the trees they like and could make money out of, and leaving the unwanted wood species and defective trees. As a forest in a productive condition or in a position to

develop a desirable tree vegetation, the area is left to degenerate into a potential worthless forest."

Fire has likewise contributed to widespread destruction of many of our forests. During the dry months, valuable timber and other forest products have gone up in smoke, due to carelessness and inadequate fire protection methods. There is not a single forestry station in the entire country provided with equipment and apparatus for fighting forest fires. When a forest fire breaks out, it is usually left to spend itself, and in the process wide forest areas are destroyed.

While other countries have made it a point to have adequate fire-fighting equipment to combat forest fires, the Philippines has not seen fit to appropriate even a single centavo for the purchase of similar equipment. And again, while other countries have developed a well-trained and highly efficient corps of forest fire fighters, the Philippines has only a handful of forest guards whose knowledge on fire-fighting verges on the dismal.—*Manila Times, August* 1, 1960.

* * *

TRIAL VIZCAYA REFORESTATION PROJECT SHOWS PROSPECTS

Trial planting of *Rauwolfia caffra* at Magat reforestation project, Nueva Vizcaya, had shown promise of adaptability to local conditions.

This was reported on in the recent issue of the "Research Note" of the forest research division by Julian R. Meimban, Jr., forestry research scientist, assigned at Magat reforestation project.

The plant genus *Rouwolfia* was discovered recently as a source of cure for high blood pressue. One species, *Rauwolfia serpentina,* had been used successfully by Dr. Robert Wilkin and Dr. Walter E. Judson of Boston over 100 cases to lower blood pressure, the research note stated.

The species introduced recently at the Magat reforestation project was the *Rauwolfia caffia.* The seeds were received by the bureau of forestry from the forest department, Kitwe, Northern Rhodesia and sent to Magat reforestation project for trial planting.

Sown in seedboxes on November 20, 1958, the percentage of germination was only 0.40 per cent, the low percentage of germination possibly attributed to the loss of viability in transit.

The two seedlings which germinated were set out at the experimental premises on May 18, 1959. On December 18, of that year, or seven months after transplanting, the one-meter seedling reached 3.25 meters, while the 0.30-meter seedling attained a height of 1.65 meters.

Meimban observed the two plants are growing luxuriantly and showing promise of adaptability to local conditions. The flowering and seeding period is being awaited to find the possibility of propagating the species either by seeds or cuttings.

Rauwolfia caffra may also be a possible source of the chemical compounds present in *R. serpentina,* which Drs. Wilkins and Judson of Boston had used successfully on several cases to lower blood pressure, the research note further stated.

This species is characterized by a bark grayish to brownish in color covered with slightly yellowish lines of corky postules. The inner bark as well as the leaves when cut exudes abundant acrid milky sap.

The leaves are dark green, venations prominent, glaucous, beneath, usually arranged in whorls of 4 to 5 (rarely 3) varying in size from 15 to 45 cms. long and 5 to 15 cms. wide.

* * *

FURNITURE INDUSTRY SEEKS TAX STRUCTURE REVISION

The Association of Furniture Manufacturers of the Philippines (ASFUM), through its acting president Robert G. Lyttle Jr., yesterday appealed to Congress for the revision of the present tax structure affecting the local furniture industry.

In a letter to the Legislative-Executive Tax Commission, the ASFUM proposed the adoption of a uniform straight tax on furniture, of whatever kind, at not more than three per cent of the gross deductible materials.

It was pointed out that the computation for tax deductible materials is a loophole for unscrupulous manufacturer and tax examiners since it is fairly easy to understate or overstate the amount of certain materials used on furniture.

A uniform straight tax as proposed will save a great deal of time and effort for tax examiners and manufacturers in computing the tax to be paid.

It was stated that the present tax structure on furniture encourages only small shops which pass off their business as "custom-made" so as not to be taxed more than three per cent contractor's tax. Whereas, larger firms which manufacture for stock have to pay either the seven per cent or thirty per cent after allowing for deductible raw materials.

The ASFUM proposal will eliminate the undue handicap placed on those firms who manufacture for stock. Also, the local furniture industry would widen its scope on other types of materials for furniture if the thirty per cent tax is abolished for furniture other than wood, rattan or bamboo.

The production of stock furniture will ultimately benefit the consumer in the form of lower costs.

Finally, Lyttle emphasized that favorable consideration by the Tax Commission and Congress on the ASFUM proposal will lead to a more progressive furniture manufacturing industry and result in the collection of more taxes if the uniform straight tax of not more than three per cent of the gross selling price is adopted.

AGUSAN LOGGERS EXPOSE DESTRUCTION OF TIMBER

By Alfio Locsin

Legitimate loggers in Agusan are up against destructive elements which are gradually depleting the rich timber lands of the province.

These destructive elements, according to lands and forestry officials here, are composed of unscrupulous loggers, absentee concessionaires, contractors, professional squatters and kaingineros.

The threat posed by these elements can well be pictured in the light of what might happen if the mighty Agusan river, deprived of its watershed, would be swollen by torrential rains.

Agusan river, one of the few navigable rivers in the Philippines, cuts through the entire length of the province. Along its banks are thriving sawmills, 15 of them, and the prosperous city that is Butuan.

Aside from the destructive elements, legitimate loggers in this richest of the timber lands in the Philippines, have to contend with aliens who have already gained a foothold in the lumber industry here.

They also have to contend with rival political forces, one headed by the executive of this province and the other headed by the congressman representing the province.

They are also faced with the problem of a Japanese monopoly of their lumber exorts which has brougpht down the rices of their products on a take-it-or-leave it basis.

But their efforts to unite to fight off this monopoly is threatened by the political differences of their leaders and by mutual distrust.

Unscrupulous loggers, according to Juan Tapales, district land officer for Agusan and Surigao, are destroying young trees and causing erosion of fertile top soil through indiscreminate logging.

These loggers, he said cut huge trees in any direction and pull down the log to the river sweeping all plant life along the way, including young trees, and scraping away the top soil.

This fact was admitted by Vicente Galicia, ranking Butuan official and a logger himself.

Another problem is that of absentee concessionaires who give their rights to contractors.

The contractors, according to Evangelista B. Balonon, assistant district forester for Agusan, are under contract to the concessionaires for a certain period.

During this period the contractors, he said, cut as much of the trees as they can indiscriminately to make huge profit. Since they are operating in a temporary basis, they do not care whether they permanently destroy a forest concession.

It is difficult to pinpoint this malpractice, Tapales said, because on paper it is still the licensee who is operating the concession.

An Agusan official, himself a logger, noted that this practice of using contractors is unavoidable. He admitted that he is using small-time loggers in the concession.

In this respect, Balanon noted that this official is guilty of overcutting and will have depleted his concession in two more years.

Professional squatters, coming from other provinces in Mindanao, come to Agusan to clear forested areas which they turn over to unwary settlers, Tapales, said.

These areas, he said, are, however, not covered by land titles and are at times forest reserves. Unchecked, this practice, he added, has contributed greatly to the depletion of the timber lands.

Added, to this Tapales said, are the activities of *Kaingineros* who move from one forested area to another burining the trees to clear the land.

Many of the *kaingins* are on mountain slopes where the lack of trees result in erosion.

The loggers here have met to find means to fight the Japanese monopoly on their products.

But political differences, it was learned, have made it difficult for them to set down their plan of action.

At the same time there is the problem of mutual distrust. As one logger puts it, nobody is willing to reveal the prices he quotes for his exports to Japan.

This leads to cutthroat competition which brings down the prices of the lumber to the advantage of the Japanese buyers.

* * *

ACACIA DEMAND IN US BARED

The department of commerce and industry reported yesterday the unlimited prospects of acacia woodcraft in the US market.

According to the department, the selling point of acacia wood is its peculiar grain beauty and individual size and shape.

Ruben Alvarez, commercial attache in Honolulu, informed the department that Hawaii and the US mainland were extensively using acacia wood for making coffee tables and for interior decoration.

Alvarez also told Jovito A. Rivera, chief of the foreign trade matters division of the department, that the trade channels for acacia are furniture makers, building contractors, interior decorators, architects and "do-it-yourself" retail outlets.

The trade official said acacia prices in Hawaii ranged $0.60 to $1 per board foot, depending on the quality.

He said that at least 10,000 board feet of acacia wood is the monthly requirement of the Aloha state.

Alvarez also reported that Hawaii's acacia trees would be exhausted after five years.

This led manufacturers, he said, to survey the potential acacia supply in the Pacific area, including the Philippines.

He suggested that Philippine acacia dealers enter into joint ventures with American and Hawaiian manufacturers.

* * *

GERMANY BUYS ISLAND RESINS

West Germany was the leading buyer of Philippines gums and resins in the world market last year, registering 666,507 kilos worth ₱385,372 according to the Bureau of the Census and Statistics.

Foreign trade statistics revealed that Italy came second with 231,668 kilos worth ₱141,464 and France third with 42,189 kilos worth ₱31,548.

* * *

URGE EXPANSION OF LOG MARKETS

Brigido R. Valencia, president of the Filipino Association of Log Producers and Exporters, urged the Philippine government to expand trade facilities in the continent for the purpose of promoting of Philippine timber exports in Europe.

"In my talks with businessmen in Europe," Valencia said, "I found that they were unanimous in acclaiming the quality of Philippine mahogany, describing it as the best in the world because of its fine texture."

Valencia, who has just returned after a four-month sojourn abroad, made the following obesrvations:

1. German capitalists are willing to undertake joint-venture projects with Filipino lumbermen in the establishment of wood-processing plants such as veneer and plywood plants on certain conditions. The German businessmen will supply the machineries provided 30% of the value of the capital goods shall be paid before the shipment and the balance shall be arranged under a five-year payment plan.

The Central Bank, howeevr, allows only 10% payment on the value of the capital goods. This policy should be relaxed if we are to industrialize rapidly. German businessmen are interested not only in the lumber trade industry of the Philippines but also in the other business fields.

2. In Japan, the Ministry of Trade and Industry (MITI) has approved in principle the planned joint venture between Filipino log exporters and Japanese log importers, the former to pay 10% on the value of the machineries up on signing contracts and another 10% when the machineries are shipped and the Japanese banaks will take care of the other requirements and the balance will be arranged also under the five-year deferred payment plan.

Many Japanese capitalists will join hands with Filipino lumbermen in establishing wood-processing plants here as soon as the pending Treaty on Navigation and Commerce between the two countries will be approved.

* * *

WOOD RESUMES ITS PLACE IN BUILDING

By Jean Des Chammers
(A.F.P., Paris)

The swirl of revealed grain in a polished wood surface is more beautiful than an abstract painting. The warm glow of waxed wood surfaces gives livability and charm to an interior, either modern or traditional. Wood is one of the oldest building materials used by man, and now in its latest forms it has become one of the newest and most modern.

Perhaps a hundred thousand years ago, men of the Stone Age discovered the value of wood, and piled tree trunks and branches interlaced and intertwined before the entrance of their cave homes. Later, it served in the construction of huts, then of houses, and finally as the framework of veritable works of art.

After the appearance of iron, steel, and reinforced concrete the uses of wood decreased. But in recent years, it has made a glorious comeback in a new form. It is once again the fashionable building material all over the world, and artists again turn to it for their creations in architecture of homes, schools, churches, and even office buildings. Furniture designs emphasize the natural grain and tone of the woods which compose them, and houses are paneled inside and outside with durable and versatile wood panels. Little by little, it has reassumed its former place of importance in construction, but in order to do this, it has had to change its "face". It has lost its massive contours, and now wood framework can be as airy as a framework of steel. Sawed planks have given way to thin panels. Plywood is the watchword today, and it is the most versatile and beautiful of materials available now. With the new heat-proof, alcohol-proof finishes, it rivals plastics as a surface for tables, counters and walls. In the new ply panels, it is a far more beautiful, durable, and more easily cared for surface than plaster, wall-paper, or stone.

Its charm lies in the revealed grain of wood. And the strength lies there, too. When two layers of wood are laid one upon the other with the grain running at ninety degree angles to each other and it not just two layers are placed in this way, but three, four, or even five, then we have a material which is far stronger than the equal weight of steel.

The industry of plywood making was really first born in the first ten years of this century in the Baltic states, in Russia, Finland, and Poland, all countries rich in lumber resources and especially in birch and alder trees.

The First World War gave this growing industry a great boost. Aviation was a budding industry, too, and planes were made of wood at that time. The fuselage and wings were made of plywood wrapped in canvas, and because aviation grew during the war, plywood also became very important. Since then, its uses have multiplied, and one has only to visit the beautiful homes in the suburbs of Manila to see how magnificent the local woods are in architecture and furniture design.

One can easily understand how this vogue came to be when one realizes that plywood is sixseven times stronger than its equal weight of steel plate, and fourteen times more durable. As for beauty, who would change the warm, living grain of natural waxed wood for a cold polished plate of steel? Even in the creation of skycrapers there has been a revulsion of feeling away from the polished glass and steel structures with their unfeeling reflections and an attempt to incorporate more wood surfaces into the exterior in order to give more living tones and warmth to the building.

Almost all woods lend themselves to plywood industry. There are a few varieties which belong to the family of Conifers which are more suitable for the making of plywood. These are Douglas and Oregon Pine in the United States; Para Pine in Brazil; Birch, pine, and fir in Europe; teak in many countries of Asia; and the many varieties of hard and lovely woods of the Philippine Islands, notably mahogany.

For some years, it was difficult to get a good plywood because it was so hard to make a good glue to hold the layers together. In order to understand this, it might be best to describe how the log is stripped before the "ply" are glued together. After the bark is removed from the tree, the log is fixed on a machine which resembles a gigantic tower.

* * *

PULP IMPORT URGED ON ICA

A proposal was made last Saturday that pulp, instead of finished paper and paper products, be brought into the Philippines in connection with the joint PI-US textbook printing program.

The proposal was made at a conference of executive officers of the Pulp and Paper Manufacturers' Association with Paul D. Summers, ICA director, and C. Earle Hoshall, chief of the ICA educational division.

Paper manufacturers expressed fear that the entry of large quantities of tax free printing paper into the country would adversely affect the local pulp and paper industry.

James L. Chiongbian, PPMA 1st vice president, told Summers and Hoshall that local paper mills can now produce bookpaper sufficient to meet Philippine market requirements.

The entire need for the PI-US five-year textbook printing program, they said, could be also supplied by local manufacturers.

Chiongbian and Villa assured the ICA officials that the quality of local paper can compare favorably with that of foreign make.

The PPMA included in its proposal the condition that it was willing to accept payment in kind like pulp and other raw materials used in paper making, for the processing by local paper plants of the pulp brought in by the ICA.

The PPMA also guaranteed that the cost price of locally made paper, under its proposal, will not be a centavo higher than the prevailing price in the world market.

* * *

MIXED PI EXPORTS REPORTED

The department of commerce and industry reported yesterday that Philippine exports to the United States west coast showned mixed trends last month.

Lumber, red and white lauan, enjoyed a continued brisk demand and apitong perked up, the department said.

Copra and coconut oil slightly dipped. Copra started at $195 per ton and finished $180 as coconut oil opened at 14.75 cents per pound and leveled off to 13 cents.

Raw sugar began at $6.05 per hundred weight, went up to 06.40 in mid-month and closed at $6.30.

The market for plywood and copra cake remained quiet.

Jose de los Reyes, commercial attache at San Francisco, urged local lumber exports to comply with the grading requirements of the US National Hardwood Lumber Association.

Adherence to these rules he said, would avoid refusal of shipments and penalties and would insure continuous trade.

At the same time, the trade official reported that the retail sales of Philippine food products in California had expanded.

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QC FLOOD WATERS DID NOT COME FROM MARIKINA AREA

It has been claimed that the recent flood in Quezon City was mainly due to the denuded forests in the Montalban-Marikina region.

That's far from the truth. Not a single drop of water from the Marikina river joined the rampaging waters of Quezon City until the junction with the San Juan river somewhere in Sta. Ana and Mandaluyong.

How could the water from the Marikina river possibly join the Quezon City flood when the river level is at least 15 meters lower than the adjacent portion of Quezon City in Quirino district?

Because of the low level of the Marikina river, the Nawasa has to use pumps to get water from it to bring to the Balara filters.

Where then did the recent flood waters come from? It was the rain water that fell so unusually strong thru the night within the area, period.

The squatters' houses along the creeks were to blame for obstructing the flow of water. They should not really be allowed there.

Let's not try to look far for the cause of the flood.—*Rev. Jose S. Sunga.*

We The People — *Manila Times*

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RUBBER FIRM EXPANSION SET

The worldwide production facilities of the Firestone Tire and Rubber Company are currently being expanded by a $120 million construction and modernization program, according to a report just received from Harvey S. Fireston, Jr., chairman and chief executive officer of the company, by J. N. Vaughan, president and general manager of Firestone Tire and Rubber Company of the Philippines.

Firestone sailed recently with Mrs. Firestone on the Queen Elizabeth for Europe where he will participate in the dedication of a recently completed tire plant at Alcochete, Portugal, just outside Lisbon. While in Europe he also will inspect other Firestone manufacturing and distribution facilities.

Included in Firestone's plans are five new plants. Tire manufacturing facilities are now under construction in Calgary, Alberta, Canada, and Bethune, France. Synthetic rubber plants will be constructed in Jort Jerome, France, and Bareilly, India, and a new plant will be completed this year in Orange, Texas, for the production of Coral and Diene man-made rubbers.

Other new facilities are being built at the company's Hopewell, Va., installation for the manufacture of synthetic fibers and polypropylene.

Expansion and modernization programs are under way at all Firestone's North American tire plants and are scheduled to be completed yet this year. Included in this are plants in Akron, Ohio; Pottstown, Pa.; Memphis, Tenn.; Des Moines, Iowa; Los Angeles, Calif.; and Hamilton, Ontario, Canada. Also scheduled for expansion and modernization is the textile plant at Woodstock, Ontario, Canada.

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LOG, LUMBER PRODUCERS URGE MARKET IN GERMANY

Philippine log and lumber producers and exporters are putting up a concerted front in urging the government to open "incentives" to penetrate European markets for local logs and lumber through relaxation of foreign exchange policies.

Brigido R. Valencia, president of the Filipino Association of Log Producers and Exporters said Philippine lumber and log industry must find other European markets in addition to Japan, the present richest market for local logs and lumber.

Valencia who just arrived from an extensive observation tour of possible European markets added that the country should look for new horizons and "wake up to the demanads of the jet age" if it is to survive world competition for its products.

He said there is a "million dollar demand for local lumber in Italy, Germany, England and low countries of Europe which should open Philippine authorities' eyes to improve Philippine foreign trade.

Sizing up the prospects, Valencia said that the Philippines can deviate at least 1/4 of the total lumber and log trade to West Germany. He estimates this new market at about $1.5 million a month with the proper government protection and incentives.

The country has a monthly export of 80 million board feet of lumber and logs costing about $4.5 million mostly directed to Japanese markets, he said.

European buyers, he noted are paying much higher price for first class lumber which are shipped out from the country as raw logs and reached European markets in finished forms.

In his observations in Hamburg, Bonn and leading West German cities, Valencia noted the Philippine products there are not advertised and are suffering propaganda setback as compared to other countries like Japan.

An example is that of the famous Philippine mahogany which has the best texture reaching the German market through Japanese lumber finished producers and exporters.

He noted a rather weak competition offered by other world best lumber against the Philippine mahogany. He said the possible contest may come from West Africa which has similarly good African mahogany but its texture inferior to the local mahogany.

West German businessman are prepared to sell not only logs and lumber from the Philippines but also other products which command respect in the world market like sugar, copra, copra products, hemp, abaca, and iron ore, Valencia said.

Philippine currency policies have restricted if not discouraged businessmen in finding markets abroad, one case in point is the lack of incentive provided by the so-called dollar retention rule of the Central Bank. This has discounted the establishment of foreign offices for local businessmen to make representations in this foreign markets.

He said he plans to request the two leading log-lumber groups the Philippine Chamber of Exporters and Producers and the Producers and Exporters Association of the Philippines — to discuss and offer recommendations to authorities on the following matters:

1. Expanded government incentives toward tapping West Germany market through foreign currency relaxation and advertising;

2. Adoption of wider multi-currency policy for letters of credit in pound sterling and mark countries; and

3. Allow German capital willing to undertake joint-venture projects with Filipino lumber men in the establishment of wood processing plants such as veneer and plywood plants on certain conditions.

Explaining this proposal, Valencia said German businessmen will supply the machineries provided 30 per cent of the value of the capital goods will be paid before the shipment and balance will be arranged under a five-year payment plan.

Valencia said the country needs German technical know-how and skills to help develop some of the nation's industries. — *Manila Times*

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OVERSHIPMENTS OF LUMBER BARED

Overshipments of lumber to Japan were reported to the presidential fact-finding committee yesterday by PFFC agents who have just returned from a special mission to Japan.

Lt. Cmdr. Marcelino Calinawan, PFFC chairman, said last night that lumber overshipments worth millions of pesos have been unloaded in Japan ports for the past few years.

By overshipping, an exporter is supposedly paid an additional sum in dollars which he then salts away in a foreign bank.

Photostats of documents showing overshipments of lumber were obtained from Japanese lumber importers and are now in the possession of Calinawan. They will be used as evidence against the exporters.

Calinawan said that several leading Filipino lumber concessioners were involved in the irregular shipments of lumber to Japan.

He said that the PFFC will start questioning persons involved in the copra overshipments to Europe. The PFFC has official documents showing the overshipments made by local copra exporters. The documents were obtained by PFFC agents from Amsterdam, Netherlands, months ago.

Questioning of copra exporters will start Tuesday at the office of the harbor police, Calinawan said. Central Bank and Philcoa representatives who have something to do with copra exports will also be questioned Tuesday.

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RESEARCHERS FIND NEW USES FOR SUGAR AND BY-PRODUCTS

By Rod F. Concepcion

The tiny, white crystals you stir in your coffee cup has innumerable uses — aside from sweetening. Sugar and its by-products, thanks to sucro-chemistry and research, are showing possibilities that reap wonders in the fields of medicine, industry, chemistry, and others.

Although majority of sugar research turned out successfully abroad, utilization of this ordinary food item's by-products for commercial end has been carried out in this country to some paying extent.

It was estimated that a metric ton of sugar cane produces 1.82 piculs of marketable sugar. After the sap was squeezed out, what remains is not waste! The residue consists of dry *bagasse* (130 kgs.), dry press cake (6 kilos) and molasses (25 kgs.).

The first successful pulp and paper mill in the world ever to feed on bagasse to produce bond paper, the Cia de Celulosa de Filipinas, was established in 1940 in Bais, Negros Occidental. The first pulp and paper plant in US designed to grind out paper products out of fibrous cane residue was put up only in 1954. Around 14 such pulp and paper operating ever since in the different parts of the world, said E. Villareal of the Philippine Sugar Institute.

While a portion of bagassee here is utilized ordinarily as fuel, a negligible part is manufactured into paper and semi-hard insulation board. In the fiberous refuse, it is the pith area which offers great promise of being converted into fine papers, corrugating boards wrapping paper, line board, greaseproof and glassine papers, newswprint, and so on.

When fully developed, "lawanit" wall board and plywood will meet a heavy competition in local market with cheap and equally sturdy bagasse wallboard and insulating panels.

Furfural is just one product that can be obtained from bagasse. It is employed as component of phenolic resin; extractant of butadine (a raw element in the manufacture of synthetic rubber); processing agent for refinding lubricating oil, resins, and so on; as a raw base in the production of furtural derivatives such as furfuryl alcohol, furagil, furic acid, and others.

Textiles containing rayon turned out of cane fiber are not remote possibilities here. Rayon fibers are produced from nitroglycenine and alpha-cellulose, both obtained from bagasse.

In 1939, an interesting process which developed out of the utilization of bagasse in New Orleans resulted in the creation of plastic materials found ideal in mass-producing toys, toilet articles, household utensils, and so on. Plastic-making studies were undertaken in the Philippines before the outbreak of the war by NDC technicians. They were quite successful, in fact. The plastics which resulted from the experiments were of the thermo-setting variety, one that was hard, durable and water-repellent.

Out of the fibrous pulp, bagasse mulch, poultry litter, and charcoal briquettes were also successfully

manufactured. Even household vinegar can be made out of molasses-based acetic acid. Acids and alcohols extracted from cane residue can be transformed into esters while residual liguin may be turned into fuel or developed into organic fertilizers.

Molasses, just after liberation was claimed by to be "wonder drug" and was sold in bottles like patent medicine. It was believed to cure several ills and afflictions like pimples, rheumatism and arthritis. Of course, the claims turned out to be a hoax although nobody denies that molasses has been used as feed for horses, pigs, and some other domestic animals.

Sugar molasses turns out yeast of commercial value which is valuable in baking industry; protein-processing; manufacture of household dyes, soaps, synthetic rubber, anti-freeze fluid, essential oils vital in perfume-making, pharmaceuticals, and others. Vitamin B complex can also be processed out of molasses-derived yeast.

The wax that holds the lampblack on your carbon papers or the wax you use in polishing the floors or shoes may be taken from the cane residue.

Sugar can become a strategic material. Chemicals made from cane sap can be prepared into explosive material used in making bombs, bullets, TNT sticks, firecrackers, etc. Yet, its peaceful utilization include several industries like metallurgy, electro-plating tanning, and others.

The safety glass sheets in your car may be stuck together with a plastic adhesive obtained from sugar-insulin extract shot into your arm may be sugar-derived. The slice of ham on your breakfast table or between a sandwich bread was cured in sugar-containing solution.

The benefits of sugar-based chemicals and by products to mankind seem endless. With the intensification of sugar research in this country and the full development of sugar cane residue into vital industries that feed on this crop's "wastes," more industries would crop up absorbing a great portion of the unemployed stratum of the population. Meanwhile, sugar and its wonders offer an enticing picture for industrialists and investors to sink in some fortune to fully develop the utilization of sugar by products into dollar-earning enterprises. — *Manila Times*

* * *

FORESTERS PLANT TREES TODAY FOR PROSTERITY OF THE FUTURE

By Amador J. Evangelista

While it takes only a year or two for a farmer to produce a crop out of the soil, it takes about 30, 40 or even 100 years for a forester or a tree planter to nurse the seedling planted into a towering timber.

In the Philippines, thousands of trees have been existing since time immemorial, particularly those that adorn the mountains. A good number of them had had some historical significance in the sense thta they served in good stead the Katipunan. It is said that trees were used as signal and look-out stations by the Katipuneros during the revolution.

This is the consolation of foresters in the bureau of forestry and tree planters. They plant trees today for tomorrow's prosperity. Tree planting is like an insurance. The planter invests his efforts for the benefit of the succeeding generations. What our forefathers have done for those who are coming after us.

Last fiscal year (1958-59), there were exported 1,133,693,636 board feet of logs valued at ₱107,465,-338.49 and 63,867,120 board feet of lumber valued at ₱15,902,510.42. The bureau of census and statistics ranks log and lumber together third among the leading exort products of the nation.

If trees do not die a natural death, they are "murdered." And the "murdered" is not the only one who suffers the misdeed. For the wrongful out of one not only the present but also the future generations share in the tragic consequences The wholesale destruction of forest in China some 2,000 years ago is still having its adverse impact felt by the Chinese today. Agriculture there is almost dead because of the improvement of the soil due to erosion. Drought and flood are very common. Most countries in Southwestern Asia, like Iran, the Arabian Peninsula and Jordan have either forests of minor significance or forests which are on their way to degeneration—all due to the past folly of man.

Our country, judging from resent indications, seems to be in a hurry to join the league of treeless nations. Already, there are some provinces whose forests are so badly depleted that agricultural lands have become unproductive owning to erosion. Lumbermen say that forest depletion is not the result of logging activities, but rather of the unchecked system of kaiñgin cultivation. The government should find a way to alleviate the economic plight of the kaingineros. Agricultural lands, not forest lands, should be cultivated.

Reforestation or tree painting cannot be expected to offset the gain in pace which deforestation has already made. Forest destruction must be put forests must be preserved and judicously used. Still, tree planting must be encourage not necassarily for our sake but for those who will succeed us. Reforestation may be costly in terms of effort and money, but it is the only way to restore forest vegetation in denuded areas.

* * *

LINE OF WOODEN PRODUCTS FROM PI DISPLAYED IN NY

A new line of Philippine wooden products for the table will be displayed to buyers here Monday.

The "carabao" line of dishes, bowls, trays, serving implements and other articles is made of heat-resistant, wrap-prooof acacia wood from the Philippines.

Promoters of the products have high hopes that they will become popular in the United States and will enable the Philippines to compete with Japan in the sales of wooden table and gift wares.

Lew Shoskes, an executive of Shriro Trading Corporation, told UPI that the Philippines products would have to compete with less expensive Japanese articles in the American market.

The Philippine tableware is designed to retail at from $4.95 to $34.95 per article.

Shoskes, whose firm operates a sawmill in the Philippines, cited United States department of commerce statistics showing that Philippine hardwood imports in that category have been running about $50,000 a year compared with $5 to $7 million for Japanese imports.

"We expect to develop the industry so that the Philippines can compete," he said. "Wages are higher in the Philippines than in Japan. The Philippines has fewer craftsmen and lower productivity.

These are some of the problems that must be overcome."

He said that two big United States stores—tailored woman and niemanmarcus—had placed orders for the Philippine wooden products and that saveral department stores had shown interest.

Ambassador Raul T. Leuterio, Philippine consul-general, is scheduled to cut a ribbon around the "carabao" line at Monday's opening of the "little management" exhibition. The ceremony will follow a champagne breakfast.

Buyers from many parts other countries are expected to attend the one-week exhibition.

* * *

STEADY RISE IN TIMBER OUTPUT BARED

Total timber production registered a steady rise for the last five year (1955-1959).

Records at the bureau of the census and statistics showed that the 1955 total timber production was 3,923,287.97 cu. m. This record was bettered by the 1956 production total for turning in 4,525,815.76 cu. m., or an edge of 602,527.79 over the output.

Production trend reached a new high in 1957 when the annual aggregate figures registered 4,614,794.27 cu. m., or an increase of 88,978.51 cu. m. over that of 1956. The production only reached 4,328,752.40 cu. m. Finally in 1959, the all time high-point of 6,252,977.59 cu. m. was registered.

MIXED PI EXPORTS REPORTED

The department of commerce and industry reported yesterday that Philippine exports to the United States west coast showed mixed trends last month.

Lumber, red and white lauan, enjoyed a continued brisk demand and apitong perked up, the department said.

Copra and coconut oil slightly dipped. Copra started at $195 per ton and finished $180 as coconut oil opened at 14.75 cents per pound and leveled off to 13 cents.

Raw sugar began at $6.05 per hundred weight, went up to $ 6.40 in mid-month and closed at $6.30.

The market for plywood and copra cake remained quiet.

Jose de los Reyes, commercial attache at San Francisco, urged local lumber exports to comply with the grading requirements of the US National Hardwood Lumber Association.

Adherence to these rules he said, would avoid refusual of shipments and penalties and would insure continuous trade.

At the same time, the trade official reported that the rental sales of Philippine food products in California had expended.

* * *

OVERSHIPMENTS OF LUMBER BARED

Overshipments of lumber to Japan were reported to the presidential fact-finding committee yesterday by PFFC agents who have just returned from a special mission to Japan.

Lt. Cmdr. Marcelino Calinawan, PFFC chairman, said last night that lumber overshipments worth millions of pesos have been unloaded in Japan ports for the past few years.

By overshipping, an exporter is supposedly paid an additional sum in dollars which he then salts away in a foreign bank.

Photostats of documents showing overshipments of lumber were obtained from Japanese lumber importers and are now in the possession of Calinawan. They will be used as evidence against the exporters.

Calinawan said that several leading Filipino lumber concessioners were involved in the irregular shipments of lumber to Japan.

He said that the PFFC will start questioning persons involved in the copra overshipments to Europe. The PFFC has official documents showing the overshipments made by local copra exporters. The documents were obtained by PFFC agents from Amsterdam, Netherlands, months ago.

Questioning of copra exporters will start Tuesday at the office of the harbor police, Calinawan said. Central Bank and Philcoa representatives

who have something to do with copra exports will also be questioned Tuesday.

* * *

MAKILING PARK RETURNED TO UP

President Garcia signed a proclamation returning the 3,900-hectare Makiling Park to the University of the Philippines recently.

The board of regents of the state university authorized president Vicente G. Sinco to prepare a plan for the development of the entire park, taking into account the need for personnel and funds for its management and use.

The UP college of forestry, which helped to develope this mountainsite before the bureau of parks and wildlife took it over, hopes to expand its experimental station. The college of agriculture hopes to be allowed to use some of it for grazing land.

* * *

FORTICH BLAMES DENUDED FORESTS ON OBSOLETE LAWS

Agriculture and Natural Resources Secretary Cesar M. Fortich in a speech over the weekend blamed obsolete laws on conservation as responsible for the present crisis regarding the country's denuded timberlands.

Fortich was principal speaker during the Boy Scouts of the Philippines national executive luncheon meeting.

The new DANR head explained that the two kinds of taxes imposed on lumber licensees today—the forest charge fees and the reforestation fees—deprive the licensees the responsibility of reforesting commercial forest areas.

Thirty years ago, Fortich remarked, the lumbermen and even the kaingineros were the ones replanting the forests. Today, he added, this responsibility has been assumed by government agencies.

Fortich, however, expressed high hopes that the newly created Reforestation Administration, primarily intended to hasten the reforestation program will minimze if not entirely solve the country's major conservation problems.

The Reforestation Administration will be in the category of a bureau. It will absorb funds and persnonel of the present reclamation of the bureau of forestry.

The DANR head also:

1) Solicited the help of the defense department to police our forest areas;

2) Corrected reports that the recent floods in Manila and suburbs were caused by deforestation;

3) Emphasized that only commercial forest areas "and not just any barren lands" will be reforested;

4) Announced a new bill in Congress authorizing both the secretary and undersecretary for natural resources to sign applications for homestead and free patents; and

5) Invited the boy scouts national council to thresh plans with DANR officials on the feasibility of cooperation toward a reforestation and conservation project of nation wide scope.

* * *

POLITICAL MEEDLING SCORED

By Macario T. Vicencio

District Forester Gerardo Tamayo has devised a patrol system for Negros Oriental forests to combat the depredations of kaingineros. "It's terrible. Negros Oriental is dotted with kaingins," Tamayo told newspapermen. The group patrol system has been devised in view of the fact that kaingineros have, on accasions in the past, challenged individual forest rangers in the enforcement of forest laws.

High up in the mountains of Sta. Fe in Nueva Vizcaya, a group of men may be seen every morning clambering up the steep slopes and going down the same tortuous trail long after the sun has dipped behind the mighty Cordilleras.

Strapped to their backs, as they make the dangerous climb, are huge rattan baskets filled with Benguet pine, teak molave, narra and mahogany seedlings.

All day long, these men go about transplanting these seedlings and caring for those already planted on some 1,500 hectares of denuded land. This back-breaking labor has been going on almost every day since 1946.

Today, the work of 15 years has seen reward in a lush growth of stately pines covering 500 hectares of once barren earth. And over another 200 hectares, teak and mahogany are slowly including their way sunwards, beating down cogon and talahib, to give fresh vegetation cover to an arid land.

Here, at least, these forestry officials and personnel have proved convincingly that reforestation can be done with fairly encouraging results. They have amply demonstrated that wastelands given up for lost can be reclaimed and made to bloom again.

At the same time, they have also drawn attention to the need for more funds to pursue reforestation work. As it was—and still is—reforestation funds have been niggardly. Public support for the effort has manifested itself in mere lip service.

Of the 56 reforestation projects all over the country however, only about 23 could be classified as successful undertakings. The rest have suffered serious setbacks, and some have been party abandoned and given up for lost.

As usual, lack of funds, public indifference and the unceasing destruction by *kaingeros* have all contributed to wreck these reforestation projects.

Funds for reforestation come from the collection of 40 and 50 centavo fees for every cubic meter of timber cut for commercial purposes. The law provides that the funds raised therefrom be *exclusively* used for reforestation.

However, this has not been the case. Of the ₱2 million derived annually from these fees, at least one half has been appropriated for purposes other than reforestation. This half goes to pay the salaries and wages of political proteges forced upon the forestry bureau by unscrupulous politicians.

Like the bureau of posts, the forestry bureau has been made a favorite dumping ground for political hangers-on, and provincial and hometown political lameducks.

If the reforestation effort has moved at a snail's pace, if funds have been sorely inadequate, then Congress is partly to blame for its officious meddling, and for saddling the bureau with an army of political recommendees.

It is not surprising therefore, that lumbermen of late have been rather reluctant to pay the required 40-50 centavo fees. They argue that the funds realized from these fees are not spent properly. They point to the loggedover areas in their concessions which have not been reforested.

Bureau of forestry records show that ₱591.29 has been spent for every reforested hectare. Responsible forestry officials have pointed out however, that actually only ₱250 goes to reforest a hectare. The balance of ₱349.29 or more than half of the sum has been squandered and paid out to salaries and wages of political proteges.

Not content with inflicting upon the bureau a horde of incompetents, several congressmen succeeded in grabbing sizable sums from a special reforestation appropriation.

Several reforestation projects started auspiciously only to fail because of unreasonable outside interference. Some such projects in the Visayas and in the Cagayan Valley failed because politicians had the bad habit of forcing upon the bureau their recommendees who knew nothing about reforestation work.

The reforestation work in the country has already been too slow, as a matter of fact, much too slow. Politicians should not set the undertaking farther back by stupid meddling. The dangers of deforestation should not be trifled with. We have already seen how costly deforestation can be in terms of lives lost and property destroyed.

(To be continued)

* * *

NEW OFFICE, NEW SECRETARY

By Macario T. Vicencio

Sixty-three persons have been arrested for violation of the anti-kaingin law during the months of April to June, according to Amado Pura, district forester.

Pura said that 46 of them were given warning as they had just started clearing the underbrushes; two were accused before the Castilla justice of the peace court; and the rest were still being investigated.

By virtue of a law recently approved by the President, reforestation work, beginning last July 1, has been lodged with a new government agency called the Reforestation Administration.

This agency, directly under the Department of Agriculture and Natural Resources, abolished the Reclamation and Reforestation Division under the forestry bureau.

As a government entity, independent of the bureau of forestry, there is reason to hope that added vigor and drive will now be given the country's reforestation effort.

The law which created the new agency was sponsored no less by Rep. Cesar Fortich who took his oath as agriculture secretary two days ago.

In sponsoring the law, Secretary Fortich pointed out before the Congress that deforestation has reached dangerous proportions and that there was an urgent need for immediate reforestation of blemished areas.

He explained that the creation of a separate and independent entity from the forestry bureau to handle exclusively reforestation work, would prevent once and for all, the diversion of much-needed reforestation funds for other purposes.

Secretary Fortich said that in order "to avoid the possibility of repeating the same and so that reforestation funds shall be exclusively used for the purpose," a separate agency must be created to handle reclamation work.

The secretary also stressed the importance of intensifying the educational drive on forest conservation and reforestation. As it is, he observed, most of the people do not realize the dangers of deforestation through indiscriminate logging and the *kaingin* method of farming.

The information section of the forestry bureau is poorly staffed and disorganized. All it has accomplished so far is distribute pamphlets containing pictures of forest fires, a few denuded mountains, and mostly of ranking bureau officials on periodic visits to reforested areas.

In pursuing an intensified information drive, the barrio councils can be most effective, considering that they are closest to the people. They should be made to conduct regular community assemblies, during which the need for forest conservation and reforestation is given emphasis

But more than an intensified and nationwide information campaign, *all* the people must take active participation in the reforestation effort—that is, they must actually go out and help reforest denuded areas.

Local government must take the lead by asking the people to plant trees. In badly stricken areas, the local government should at least ask

the people to devote one or two days of every months to planting trees.

Seedlings are plentiful and the forestry bureau has been distributing them for free. Several farm and agricultural schools have been provided with tree-seedlings by the bureau. These vocational schools alone, have reforested some 10,000 hectares of barren land.

Schools, civic organizations, including the armed forces must join in the nationwide effort. Not only should a week be set yearly for tree-planting. It must be a continuing effort.

Reforestation will be useless, if at the same time no effort is made towards conserving our remaining forests. While it is true that the PC, NBI and other law-enforcement agencies have joined in going after *kaingeros* and illegal loggers, the effort put into the drive is still wanting.

Illegal logging activities continue to go unchecked. Prosecution of guilty parties has been seldom, and if prosecuted, in most cases get away with only a warning.

So far, there has not been a single case of a license or permit withdrawn or cancelled by the bureau for violation of existing forestry regulations on timber-cutting.

As a matter of fact, the bureau continues to issue licenses and permits for logging to persons previously arrested by the PC for violating forest laws.

In the matter of combatting forest fires, the airforce could be used most effectively. In several southeast Asian countries, airforce planes have been carrying daily flights over their forest regions to spot forest fires.

The use of planes have minimized forest fires so much so that no destructive fires have been reportedly lately in these countries. Since all our airforce does is ferry government officials and undertake mercy mission the government could avail of its services in forest conservation.

On the legal aspect, more teeth must be given our forestry laws, Stiffer penalties must be meted out to *kaingeros* and to persons found engaged in illegal logging.

* * *

OFFICIALS, ALIENS, DUMMIES

By Macario T. Vicencio

A total of** 217 **persons have been arrested by the PC in Oriental Mindoro for illegally cutting timber. Major Raymundo Paredes, PC commander, said that** 11 **have been convicted while** 117 **are awaiting trial in seven towns.

The multi-million-peso Gumain-Porac irrigation system is threatened by erosion. Gov. Francisco Nepomuceno has asked the forestry bureau to increase the number of forest guards to stop kaingineros. Creeks have silted up while artesian wells in Macantian, Porac, have completely dried up.

Fabulous profits have blinded many a lumberman to the dangers of deforestation. Spurred by the unprecedented demand for Philippine logs abroad, concessionaires have plunged into a frenzy of tree-cutting without parallel in history.

Young as well as mature trees fell before the logger's axe. Consequently, when the demanad suddenly dropped two years ago, several of these lumbermen found themselves with millions of board feet in felled timber.

Without a ready market, this enormous quantity of logs had to be abandoned and left to rot. In several logging concessions, thousands of decaying logs may be seen today, clogging streams and rivers.

Forestry officials have placed the value of these rotting logs at close to ₱3 million.

Irresponsible logging dominates most forest concessions operated and managed by aliens through Filipino dummies. Scores of these concessions are found in Mindanao and the Bicol region.

According to forestry officials, there are at least 700 of these alien-controlled concessions violating with impunity the regulations governing logging.

Asked why their licenses have not been withdrawn, and the dummies prosecuted, the forestry officials said that both the dummy and the alien enjoy the protection of powerful politicians.

In a number of cases, they added, the politicians themselves are the dummies of the alien interests who even now are slowly taking over control of the country's lumber industry.

To really enforce logging regulations will require thousands of additional forestry personnel, to be assigned to the numerous timber concessions. Considering that the bureau has always lacked adequate funds, it would be difficult, if not impossible, to employ additional personnel at this stage.

Even if this should be possible, there would still be the question of whether or not these employes can enforce logging regulations, free from persecution or reprisals by politicians in league with alien interests.

Old-timers and ranking bureau officials believe that the strict enforcement of logging regulations lies not in the employment of more personnel.

They pointed out that destructive logging practices can only be contained by putting a stop NOW to the further issuance of new permits and licences to concession-applicants.

So much of the country's timberland, classified as commercial forests, has already been released for exploitation and these areas, in the opinion of forestry experts, can adequately meet our timber requirements.

Once the government adopts this policy, lumbermen will have to exercise judicious logging methods, or face the prospect of going out of business

(*Continued on page* 74)

Sunshine Corner

Compiled by MLM

"DOCTOR? DOCTOR?" called Mr. Schultz frantically, "come quick. You know my wife always sleeps with her mouth wide open and just now a mouse ran down her throat."

"I'll be over in a few minutes," said the doctor. Meanwhile, try waving a piece of cheese in front of her mouth and maybe the mouse will come out."

When the doctor reached the Schultz apartment, he found Mr. Schultz in his shirt sleeves waving a six pound flounder frantically in front of the prostrate Mrs. Schultz's face. "What's the big idea?" said the exasperated doctor. "I told you to wave a piece of cheese. Mice don't like flounders."

"I know, I know," gasped Mr. Schultz. "But we've got to get the cat out first."

* * *

Two other cannibals—darned if they didn't belong to the same tribe!—were strolling aimlessly down the jungle Fifth avenue. "Who was that lady I seen you with last night?" Asked the first cannibal.

"That was no lady," the other assured him. "That was my dinner."

* * *

A CHEMISTRY PROFESSOR chalked a formula HNO_3 on the blackboard. Then he wheeled about and pointed a finger at the sleepiest member of the class.

"ER,ah," stalled the unhappy student, "I've got it right on the tip of my tongue, sir."

"In that case," said the professor softly," you'd better spit it out, my boy. It's nitric acid."

* * *

A LADY IN VERMONT wrote to the Department of Agriculture and asked for a little advice on the care of chickens. "Every morning for the past month," she wrote. "I've discovered three or four of my hens lying on their backs with their feet in the air. What's the cause of this?"

The Secretary of Agriculture spoke to three of his assistants who called in an Undersecretary of State and three or four Ambassadors who happened to be standing around. They all put their heads together and sent the lady a telegram. "Your hens," it read, "are dead."

* * *

"I simply gotta divorce this woman," the disconsolate man explained to the court. "She insisted upon keeping a pet goat in our bedroom. The smell got so terrible I just couldn't stand it any longer."

The judge shook his head. "That sounds bad," he admired, "but couldn't you open a window?"

"What?" cried the husband. "And let all my pigeons get out?"

* * *

"What's the idea stopping in the middle of Central Park?" came an indignant voice from the back of the cab.

"Didn't I hear a young lady holler 'Stop?' said the taxi driver.

"Get on with it," said the voice. "She wasn't talking to you."

* * *

Teacher: What do elephants have that no other animals have?

Willie: Little elephants.

* * *

A mother was writing to her son, congratulating him on his engagement. "My son, what glorious news. Your father and I rejoice in your happiness. It has long been our greatest wish that you should marry some good women. A good woman is heaven's most precious gift to man. She brings out the best in him and helps him to suppress all that is evil."

Then there was postcript in a different handwriting: "Yuor mother has gone for a stamp. Stay single, you young fool."

* * *

When a ship finally put into a small island where a distress signal was noticed, the crew found two women and the corpse of a man, who had died recently. One of the women explained his death with:

"He simply wore himself out and died from exhaustion." The captain could not grasp it all, so the women continued:

"You see, he kept running from spot to spot to tear down the distress signals we kept raising."

* * *

A frowning woman walked up to a little boy she caught smoking, "Does your mother know you smoke?" she demanded.

"Lady," he countered "does your husband know you stop and talk to strange men on the street?"

FORESTRY IN THE . . .

(*Continued from page* 72)

since no additional forest concessions will then be granted.

The fear has been raised that should the government put a stop to granting additional licenses, the bureau's income will be adversely affected.

Forestry officials said that to bolster the bureau's income from forests, all that should be done is intensify the collection of fees and other charges. As it is, collection efforts have not been given sufficient drive.

Many concessionaires, it was pointed out have been remiss in the payment of forest charges. Long overdue payments on forest fees would easily reach a million pesos.

In the matter of widespread destruction of timberlands which constitute part of the country's main watersheds, faulty classification of our forests has, on the main, been responsible.

In several cases, forest areas have been classified as commercial and released to concessionaires. After a while, these areas were found to be watersheds.

By then, it was too late. The area had been denuded, and as a consequence, floods and droughts had started to blight the regions at the base of these vital watersheds.

Again, certain timberlands have been classified as fit for agriculture. The forestry bureau releases the area, and farmers take over.

For a year or two perhaps the land is made to yield agricultural crops. And then, soil erosion sets in. In no time at all, the area becomes a barren wasteland and is abandoned by the farmer.

In the Ilocos regions, Nueva Vizcaya, Zambales, Bataan and Pangasinan, huge areas have thus been wasted through faulty classification.

The country has certainly need for more experts to undertake the job of land classification. Unless we avail of the services of these experts, we shall continue to commit grievious efforts to declaring which areas should be reserved as forests and which should be declared fit for agricultural purposes.

* * *

INDISCRIMINATE CUTTING OF TREES AND FLOODS

Indiscriminate cutting of trees, illegal kaingin making, and other acts of vandalism in our public forests which contributed principally to our present deforested areas, were the indirect causes of the past destructive floods we have had.

NEED TO CONSERVE PARKS AND FORESTS

The need to conserve national parks and forests was stressed yesterday in a meeting of a group of civic leaders at the Avenue Hotel.

Lead by the former Natural Resources Undersecretary Armando Dalisay, the group sought to initiate a nationwide campaign aimed at instilling in the minds of the people the dire need for forests conservation.

The move was made more urgent by the disastrous floods in Luzon which have been exacting a toll of human lives and millions of pesos worth of property.

A long term plan to avoid a repetition of the floods was pointed to by the group as a primary reason for conserving forests.

The group plans to enlist local and national organizations in carrying out the work of protecting and developing national parks, reforestation and soil conservation.

Dalisay noted the need for keeping permanent forest zones throughout the Philippines to maintain a balance between open land and forest.

He cited the disastrous floods in Central Luzon which was the result of a precarious imbalance between these two elements.

Destruction of trees in watershed areas, wanton cutting of forest cover and the shifting of the top soil from elevated areas to the river beds have been contributing factors to uncontrollable floods, he explained.

To kick off the national drive towards park conservation and development, Ceferino Picache, president of the Quezon City Rotary Club, pledged his organization's cooperation in establishing a well-protected national park in the Philippines' capital.

Director Vicente de la Cruz of the national parks and wildlife gave his support to the project and called for similar projects throughout the country as part of national conservation efforts.

Also present at the meeting were Dr. Amando Clemente, and Raoul Beloso, former head of the National Rehabilitation and Resettlement Administration.

(From the *Manila Times, Aug.* 24, 1960)

The recent typhon "Lucille" and its accompanying flood which placed Manila and Quezon City as well as the surrounding areas under water while leaving in the wake thousands of victims either killed or rendered homeless was one of the grim influences brought about by deforestation.—*Manila Times*

LOS BAÑOS BIOLOGICAL CLUB

June 30, 1960

A SUGGESTION TO THE MEMBERS OF THE LOS BAÑOS BIOLOGICAL CLUB

If my memory does not fail me, I recall that during pre-war days the regular meetings of the Los Baños Biological Club used to be held on the last Thursday of the month (unless this day happened to be official holiday) at 7:30 p.m.

In my opinion, there were many advantages of that arrangement. Just to mention some:—By that time the students, faculty members, and scientists generally had had their evening bath and meal; had rested, to a certain extent, from the rigors of their daily chores in the school, office, or at home; and their minds were more receptive in ideas. In other words they were again *"raring to go"*, to delve on scientific problems. They then had the leisure and patience to listen critically to the reading of scientific papers and to enter into vigorous, constructive discussion on whatever subject was being presented. The meetings were lively and could proceed up to 9:30 or later in the evening. The scientists and faculty members used even to invite their wives and friends to those meetings.

Contrast the present set-up. We hold the Los Baños Biological meeting either on the last Thursday or Friday of the month at 4:15 p.m. As a result, the attendance is usually very poor. Why? Some Departments of the College of Agriculture may be having their seminars concurrently. There may be physical education classes or R.O.T.C. drills and office work going on. In the afternoon of Friday, many students, faculty members, and others who reside outside Los Baños, are usually in a hurry to go home for the week-end. They have neither the interest nor the patience to attend the Los Baños Biological Club meetings. Take note of the usual poor attendance at present meetings. Many of those who attend do so out of moral obligation, or just to please their superiors. Not many students and faculty members are attending the meetings these days. Perhaps they have not the time to do so or they have more important things to attend to. In short, pardon my using the following words, many are just paying *"lip-service attendance"* at current meetings of the Club.

In view of all the foregoing, it is my sincere belief that, in order to create an atmosphere more conducive to thinking and scientific discussion and in order to foster attendance at these meetings, they should be held at 7:30 p.m. on the last Thursday of every month during the academic year. This is a suggestion—a food for thought. Please consider it for whatever it is worth.

MANUEL R. MONSALUD
Secretary

* * *

Republic of the Philippines
Department of Agriculture and Natural Resources
BUREAU OF FORESTRY
Office of the District Forester
Laoag, Ilocos Norte

D-1, Publication July 22, 1960

The Editor
Forestry Leaves
College, Laguna

S i r :

I have the honor to enclose herewith a complete list of those who successfully passed the Forester Examination with the request that the same be published in the Forestry Leaves. Teh successful candidates were published in the July 21, 1960 issue of the Manila Daily Bulletin but the names of Forester Alfredo V. Sanchez and the undersigned were inadvertently omitted. This would at least cure the gross omission.

Very truly yours,
FLORENCIO B. MINA
Forester I

* * *

Republic of the Philippines
MUNICIPALITY OF MONTALBAN
R I Z A L
Office of the Municipal Council

MINUTES OF THE SPECIAL SESSION OF THE MUNICIPAL COUNCIL OF MONTALBAN, HELD ON APRIL 10, 1960 AT 8:20 P.M.

PRESENT:

Mr. Teodoro D. Rodriguez	Mun. Mayor
Mr. Jose P. Ramos	Mun. Vice Mayor
Mr. Cenon San Pascual ..	Mun. Councilor
Mr. Eleuterio Antonio ..	Mun. Councilor
Mr. Arsenio Nicolas	Mun. Councilor
Mr. Apolinario Espiritu .	Mun. Councilor
Mr. Octavio Manahan ...	Mun. Councilor
Mr. Gregorio Salvador ..	Mun. Councilor
Mr. Marcelino San Juan .	Mun. Councilor

Mr. Agapito Martinez ... Mun. Councilor
ABSENT: None

Mayor Teodoro D. Rodriguez called the special session as order at 8:20 p.m. and in the course of its deliberation the following was adopted:

RESOLUTION NO. 57
Series of 1960

After careful deliberaton and upon motion of Vice Mayor Jose P. Ramos and duly seconded by Councilor Arsenio Nicolas, it was

RESERVED BY THE MUNICIPAL COUNCIL OF MONTALBAN, in session assembled, to authorize the Municipal Mayor in causing for the survey of Communal Forest Parcel II, containing an area of 172 hectares and the Communal Land, containing of about four hectares, more or less, both, situated in the barrio of San Rafael, Montalban, Rizal.

RESOLVED FURTHER, That the Mayor shall negotiate in hiring a public land surveyor and enter into a contract therewith for and in behalf of the municipality in such manner as he may deem beneficial and advantageous to the interest of the municipal government.

Unanimously approved.

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* From Forestry Press Release.

* * *

RESOLUTION NO. 58
Series of 1960

The Secretary read Ordinance No. 1, current series, of the Barrio Council of San Jose, imposing a fee of ten (₱0.10) centavos upon persons, partnerships, or corporations engaged in hauling sand, gravel, soil, banda-banda and boulders taken from any part or within the jurisdiction of barrio San Jose; Provided, that the fee of ten centavos shall be paid for each ordinary truck load of said materials, and prescribing penalties for the violation thereof.

After due deliberation, on motion duly seconded,

IT WAS RESOLVED to approve the above mentioned ordinance.

Carried.

PAGE TWO ON THE MINUTES OF THE SPECIAL SESSION DONE ON APRIL 10, 1960

RESOLUTION NO. 59
Series of 1960

The Secretary read to the Council for its consideration, Ordinance No. 3, series of 1960, of the Barrio Council of San Jose, imposing a fine upon persons or live stock owners whose pigs, cows carabaos and other animals caught wandering, intruding and trespassing thereby causing damages to other properties, and presccribing penalties for the violation of the provisions thereof.

After due deliberation, on motion duly seconded.

IT WAS RESOLVED to approve the above mentioned ordinance.

Carried.

There being no other business to be acted upon the special session adjourned at 10:40 p.m.

ATTESTED:

(SGD) TEODORO D. RODRIGUEZ
Municipal Mayor

(SGD) JOSE P. RAMOS
Vice Mayor

(SGD) CENON SAN PASCUAL
Councilor

(SGD) ELUETERIO ANTONIO
Councilor

(SGD) APOLINARIO ESPIRITU
Councilor

(SGD) ARSENIO NICOLAS
Councilor

(SGD) GREGORIO SALVADOR
Councilor

(SGD) OCTAVIO MANAHAN
Councilor

(SGD) MARCELINO SAN JUAN
Councilor

(SGD) AGAPITO MARTINEZ
Councilor

(SGD) RODOLFO L. SUAREZ
Municipal Secretary

* * *

Department of Agriculture and Natural Resources
BUREAU OF FORESTRY
TIMBER INVENTORY PARTY NO. 6
Manila

Personnel

Sison, A. B. July 8, 1960
Director of Forestry
Manila

(Thru the Chief, Forest Management Division, Manila)

Sir:

I have the honor to inform you that I successfully passed the forester examination given by the Civil Service Commission in Davao City on August 8, 1959 with a general rating of 86.97%.

Very truly yours,

ANASTACIO B. SISON
Forester I

July 8, 1960

1st Indorsement

Respectfully forwarded to the Director of Forestry, Manila for his information and record.

MARTIN GUERRERO
Chief, Forest Management Division

CAMPUS NOTES . . .

(*Continued from page* 44)

GOLDEN ANNIVERSARY CELEBRATION OF FORESTRY EDUCATION IN THE PHILIPPINES AND FORESTRY CONFERENCE

PROPOSED GENERAL PROGRAM

1. November 29, 1960 (Tuesday) Los Baños
   - 9:00-10:00 A. M.—Arrival and registration of Alumni and Guests at the College of Forestry Building.
   - 10:00-12:00 A.M. and 1:00-5:00 P.M.—Conference. Trends in Forestry Education. (Professional, sub-professional, general and public information)
   - 2:30-4:00—Open house, College of Forestry, Forest Products Research Institute, Forest Experiment Station and the Makiling Reinformation).
   - 8:00 P.M. Bonfire Program
     1. Fireworks
     2. Skit, contributed by: College of Forestry, Forest Products Research Institute, Bureau of Forestry, Parks and Wildlife Office and Reforestation Administration.
     3. Surprise Numbers, One number to be contributed by: College of Forestry, Forest Products Research Institute, Bureau of Forestry, Parks and Wildlife Office and Reforestation Administration.
2. November 30, 1960 (Wednesday) Los Baños
   - 5:00 A.M.—Reveille, Forestry Campus
   - 8:00 A.M.—Opening of exhibits and exhibition games
   - 9:30 A.M.—Floral Offering
   - 10:00 A.M.—Convocation, College of Forestry building. Director Eugenio de la Cruz, M.C.
     1. National Anthem—Philippine Army Band
     2. Opening Remarks—Dean Gregorio Zamuco
     3. Song—College of Forestry Song,
     4. Address—President, Society of Filipino Foresters
     5. Song by the Forest Songbirds
     6. Introduction of the Guest of Honor by the President, University of the Philippines
     7. Address by the Guest of Honor, His Excellency, President Carlos P. Garcia
     8. U.P. Beloved—by the Audience.
     9. Recessional. The Philippine Army Band.
   - 12:00 Noon—Alumni Luncheon (Forestry building)
   - 2:00-5:00 P.M.—Alumni Reunion and Society of Filipino Foresters' meeting.
   - 7:30 P.M.—Reception and dance (Forestry pavillion) Awarding of Prizes
3. December 1, 1960 (Thursday) Manila
   - 7:00-8:00 A.M.—Open House. Arrival and registration of delegates. Bureau of Forestry, Parks and Wildlife Office, Reforestation Administration.
   - 10:00-12:00 A.M.—Conference by the different units.
   - 1:00-5:00 P.M.—Joint conference of the Bureau of Forestry, Parks and Wildlife Office, Reforestation Administration, Forest Products Research Institute and the College of Forestry on establishment of more effective coordination of functions and implementing of forest economic policies.
4. December 2, 1960 (Friday) Manila
   - 10:00-12:00 Noon—Conference. Coordination of functions of the Bureau of Forestry, Parks and Wildlife Office, Reforestation Administration, Forest Products Research Institute and the College of Forestry with other units of the government represented by the members of the National Forestry Council.
   - 2:00-5:00 P.M.—Plenary session and resolution preparation.
   - 7:00 P.M.—Dinner (with short musical program and after-dinner speeches) Awarding of prizes.

CALLING ALL ALUMNI!

Four days of happy and fruitful Reunion have been earmarked for the GOLDEN JUBILEE OF THE COLLEGE OF FORESTRY and the DIAMOND JUBILEE OF THE BUREAU OF FORESTRY . . . . from November 29, 1960 to December 2, 1960 (inclusive).

Turn to page 77 for the tentative schedule of activities.

And as Dean Zamuco wrote you, this will be our splendid chance to have one grand, joyous time together "enjoying ourselves, as in the past, reminescing the good old days, renewing friendships and rekindling the proverbial spirit.".

We feel that we can rely on your cooperation to make this year's Reunion an Outstanding Success.

THE EXECUTIVE COMMITTEE
Golden Jubilee of the College of Forestry and the Diamond Jubilee of the Bureau of Forestry.

FPRI TECHNICAL . . .

(*Continued from page* 56)

drying time, and the dry moisture content of the veneer being dried. Knowledge of the drying characteristics is necessary to estimate the temperature-time combination which will give the desired dry moisture content. Then the moisture content of the first few pieces dried can be measured; if it is not correct the drying time must be changed. Knowledge of the drying characteristics of the veneer again is necessary to estimate the correct drying-time change. The dry moisture content must be checked from time to time with a reliable moisture detector to insure continued drying.

Veneer drying research at F.P.R.I. has shown that the large differences in required drying time among Philippine species are attributable much more to green moisture content differences than to drying rate differences. Green moisture contents from 55 percent (bagtikan) to 145 percent (mayapis) have been found in the species studied to date. The bagtikan was dried in almost half the time that was required to dry the mayapis. It has also been found, in the species studied thus far, that doubling the veneer thickness increased the required drying time by an average factor of about 2.7, all other things being equal. In other words if, under a given set of drying conditions, 1/12-inch veneer was dried in 10 minutes, then 1/6-inch veneer of the same species, dried under the same conditions, would require about 27 minutes to dry.

REFERENCES

1. Bethel, J. S. 1950. Drying and conditioning veneer. N. C. State College, School of Forestry Tech. Bull. No. 4: 52-56. Raleigh, North Carolina.
2. Bethel, J. S. and R. J. Hoder. 1952. Hardwood veneer drying. Journal For. Prod. Res. Society II: 205-515.
3. Fleischer, H. O. 1953. Veneer drying rates and factors affecting them. Journal For. Prod. Res. Society III: 27-32.
4. ..... 1954. Shrinkage and the development of defects in veneer drying. Journal For. Prod. Res. Society IV: 30-34.
5. ..... 1958. A graphic method of estimating veneer drying rates. U. S. For. Prod. Lab. Rept. No. 2104.
6. Lutz, J. F. 1955. Causes and control of end waviness drying of veneer. For. Prod. Journal IV:114-116.

INCIDENTALLY

e. g. dizon

OF GRAPES AND GRIPES

Metropolitan papers have given a nice "coloring" to what I call a moral boost to the conservation-conscious people in the country when all over rang the news again that the student body of the college of forestry took time out to plant timber-producing trees in celebrating the Arbor Week. A few witnesses to the occasion last July 30th felt sympathy for such papers. For behind the "flavorings" they should have exposed the sad and the so horrible news that what actually some forestry students have done (and for years have been donig) was to give the seedlings the chance to wilt and-die standing with roots "planted" on the good old makiling soil. Such a waste of manpower carrying all those planting tools up there when the "saksak" method * of planting trees have proven to be the most popular among some forestry students. I don't pity the papers, but I pity the students!

———oOo———

It is a saddening fact to know that inspite of the elimination of the entrance examination, the circulation printed brochures throughout the country, and the good attraction of scholarships, still there was a heavy drop in the number of students who registered this first semester. The reasons for such, the faculty have never found out, even after having dissected the perennial problem of attracting students to enter the college of forestry from all angles. What a worrying news to those behind the project of keeping abreast with rapid Philippine forestry technological advances!

———oOo———

Elections are over. Now it is already too late to brood over mistakes committed. The first SBO meeting showed so many a repentant faces of both the voters and the elected. Too late when the former realizes activities are not well planned, SBO meeting being mistaken for *beatnik sessions,* and too late when the latter realize there's too much behind the personal glory he is after. The meeting only showed who the nincompoops are—and I sympathized with both, the elected and the voters. A brotherly advice—never commit the same mistake again!

———oOo———

Let's take the first test—the Smokers' Rally. Gripes flew away with the tobacco smokes, yet not all, for the remnants could still be felt even a week had passed by after the rally. Password for the night: Where were the cigarettes? And I could only ask: where were the sweet, honey-flavored words of "I could give you the best" so neatly disposed of during pre-election campaigns? I never knew fork tongues existed on our campus.

———oOo———

Ask a layman and he'll define tradition for you as: an unwritten law in a written constitution. It is a law, imaginary in stature, yet it is there, in black and white printed only upon the hearts of those who have respect for it. When it is born, it is to be unaltered, yet to be followed with full respect for what it is.

In a Philippine military institution, it took years for their faculty to change one tradition, but in one Philippine forestry institution, it only took a simple caucus to make a bungle of the most colorful tradition which in the whole university was most admired and respected. And still so disheartening it is to know that people who have only stayed a month or so in the campus are the ones who took over and erased the good tradition in the list. The head of the herd could never be blamed for it—for his horns are still green—and such property was an element so good to take advantage of. That is a fact so fatal. Yes, gone are the *cops,* and gone what was once a good tradition that have always kindled among the hearts of forestry students that old expression of *esprit de corps* they call the "exclusive makiling spirit." I wish I could express the general sentiments of the upperclassmen. But the big question mark on their face was: why not just "helmets" instead?

*A genius in his own right, a forestry student formulated the method, where a big bundle of seedlings could be planted in quarter of an hour, and without the use of foxhole borers nor spades!

Editorials

BROKEN DIKES LINKED TO FOREST DESTRUCTION

Widespread deforestation is blamed in some quarters for the seriousness of last week's floods in Central Luzon. While there is some controversy over this claim—pending, at least, a scientific investigation — yet it cannot be denied that the amount of "run-off" from the mountainsides was abnormally high. It is possible indeed that it may have been the last straw which broke the dikes.

The run off from Mount Arayat was particularly heavy. This was doubtlessly caused by the destruction of nearly one-half of the mountain's forest cover during the last few years.

From the Manila-Baguio highway, the extent of deforestation can be judged by the passing motorist. Where the face of the mountain was once a deep blue, today it is splashed with brown patches — evidence of the kaingero's *cut-and-burn invasion of the forest.*

Water which formerly was drawn by bark and foliage and the thick underbrush now flows unimpeded to the lowlands, causing streams to swell and rivers to overflow their banks. A government official who saw the flood coming down from the foothills of Mount Arayat reported that "it was like a tidal wave." Never before had anything like it been seen within the memory of the barrio folk. This notwithstanding the fact that there must have been several instances of unusually heavy rainfall in the area in the last 50 or so years.

The Mount Arayat kaingins *got out of control only within the last few years It is said that during the Magsaysay administration, when the government's attraction policy towards former or potential Huks was at its height, scores of illegal settlers were practically encouraged to clear forests against the advice of forestry officials. It was not until the destruction had become obvious even to laymen that the depredation was stopped. But by that time it was too late. All that was needed to show the skeptics the evils of deforestation was a sufficiently heavy rainfall, such as occurred recently.*

Closely the kaingero's *torch is the illegal woodcutter's ax, which has laid waste vast tracts of forest land in other areas, from Bataan and Zambales to Rizal — not to mention the unrestrained logging in Mindanao. A reforestation program may yet repair the damage, but only after many years and at such cost that the government may never be able to undertake it on anything like an adequate scale.*

The best that can be done for the present, it appears, is to stop the vandalism once and for all. But even this is not being done effectively, as witness the recent surveys made on forest lands in the provinces of Quezon and Bataan. Only when, as in Mount Arayat, the destruction brings catastrophe to the lowlands may public conscience be aroused enought to support a strong policy against forest vandals. (*Manila Times* Editorial, Aug. 22, 1960)

Forestry Leaves

Organ of the Student Body and Alumni of the College of Forestry, College, Laguna

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Mayor, Los Baños, Laguna

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