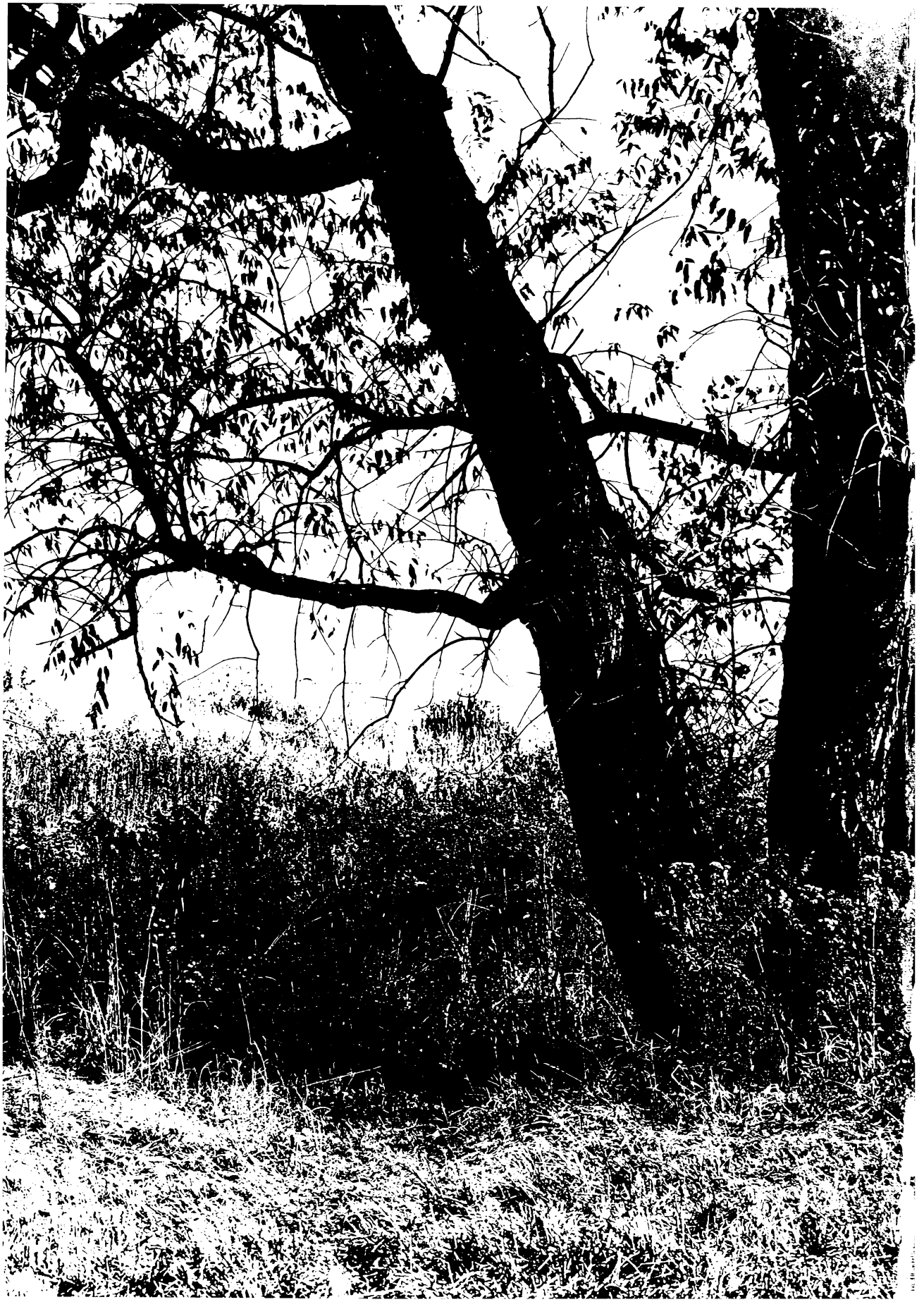
FORESTRY LEAVES

Official Publication of the Alumni and Student Body
U.P. College of Forestry, College, Laguna

MOVING-UP DAY ISSUE VOL. XVII NO. 4



Office of the President
of the Philippines

M E S S A G E

My warmest greetings to the Forestry Leaves, and my congratulations to the graduating classes of the U.P. College of Forestry.

As the graduates of the college "move up" to the wider world outside of the campus, it is my hope that they will apply their knowledge and skills not only in pursuit of their endeavors as foresters, but also in devoted vigilance against the despoilers of our forests. Our country has suffered from the wanton misuse of our forests and we urgently need to restore losses as well as preserve what remains.

My heartiest wishes for the success and happiness of your graduates.

FERDINAND E. MARCOS
President of the Philippines

Office of the Vice President
of the Philippines
Malacañang

M E S S A G E

The lumber industry which ranks as the premier dollar earning enterprise in the country today stands at the crossroads.

It is faced with the choice between forest destruction through unrestricted logging to gain more profits and forest conservation to preserve and maintain its usefulness for all generations.

What the industry needs today obviously is the rational line of thought that while we should derive reasonable margin of profit from the enterprise, we also should heed the basic requirements of a growing and expanding industry.

Graduates of the University of the Philippines College of Forestry will eventually face these problems whether they find themselves in government service or with private firms. But I am sure that with their intimate knowledge and love for trees they will chart a bright and prosperous future for our wood industry.

Congratulations and best wishes for success.

FERNANDO LOPEZ

April 3,1967

UNIVERSITY OF THE PHILIPPINES
QUEZON CITY

OFFICE OF THE PRESIDENT

M E S S A G E

I congratulate the members of the 1966-67 graduating classes of the College of Forestry through this issue of The Forestry Leaves.

The national society is in need of expertise and the dedication of the youth to its progressive aspirations.

I anticipate the unselfish and engaged participation of the graduating classes of the College of Forestry in the actual work of national development.

March 31, 1967

UNIVERSITY OF THE PHILIPPINES
COLLEGE, LAGUNA

OFFICE OF THE VICE-PRESIDENT
FOR AGRICULTURAL & FORESTRY AFFAIRS

March 29, 1967

MESSAGE

It is a fitting moment to greet and congratulate the 1967 Forestry graduates on the occasion of this year's Moving-Up Day.

In so doing, I should like to stress the opportunities and responsibilities that await the Forestry graduates. The opportunities are almost unlimited when focused on the responsibilities to help check the abuse or misuse of our forest resources.

The greatest crime that is being committed against the future generation of our country is the wanton destruction of our valuable forest resources. The desire to draw the largest immediate profits drive some of our people to exploit these resources at the expense of efficiency of operation and in utter disregard of the broader interests of society and its future. Deliberately or unconsciously, these people fail to recognize that most of our resources are irreplaceable and are exhausted in the course of time. Our hillsides and forests are denuded as fast as they are reforested, with the consequence that forest covers and watersheds that minimize the silting of reservoirs, lakes and rivers are destroyed. In the process, topsoil is washed away to the sea and flood occurs unabated.

It is in this area of endeavor that Forestry graduates could and should exert influence. Precisely because your Alma Mater has trained you along this discipline.

We wish you all the success and happiness that you can gain from the "height of a tree, not its length."

D. L. UMALI

Moving-Up Day 1967
U.P. College of Forestry April 3, 1967

M E S S A G E

Through the FORESTRY LEAVES, I extend my sincerest greetings to the Dean, Faculty Members and the student body of the College of Forestry, University of the Philippines, on the occasion of their "Moving-Up Day" this year.

I feel singularly happy for the new forestry graduates for after they leave their Alma Mater, they will enter a new life full of responsibilities directly connected with the very survival of the nation. The pressing need of the moment beacons them to the more important task of properly managing, conserving and protecting the country's forests.

During the last 35 years of my service in the government, I have been in close association with forestry graduates whom I have known to be hardworking and loyal to their country and profession, dedicated and persevering men who are ready to accept even the painful sacrifice of self-denial of personal confort for the commonweal.

Even if I am a non-forester, as Director of Forestry, I sincerely share with the new graduates, their parents and professors, their happiness in this most felicitous occasion. The Bureau of Forestry which has been looking forward to this happy moment opens its door to the new graduates and welcomes them with great expectation that they will fit well into the chasm in Philippine forestry caused by lack of men and women of their training.

ANTONIO A. QUEJADO
Acting Director of Forestry

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES
REFORESTATION ADMINISTRATION
VISAYAS AVE., DILIMAN, QUEZON CITY

In reply, address:
P. O. Box 2363, MANILA

TEL. Nos. (GTS):
55-53
55-52
55-51

M E S S A G E

Congratulations to the 1967 GRADUATES of the U.P. College of Forestry and to the STAFF of the Forestry Leaves!

As our forestry graduates join the rank of the employed, be it in the public sector or in the private sector, I wish they would always remember the following great precept which is appropriately called the "Press on!" slogan:

> "Nothing in the world can take the place of persistence. Talent will not; nothing is more common than unsuccessful men with talent. Genius will not; unrewarded genius is almost a proverb. Education will not; the world is full of educated derelicts. Persistence and determination alone are omnipotent....."

This is not to disparage our graduates as regards the college education they have just acquired. Rather, this precept should remind them that a college diploma is nothing more than a useless scrap of paper unless that which it stands for is put to constructive and beneficial use. Strive and don't be easily overwhelmed by failures which may come your way. The electric Thomas Edison is said to have told a discouraged co-worker during one trying series of experiments: "We haven't failed. We now know 1000 things that won't work, so we're that much closer to finding what will."

I shall then wish you luck. And don't forget: press on!

JOSE VIADO
Administrator

April 6, 1967

REPUBLIC OF THE PHILIPPINES
UNIVERSITY OF THE PHILIPPINES
FOREST PRODUCTS RESEARCH INSTITUTE
COLLEGE, LAGUNA

M E S S A G E

This year's "Moving-Up Day" is another significant milestone in the history of the U. P. College of Forestry. Once again this great institution of learning has produced another crop of energetic, professional foresters imbued with technical skill and high forestry ideals of honor, service, and conservation.

Most of these new graduates, if not all, will no doubt dedicate themselves to the wise utilization, conservation, and perpetuation of our forest wealth. To the members of the 1967 graduating class of this College, therefore, this "Moving-Up Day" is naturally a happy, hopeful, and glorious occasion, for this day marks a turning point in their lives. After four years or so of arduous work and conscientious study, they are now converted into newly-made instruments for possible use by the government and private sectors in the great forestry movement in this, our beloved country, and, for this reason, I extend to them my heartfelt congratulations.

I am happy also to felicitate sincerely the U.P.C.F. FACULTY for work well done. Finally, to the Staff of the Forestry Leaves I extend my best wishes for many more years of continued existence in the service of the Alumni and Student Body of the College of Forestry, UNIVERSITY OF THE PHILIPPINES.

MANUEL R. MONSALUD
Director

University of the Philippines
COLLEGE OF FORESTRY
COLLEGE, LAGUNA

M E S S A G E

Congratulations to the graduating rangers and foresters:

This years graduates will be a valuable contribution to the advancement of forestry in this country. The slow pace of manpower training is the bottleneck to an effective forest resources conservation and utilization program which is the key to a progressive forest based economy. It is gratifying to see another crop of graduates joining ranks of the country's rangers and foresters.

Your years of stay in the College have not been easy and it is to your credit that you have done so well. This is an accomplishment worthy of praise.

The task ahead is great and your college training has been designed to enable you to meet the challenge of developing the country's veritable source of wealth. You, as rangers and foresters, can contribute much to nation building. Your parents, the faculty and the Alma Mater have high hopes in you. The profession and the country need you. Strive hard not to fail them and this you can do by practicing your profession with fortitude, honesty and a sense of dedication.

Good luck and best wishes to you all!

Domingo M. Lantican

DOMINGO M. LANTICAN
Dean

The Wood Preservation in the Philippines[1]

by

MANUEL R. MONSALUD and
FAUSTINO C. FRANCIA[2]

INTRODUCTION

The Philippines, composed of 7,093 islands, is one of the developing countries in Southeast Asia. It has a land area of about 30,000,000 hectares and a population of more than 32 million people. Many regions of this country are heavily covered with forests (about 41.5% of the total land area). Practically all the forested areas are owned by the State. The estimated volume of standing timber is more than 408.31 billion board feet, represented by trees from 30 centimeters to 60 centimeters and over in diameter. There are more than 3,500 tree species found in this country, of which only about 100 are utilized for commercial purposes and only 8 are used by the wood-preservation industry for treating purposes. This stand of timber supports a number of growing industries such as lumber, veneer and plywood, tool handle, furniture, hardboard, paper, match, wood-carving, wood-preservation, etc. Also, it supplies the country with wood for construction and other purposes. The total production of timber from 1960 to 1965 was 14.036 billion board feet of which 5.67 billion board feet were used locally and the rest exported. During the same period, only 216,000 poles and about 50.59 million board feet of lumber were treated by the wood-preservation industry.

Despite this abundance of wood species in the Philippines, several paradoxes have persisted for years. One is the utilization of only about 100 out of 3,500 species; another is the commercial utilization of only 8 wood species for treating purposes; and the greatest paradox is the fact that only 42.5% of the total 4,648,245 occupied housing units are constructed largely of wood. Makeshift dwelling units of the majority of the population, who are fishermen, farmers and laborers, are constructed of light materials such as bamboo, grass, thatch, or palms.

It is also natural, in a tropical country like the Philippines, to have numerous species of wood-decaying fungi and wood-destroying insects. Alone, the 54 known-species of termites that thrive here cause damage throughout the year. Soft-rots are common in cooling towers and in many of the wooden structures used in the wet industries. Marine borers such as *Teredos, Bankias, Martesias, Cheluras,* and *Limnorias* abound in Philippine salt waters and wreck havoc throughout the year on all wooden structures exposed to them. Thus, the wood-preservation industry in the Philippines has all the justifications for its existence and progress.

Historical Background

Long before the first wood-preserving plant was established in the Philippines, many people had already known from experience that the wood of several species of Philippine timber lasts long in service. Many of the ancient buildings of well-to-do families were constructed of durable timber.

[1] Paper intended for presentation at the Training Centre on Wood Preservation in Tropical Countries to be held in Munich, Federal Republic of Germany, in connection with the IUFRO Congress in September, 1967.

[2] Director and Supervising Forest Products Technologist and Chief of the Wood Preservation Division, respectively, of the Forest Products Research Institute, University of the Philippines, at College, Laguna, Philippines.

Exposure tests, conducted by the Philippine Bureau of Forestry and later by the Forest Products Research Institute, indicated that the untreated heartwood specimens of the following species last from 9 to 25 years under severe "grave yard" conditions:

1. Narig (*Vatica mangachapoi* Blanco), Dipterocarpaceae
2. Yakal (*Shorea astylosa* Foxw.), Dipterocarpaceae
3. Saplungan (*Hopea plagata* Blanco), Dipterocarpaceae
4. Akle (*Albizzia acle* Blanco), Leguminosae
5. Akleng-parang (*Albizzia procera* (Roxb.) Benth), Leguminosae
6. Ipil (*Intsia bijuga* (Cole.) O. Ktze), Leguminosae
7. Tindalo (*Afzelia rhomboidea* (Blanco) Vid), Leguminosae
8. Dangula (*Teijsmanniodendron ahernianum* Merr.), Verbenaceae
9. Molave (*Vitex parviflora* juss.), Verbenaceae
10. Mangkono (*Xanthostemon verdugonianus* Naves), Myrtaceae
11. Mapilig (*Xanthostemon bracteatus* Merr.), Myrtaceae
12. Malabayabas (*Tristania decorticata* Merr.), Myrtaceae
13. Bansalagin (*Mimusops parviflora* R. Br.), Sapotaceae
14. Betis (*Madhuca betis* (Blanco) Maebr.), Sapotaceae
15. Anubing (*Artocarpus ovata* Blanco), Moraceae
16. Philippine ebony (*Diospyros ferrea* Willd), Ebenaceae
17. Kamagong (*Diospyros philippinensis* (Den.) Gurke.), Ebenaceae
18. Urung (*Fagraea fragrans* Roxb.), Loganiaceae

In addition to these are 24 other species whose heartwoods have been test-exposed without treatment and found to last from about 4 to 9 years in service. The woods of the durable species are used untreated for heavy-construction timber such as posts, piles, bridgework, and ties. Heretofore, the major railroad company in the Philippines (Philippine National Railways) depends on ipil, molave, and yakal for use as railroad ties. But the stand of these durable timbers is getting thinner every year and whatever materials now available come from second growth forests and these contain much sapwood. They do not last long in service without preservative treatment.

The present scarcity of durable timber and the growing dependence on the less durable woods have resulted in the establishment of wood-preservation plants in this country.

The wood-preservation industry in the Philippines initially started in 1922, with the establishment of a pressure-treating plant with a capacity of 70 standard poles, or 3400 bd. ft. of lumber, per charge for creosoting electrical transmission and telephone poles, crossarms, marine pilings, for wharves and piers, railroad ties and construction timber for bridges.

There is no available record to show that treated woods were used in the first wharf constructed in the Manila harbor in 1906 for international merchant ships, neither in the first railroad line laid out in 1892, nor in the first transmission line of the Manila Electric Company put up in 1903.

In 1954, after a lapse of 32 years, another treating plant, using "Wolman salts," was put up primarily to serve the building-construction industry. The establishment of several industrial, commercial, and residential buildings boosted the demand for treated lumber so that subsequently more treating plants were put up. At present there are about 16 wood treating plants all over the islands, with a total of 18 pressure-cylinders of various sizes and 2 non-pressure tanks (see Table 1).

Preservatives Used

All the wood preservatives used in the Philippines come from abroad. Creosote, Tanalith U, Tanalith CT-106, and Pentachlorophenol are imported from the United States; Boliden S-25 and Boliden K-33, from Sweden; and Celcure and boron (Timbor) from England.

Species of Wood Treated

The most popular and easily impregnated wood is "Apitong." It is the common name for the woods of several species of *Dipterocarpus:* (*D. grandiflorus* Blanco, *D. basilanicus* Foxw., *D. orbicularis* Foxw., *D. philippinensis* Foxw., and *D. speciosus* Brandis).

It is utilized as poles, piles, bridge timber, ordinary and form lumber. Other commercial species, whose heartwoods are easy to treat, are white lauan (*Pentacme contorta* (Vid.) Merr. and Rolfe), bagtikan (*Parashorea plicata* Brandis) and manggasinoro (*Shorea philippinensis* Brandis) but these are not as popular as apitong for treating purposes.

Problems of the Industry

1. *Public education.* — Today despite 44 years of existence of the wood-preservation industry in the Philippines and the year-round occurrence of wood-destroying agencies, the problem of educating the consuming public on the proper use of wood and getting more people to use treated wood still requires serious attention and concerted effort.

Public education in the form of advertisements is carried on individually by commercial treating companies but this only confuses the public because the advertisements play up the superiority of certain preservatives over the others. An association of the industry is still non-existent. Its formation appears necessary in order to improve public information or knowledge on wood preservative and to promote the bona fide interest of the wood-preserving industry. In this connection, it also appears important that the quality of wood treatment should follow well-established standards so that the public will have faith in, and be encouraged to use extensively, treated wood.

The wide use of treated wood for building construction depends not only on the financial ability of the user but also on the availability of the material. As the country progresses economically and as the upper and middle-income groups of people increase in number, the demand for treated wood for building construction will inevitably go up provided, of course, the industry maintains a good reputation regarding its treated wood materials.

Even now, there already exists an appreciable but scattered number of middle-income groups, who desire to use treated wood for residential-building construction. Except those that live in, or are located near, big cities, where treated wood is available, the rest have to resort to the use of naturally durable woods that are sold in local lumber yards or to ready-mix wood-preservative solutions obtainable in local hardware stores.

2. *Wood supply for treatment.*—Practically all commercial wood-preserving plants buy wood for treatment from sawmill establishments. Whenever there is a big order for treated wood, there often arises the problem of getting the desired species of wood, quantity and sizes of lumber. While the problem may be solved by stocking enough wood materials for future treatment, no wood-preserving plant is willing to stockpile heavily.

The pole supply in the Philippines is becoming a serious problem. Pole-size apitong trees are getting difficult to procure. It used to be that apitong poles could easily be obtained from the rights-of-way of many logging companies, from forest areas declared as alienable and disposable, and from private

forests. But these areas are now depleted of apitong trees and whatever apitong trees are found in the public forests are not allowed to be cut under the sustained-yield management plan of the government unless there is a special permit. While there are other species that may be used instead of apitong, the treated-wood-using public is lukewarm in accepting the former as substitutes for the latter.

Wood Preservation Research

The establishment in 1922 of the first treating plant in the Philippines was the result of studies conducted by the Philippine Bureau of Forestry and the Atlantic Gulf and Pacific Company on the pressure treatment of apitong with creosote. Later, the Bureau of Forestry service-tested creosoted poles, piles, and railroad ties. Preliminary studies were also done on the preservative value of copper sulfate, zinc chloride and other salts. These studies, however, were interrupted by the second world war and practically all the test records were lost or destroyed.

With the establishment in 1957 of the Forest Products Research Institute (F.P.R.I.) under the University of the Philippines, a wood preservation division in this Institute was created. It is composed of four sections: — pathology, entomology, wood treatment and wood seasoning.

The wood treatment section has been doing research work on various treating methods and the penetrability of various preservatives into the wood of local timber species.

In view of the variation on the permeability to pressure treatment of wood, the FPRI initiated in 1958 a study on the classification of Philippine commercial wood species as to their treatability by pressure, using coal-tar creosote.

Hereunder are the brief treating schedules employed for seasoned wood:

(a) A 30-minute preliminary vacuum of about 29" Hg is created on the charge in the treating tank.

(b) Without breaking the vacuum, creosote preheated at 190 deg. F is introduced into the treating cylinder; and to build up the desired pressure, additional creosote is pumped in.

(c) The pressure at 180 psi is maintained for about 2 hours, after which the creosote remaining in the cylinder is sent back to the storage tank.

(d) Finally, a 30-minute vacuum of about 25-29" Hg is established.

The amount of creosote absorbed is determined by weighing the wood charge before and after impregnation. It is usually expressed in pounds per cu. ft. or kgm. per cu. m.

With green specimens, a preliminary conditioning by boiling-under-vacuum (Boultonizing) for 6 hours at 200 deg. F is employed and this is followed by the same treatment schedules listed above but skipping the 30-minute preliminary vacuum.

A total of 609 specimens (3" x 3" x 48"), representing 61 species, have so far been tested at the F.P.R.I. Among the commercial species classified as easy to treat are the apitong groups, bagtikan (*Parashorea plicata*), malaanonang (*Shorea polita*), white lauan (*Pentacme contorta*), and manggasinoro (*Shorea philippinensis*). The heartwoods of almaciga (*Agathis philippinensis*), Benguet pine (*Pinus insularis*), dungon (*Tarrietia sylvatica*), mayapis (*Shorea squamata*), and narig (*Vatica mangachapoi*) are moderately difficult to treat. Agoho (*Casuarina equisetifolia*), almon (*Shorea almon*), guijo (*Shorea guiso*), dangula (*Teijsmanniodendron ahernianum*), ipil (*Intsia bijuga*), red lauan (*Shorea negrosensis*), and tangile (*Shorea polysperma*) are some of those very difficult to treat.

The resistance of wood against wood-destroying organisms varies as its treatability. Realizing the importance of this information,

the Institute conducted a study on the natural durability of Philippine woods by stake tests. Specimens, 1" x 12" in size, were set vertically with 2/3 of their individual length buried in the ground, where fungal and termite hazard is high. To date, a total of 1,649 specimens, representing 106 species, have been installed. The "sapwood" tree species (where the color of the sapwood is not clearly marked off from the heartwood) have low durability, less than one year in test. Some of the durable species are molave, ipil, yakal-saplungan Hopea plicata), akle, mangkono (*Xanthostemon verdugonianus*), and dungon. Red lauan, tangile, white lauan, almon, and mayapis are moderately durable. Among the perishable species are the apitong groups, mangasinoro, tiaong (*Shorea agsaboensis*), almaciga, gubas (*Endospermum peltatum*), and kaatoan bangkal (*Anthocephalus cadamba*).

Though many wood preservatives possess enough toxicity to protect wood against deterioration, they vary in their effectiveness to increase the durability of wood when exposed to biological deterioration. To determine the effectiveness of the preservation against marine borers, termites, and fungi, various wood preservatives are being studied. Wolman salt (Tanalith U), Boliden K-33, Boliden S-25, Tanalith C, Timber, PCP, copper naphthenate, creosote mixtures are now included in this study. Creosote and Boliden K-33 showed fairly good performance against marine borers.

Service records of commercially creosoted- and tanalith-treated poles, installed in various parts of the country, are maintained by the Institute to compare their service performances for telecommunication and electric poles.

Behavior of fire-retardant treated wood, when exposed to fire, was recently conducted. The fire-test-tube apparatus is used to compare the efficacy of Timber, $ZnCl_2$, $(NH4)_2$ SO4 and Pyrolith, when pressure-impregnated in apitong. Pyrolith showed satisfactory performance when impregnated at 2.5 lbs/cu. ft.

The effectiveness of various non-pressure methods by which timber may be treated is also being conducted. These processes are advantageous in many tropical countries where pressure treating plants are inadequate or non-existent.

The study on the effect of treating variables such as pressure, temperature and pressure-period on the treatability of refractory species, specifically tangile and red lauan, were made possible with the use of the 1000-psi treating cylinder. This pilot treating plant has a maximum working pressure of 1000 psi designed for refractory species, which ordinarily can not be treated under the commercial treating pressure of 150 to 200 psi.

Cooperative projects with various local wood-preservation plants are being undertaken by the FPRI staff to assist in solving technical problems encountered in these plants and to recommend suitable treating practices designed for efficient and economical operations.

Use well the moment; what the hour
Brings for thy use is in thy power:
And what thou best canst understand
Is that the thing lies nearest thy hand.

— JOHANN WOLFGANG VON GOETHE

TABLE 1. Wood Treating Plants in the Philippines

Company	Date established	Size of cylinder	Treatment process	Preservative used	Capacity (bd. ft.)
1. Atlantic, Gulf and Pacific	1922	7' x 96'	Full cell & empty cell	Creosote	70 Std. poles
	1954	5' x 45'	Full cell	Wolman	3,400
	1954	7' x 72'	Full cell	Wolman	12,000
2. Anakan Lumber	1958	6' x 105'	FC and EC	Creosote	70 Std. poles
	1958	7' x 68'	FC and EC	Creosote	30-40 Std. poles
3. Philwood	1958	6' x 33'	Full cell	Boliden S-25	5,000
4. Philmac	1959	6' x 60'	Full cell	Boliden S-25	10,000
5. Philippine Packing	1961	5' x 36'	Full cell	Pentachlorophenol	1,700
6. Pacwood	1962	7' x 90'	FC and EC	Creosote	70 Std. poles
	1962	6' x 60'	Full cell	Tanalith C	10,000
7. Benguet Consolidated	1962	5' x 40'	Full cell	Tanalith U	3,000
8. Victorias Milling	1964	6' x 36'	Full cell	Creosote	400 ties
9. P. Barreto	1964	6' x 37'	Full cell	Celcure and Boliden S-25	5,000
10. Sta. Clara Lumber	1964	n. a.*	Full cell	Celcure	n. a.
11. Valwood	1965	6' x 40'	Full cell	Tanalith C	25 poles 3,000 bd. ft.
12. Nasipit Lumber Co.	1965	6' x 84'	Full cell	Boliden K-23	11,500
13. Tinio Lumber	1965	5' x 40'	Full cell	Tanalith C	3,000
14. Denila Bros.	1966	n. a.	n. a.	Boliden K-33	n. a.
15. U. S. N.	1955	5' x 7' x 25'	Vacuum	Pentachlorophenol	2,000
16. Nasipit	1966	5' x 5' x 20'	Momentary dip	Boron	2,000

* Data not available.

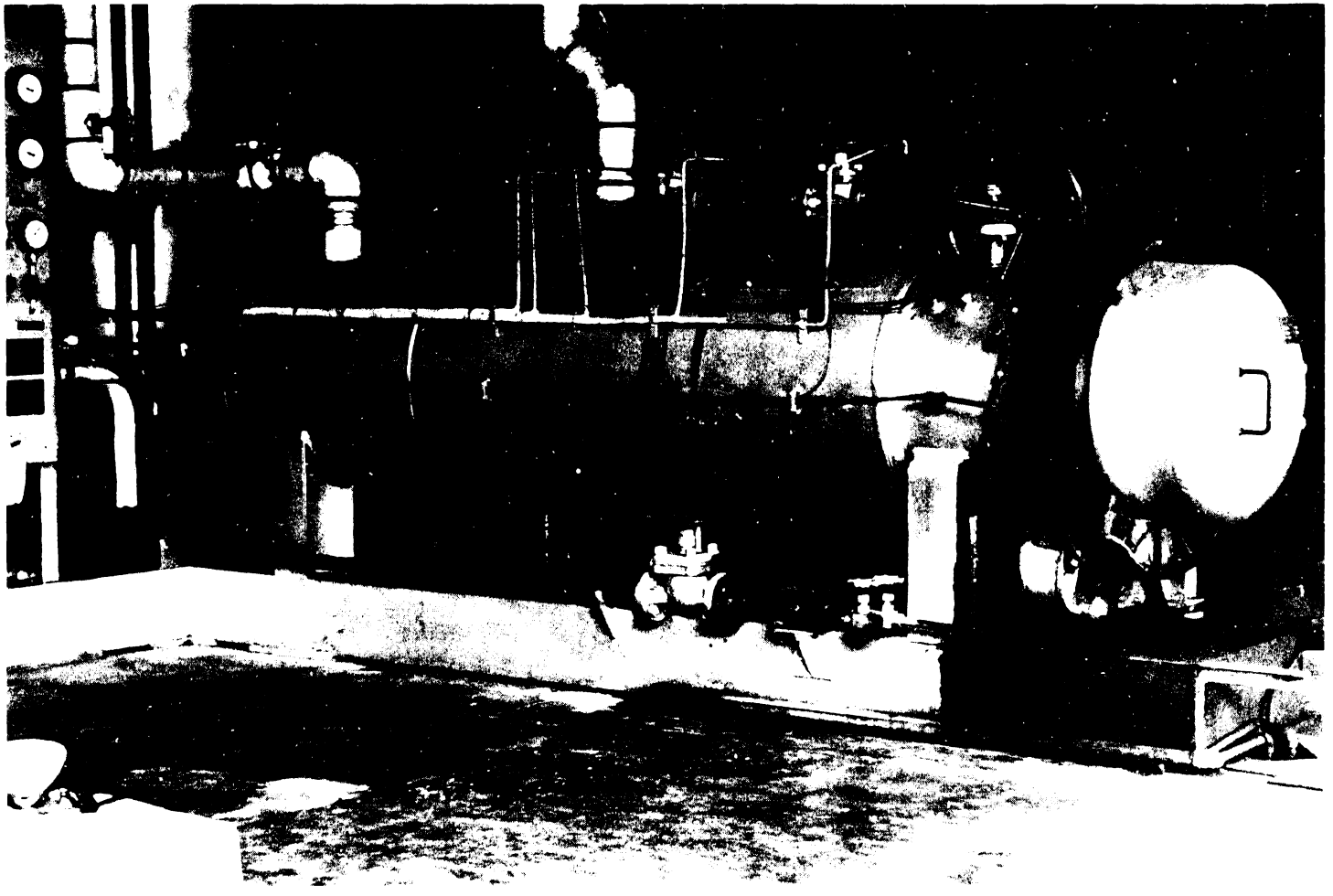


Fig. 1. Experimental wood treating cylinder donated to the Forest Products Research Institute, University of the Philippines, at College, Laguna by Commonwealth Government of Australia, under the Colombo Plan. This cylinder can be operated at a maximum treating pressure of 1,000 lbs. per square inch — designed for research studies even with refractory wood species.

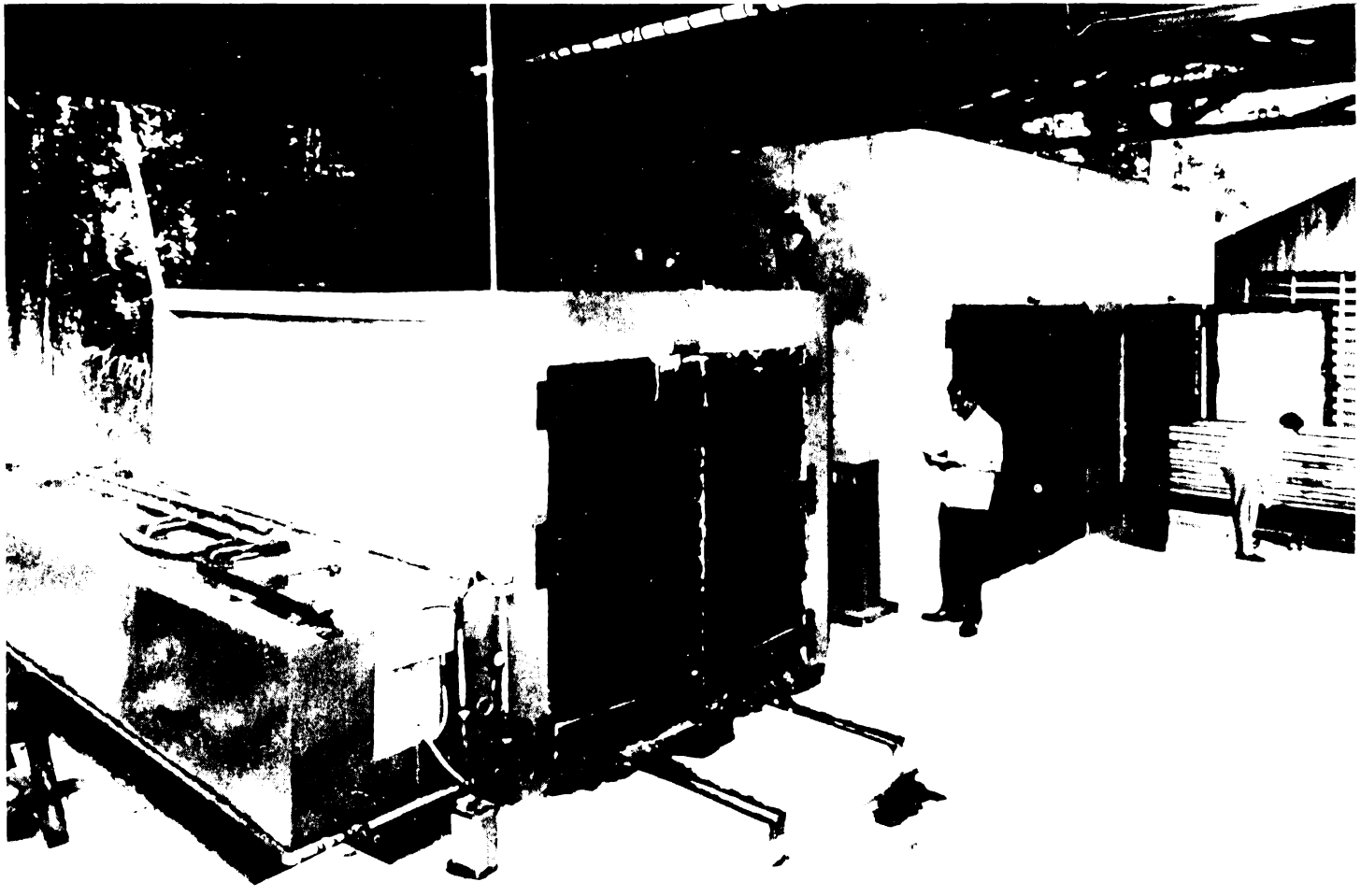


Fig. 2. Experimental dry kiln for wood seasoning studies recently constructed at the Forest Products Research Institutes, University of the Philippines, College, Laguna.

Report on the 8th Session Work Party on Small-Scale Industries of ECAFE

by

D. G. FAUSTINO[1] and
O. B. CADELIÑA[2]

BACKGROUND AND PURPOSE

At the invitation of the Philippine delegation during the 7th Session of the Working Party on Small-Scale Industries of ECAFE in Bangkok, Thailand, in 1963, the 8th Session of the Working Party was held in Manila on June 3 to 9, 1966 at the World Health Organization Building, United Nations Avenue, Manila. The National Cottage Industries Development Authority (NACIDA) is the sponsoring Philippine government agency of the international meeting.

The purpose of the 8th Session of the Working Party was to discuss and make practical recommendations for the development and promotion of small-scale industries among member nations in the region.

Through the invitation of Mr. U. Nyun, Executive Secretary of the United Nations Economic Commission for Asia and the Far East, the Authors attended the sessions as observers from the Institute from June 6 to 9, 1966.

SESSION PROCEDURE AND COVERAGE

Countries that sent delegates to the session were the followings: Australia; Ceylon; China; France; Japan; Laor; Netherlands; Pakistan; Republic of Vietnam; Singapore; Thailand; United Kingdom of Great Britain; Northern Ireland; U.S. of America; Hongkong; Belgium; Federal Republic of Germany; and the Philippines. Some international agencies were also represented. These were the United Nations Development Program; International Labour Organization; Asian Productivity Organization; World Veterans Federation; and the United Nations Asian Institute for Economic Development and Planning.

Sessions were held at the conference hall of the WHO building. Morning sessions started at 9:00 o'clock and afternoon sessions started at 2:30 o'clock.

The adopted agenda during the session were:

1. Opening addresses
2. Election of the chairman and two vice-chairmen
3. Adoption of the agenda
4. Review of progress and problems of small-scale industries, and specific measures taken in the countries of the region regarding:
   (a) Government policies and programmes for the promotion and development of small industries;
   (b) The establishment of central development agencies for implementation of action programmes;
   (c) The establishment of services and facilities for small industry development.

[1] Chief, Industrial Investigations Division, Forest Products Research Institute, College, Laguna.

[2] Forest Products Technologist I, Quality Evaluation Section, Industrial Investigations Division, Forest Products Research Institute.

5. (a) Development and training of personnel in the field of small-scale industries with special reference to training of instructors, trainers and practicing managers for increasing productivity;

   (b) Regional co-operation for the development and training of personnel;

6. The role of small-scale industries in decentralization of industry, industrial dispersal and regional balance.

7. Development of engineering industries on small-scale basis.

8. Export promotion of small industry products.

9. Programme of work and priorities.

10. Date and place of the next meeting.

11. Adoption of the report of the Working Party on Small-Scale Industries.

Mrs. Pacita M. Gonzales, Administrator of NACIDA was elected unanimously as Chairman. The working party also elected Mr. Jin Divari, (Head, delegate of Thailand) and Mr. Masao, Kanazama (Head, delegate of Japan) as First Vice-Chairman and Second Vice-Chairman, respectively.

For every item in the agenda particularly items 4, 5, 6, 7 and 8, each head delegate was required to read a country paper informing the participants of the status and development of each topic item in their respective country.

REPORT AND RECOMMENDATIONS

Report

The report of the Working Party on items 4, 5, 6, 7, 8 and 9 as adopted on June 9, 1966 are presented below.

A — Item 4 — Progress and problems of small-scale industries in the region.

The working party reviewed the progress and problems of development of small-scale industries on the basis of papers prepared by the Governments and the secretariat and statements made by delegations covering specific measures taken in the countries regarding government policies and programmes, the establishment of central development agencies and services and facilities for small industry development.

The Working Party observed that small-scale industries have made remarkable progress during recent years in almost all countries of the region owing to the increasing attention paid by Governments to the promotion of small industries. This attention is reflected by many countries of the region evolving special policies and programmes for assistance to existing small-scale industries and the promotion of new enterprises. Increased budgetary appropriations have also been made by governments for small industry development, the establishment of central development agencies and the provision of the requisite services and facilities for its promotion. In addition, several promotional measures have been taken to strengthen this sector of industry.

The Working Party was informed that in *Hongkong* the policy of the Government regarding small-scale industries is generally in line with its policy for the development of industry as a whole, and is essentially based on a recognition of free enterprise and free trade. Although there is no special organization in the Government specifically charged with responsibility for small-scale industries, no developmental financial inducement and no special source of credit for small manufacturers. Government has created a favorable domestic climate under which industries both large and small, can flourish. The task has required very great effort and much expenditure in creating social and economic stability, as well as providing the basic needs for new industrial enterprises, land for building, good communication, provision of hous-

ing for workers close to industrial towns, adequate port facilities, a plentiful fresh water supply, electricity supplies, and so on. As the Government recognized the part played by small industries in Hongkong in a servising capacity for larger factories, as employers of substantial number of workers and as significant export earners, it was decided that as many as possible of these smaller units which were operating on encroached crown land required for intensive development should be resettled in Government built "flatted" factories. As of 1966 under the resettlement programme a total floor area of 1,262,000 square feet has been provided and occupied by some 1,400 small industrial concerns. The rent for these factories is roughly about one half of the rent for private flatted factories, but this does not involve any element of subsidy.

In *Laos,* the law of 1958 for the creation of new industrial enterprises exempts them from customs duty for the importation of material and equipment and income tax during the first ten years of their operation. Those small enterprises which are judged capable of contributing to meet the local needs of certain goods enjoy equally the concessions under this law. Since 1964, the Bureau de li Artisinat et de l' industries has been established as a central organization to be responsible for industrial activities, in particular small industries. This Bureau is charged with guiding and counselling the managers of cottage and small-scale industries. For providing financial facilities there exists le Credit National, Laos, which is a state autonomous financial organization deriving its resources from the state budget and La Banque Nationale. It lends almost all the funds needed for working capital and for purchase of materials and equipment to all projects judged capable of contributing to the national economy.

In *Thailand,* the policy and objectives of industrial development contained in the country's National Economic Development Plan (1960-1966) aim not only at the development of medium and large scale industries but also at the promotion of small industries. For small industry development, comprehensive and integrated development measures have been formulated and already started. These measures consist of the establishment of a Small Industries Service Institute, the alocation of a sum equivalent to US$500,000 a year for loan to deserving small industries at an interest rate of 9 percent per annum and the creation of a handicraft retail shop. The Department of Industrial Promotion in the Ministry of Industry is at present the agency responsible for small industry development.

In *Vietnam,* the organizations that were given the responsibility for development of small industries are the Industrial Development Centre and the Directorate of Industry and Crafts. The Investment Law accords substantial advantages to new investment in the form of exemption of income tax, the transfer of profits, and guarantee against nationalization. The Industrial Development Centre offers medium term loans for importation of industrial equipment at a fixed interest rate of 5% with a commission of 0.25 to 1 percent per half year. Such loans amounted to 298.7 million piastres in 1964 and 296.6 million piastres in 1965. Apart from providing these loans the Industrial Development Centre has created a Productivity Service under its wing to provide consultancy services and dissemination of technical knowledge to small enterprises which desire to modernize or expand into new construction. This Productivity Service advises on market studies, technical study and process of manufacture, specifications of machines and calculates the profitability of the enterprise. The small industries can equally consult the service on all questions concerning production such as choice of equipment and improving the process of manufacture. In addition, the Handicraft De-

velopment Centre offers financial and technical assistance to craftsman for the marketing of their products.

In the *Republic of China,* in 1961 there were 51,900 factories of which only 460 were large ones employing over 100 workers with modern equipment. Financial and technical problems were main handicaps which prevented small industries from expansion and improvement. In 1954 the Government started the Small Industry Loan Programme with the cooperation of the local commercial banks giving loans in US dollars or local currency. The local currency loans were being used for the construction of factory buildings and purchase of locally manufactured machinery and the dollar loans for the procurement abroad of machinery, equipment and spare parts to improve and expand production capacity. The main purpose of the programme was to induce small enterpreneurs to invest with their private capital in industries with the view to increase the quantity and improving the quality of production at a lower cost.

Loans are channelled through banks and any loss from the lending operation was for the account of the banks. The banks were made responsible for screening loan applications and the supervision of the utilization of the loans. The maximum amount of loan given to individual borrower was NT$1,200,000 for local currency and $60,000 for US dollar loan. The amount was later on increased to NT$4,000,000 and US$100,000 respectively to take care of the increasing needs brought about by the progress made by the economy.

Recently, a Small Industry Committee was formed for the purpose of assisting manufacturers employing less than 100 workers with total assests of less than NT$5,000,000 (US$125,000). The assistance to be performed include financing of long-term loans, production technique, quality, control, modernization of equipment, expansion of premises, supply of technical data, samples, laboratory apparatus, check-up, research and development of products, etc. The China Productivity and Trade Centre and the Metal Industries Development Centre are also associated with the Committee in assisting the small-scale manufacturers in the field of management and technical consultation services.

In *Japan,* the problem was not development of small industry per se but to close the gap between small industry and large scale industry in productivity, profitability, wages scale, etc.

To bridge the gap several measures were taken:

1. The government enacted "Smaller Enterprise Modernization Promotion Law" in which the group of industries which could be suitably developed into a small scale was designated and the industries were entitled to special treatment in regard to financing and tax system. In 1965, such financing amounted to $22 million and the interest rate was lower than the average rate available in the market.

2. When each enterprise purchased certain modernized facilities listed in the law, half of its expenditure was financed by the central and local governments with no interest. In 1965, the amount of such financing was $14 million.

3. As modernization of small-scale industry could not be achieved by the modernization effort of one single enterprise, various steps were taken to encourage the corporation of individual enterprises. When twenty or more could make up a corporation, half of its fund was financed by the Government with no interest.

4. A new financing system was introduced into the law in which eighty

percent of the fund was financed by the longterm credit loan provided by the central and local governments with no interest if smallest enterprises with less than twenty employees could make up a corporation.

5. Various training programmes were organized under which both managers and technical personnel received training for a set period of time. Special instructors were dispatched throughout the country to give guidance to the local managers. The number of such special instructions numbered seven thousand.

6. To further strengthen small industries in local organizations and in large cities after 1966, to form the nucleus for giving guidance of small enterprises. In 1965, budgetary allocation for such training activities amounted to approximately $2.2 million.

7. For securing financial resources for small-scale industries, Japan set up three specialized financial institutions with a total of 695 million dollars capitalization.

The development and promotion of small industries *in the Philippines* started in 1910 and was given impetus in 1949 when the Import Control Law was passed. This law limited the importation of foreign products and provided encouragement and incentives in the production of local substitutes. As a result of this governmental restriction and also to assist the promotion of locally made goods, both by small and large industries, governmental policies and programs were focused on technical, financial and marketing assistance to the industries, most specifically, in the small industry sector such as tax incentives, priority in the purchase of government requirements, the allocation of capital goods from the reparations and the establishment of services and facilities.

In line with the assistance of the government to the small industry sector, the Republic of the Philippines has established the National Cottage Industries Development Authority (NACIDA) to integrate its promotion and development. This agency was entrusted with the following functions: To organize, revive, and encourage and promote the establishment of small industries; to conduct industrial surveys and researches and training programs; to promote merchandizing of small industry products in domestic and foreign markets; to prescribe and maintain standards of small industry products; to assist small industry producers in financing, production and marketing; and to render industrial consultancy, as well as extension services. As incentive to small industries, NACIDA grants tax exemptions (fixed and privilege taxes, percentage tax on sales, and equipment) to its registered producers for a period of five years from the date of registration.

In spite of government assistance and support to the development and promotion of this sector of industry, some problems still exist, among which are: lack of financial resources, lack of qualified personnel and inadequate marketing outlets. Because of these problems, its development and promotion is rather low and, therefore, expected results were never achieved.

In order to accelerate its promotion and development, the following are being considered for implementation:

1. Putting up of industrial estates;
2. Establishment of facilities for the procurement of raw materials, machinery, tools and equipment;
3. Expansion of industrial consultation and extension services as well as model production centers;
4. Intensification of industrial and management training for small industry producers and managers;

5. Setting-up of common production program for complementary development of small industries with that of large industries through sub-contracting services and production facilities;

6. To supplement the credit assistance program of NACIDA, the NACIDA Bank and other existing financing institutions serving small industries shall be made more responsive to the peculiar problem and needs of such industries.

7. Accelerated market promotion.

The Government of Singapore recognizes the importance of small industries and the need to recognize them to achieve maximum productivity efficiency thus enabling them to contribute effectively towards its industrial development. Towards this end, the Economic Development Board, an autonomous body established to implement vigorous industrialization programme, was established in October 1963 with the assistance of the UN Special Fund and the International Labor Office the Light Industries Services to modernize and promote the development and growth of small industries. This agency assists enterprises employing less than 50 workers per shift and with investment in machinery and equipment valued at M$250,-000 or less. It undertakes the following: Industrial and engineering consultancy service; grants loans through commercial banks to firms with good prospects for improvements and growth; conducts series of short training course in bookkeeping, cost accounting and simple management techniques; organizes industrial exhibitions; encourages and assists in the formation of trade associations; develops preventive maintenance and industrial safety programes; provides common facilities to small enterprises in the field of tool and die making, heat treatment, electro-plating, and plastic technology; and undertake surveys and studies to determine those industries which have scope for expansion and growth and recommends specific measures to be taken to make the industries economically viable.

The working party also heard with interest the statements made by the Netherlands and United States delegations. *In the Netherlands* small industry is defined by the Research Institute for Management Science (RVP) as an enterprise in which the manager-owner does not actively participate in the production process but has to perform himself — without the assistance of specialized staff — all the main managerial functions (purchasing, production, marketing, financing, and personnel problems). This definition though not suitable for statistical purposes, highlights the difficulties confronting the small industrialist. Small industries can obtain medium — and/or long-term loans guaranteed by the Netherlands Government. "The Netherlands Middle Class Bank" which has a monopoly for granting such guarantee loans can request technical, commercial and financial advice from governmental or semi-governmental organizations, free of charge to the applicants. Two methods used for increasing insufficient share-capital of small industries were explained: (1) The Netherlands Participation Company (NPM), whose share is held by the big commercial banks as well as by "institutional investors" (pension funds of big enterprises and big life-insurance companies). Participations in the share-capital of industrial firms (to a minimum of Dfl 100,000 and representing a 1/3 minority) are financed out of NPM's own share-capital and reserves. As a rule participations are regarded as permanent investments and one seat on the Board of Directors is required. (2) Financing Company of the Industrial Guaranty Fund (FCIGF): participations to a maximum of Dfl 100,000 may be taken in smaller enterprises (representing 1/3 of the latter's total capital); this participation is intended as temporary (e.g. for 5 or 10 years), management. The capital needed for such participation is at-

tracted as longterm loans from institutional investors. The loans are guaranteed by the Foundation Industrial Guaranty Fund.

In the United States of America small industry is given impetus and encouragement in various means among which operation of the Income Tax Law of the United States is significant in two aspects; one, by imposing a lower income tax and two, by allowing small industries to buy state bond for capital improvement tax-free. The rapid development of small industry in Puerto Rico during recent years owing to these and other developmental measures adopted by its Government resulted in rapid expansion of Puerto Rican Small Industries.

The Working Party heard with interest a statement of the representative of the *International LabourL Organization* on the need to select appropriate technologies for small industries in developing countries. If care is not exercised in this field it could result in the inefficient use of capital thus demoralizing both the work-force and the management.

The Working Party observed that it is essential for countries interested in developing small-scale industries to devise a development policy properly integrated with the over-all industrial development of the country. In evolving a proper programme for their development, it should be ensured that certain special measures of assistance and support are provided for the specific purpose of helping them to overcome their handicaps within the shortest time possible. The Working Party felt that one important aim in small industry development should be to promote the selective growth of industries which would be viable, have competitive strength and growth potential. It felt that another factor in the strategy of small industries development is that the various forms of assistance — technical, financial, marketing, organizational, etc. — should be provided in an integrated manner in order that the best results can be obtained.

There appeared to be no set of universal rules that all developing countries may follow in this regard. Each country had to devise its own set of rules. Experiences of others could be of great value in this matter and the Working Party accordingly recommends that the Secretariat should collect, compile and circulate among the developing countries inventories of all policies and measures adopted by diferent countries in this regard.

The Working Party felt that a clear distinction should be made between small-scale industries and traditional industries generally termed as handicrafts, artcrafts and cottage industries. Although the two types of industries have much in common, each group requires specific measures of promotion and assistance to suit its special needs.

There appeared to eixst no general agreement on the definition of the term "small-scale industry" or "cottage industry" and it was felt that each country had to have its own definition based on its own development problems and programmes.

The Working Party took note of the need for a systematic study of the available resources in the countries of the region and advocated that particular resources in the countries of the region and advocated that particular attention be given to the possibilities of making economic use of waste materials.

B — Item 5 — Development and training of personnel in the field of small industries.

Regional co-operation for the development and training of personnel.

The Working Party heard with interest accounts for the efforts that are being made by many Governments and Industrial organizations to improve the efficiency of small

industries by imparting training at various levels.

The Working Party was informed that in the *Republic of China,* the China Productivity and Trade Centre (CPTC) one of whose main functions is inservice training has offered training courses and seminars in the fields of general management, industrial engineering technical know-how, finance, costing and marketing. Up to 1965, CPTC has conducted 472 training courses and seminars with a total of 15,700 participants. The Metal Industries Development Centre (MIDC) established in 1963 with the objective of development and improvement of basic metals, metal processing, machinery, transportation equipment and electrical appliance manufacturing industries offered fourteen courses to a total of 430 participants in 1965. The Management Development Centre set up in 1954 for training personnel for Training Within Industry has imparted training to 1338 persons up to the end of 1965.

In Hongkong, the newly established Hongkong Productivity Centre will provide special productivity consultancy services and technical assistance to small enterprises and will also undertake the work of training trainers, consultants and specialists for small industries.

It is expected that within three years the Centre will have available team of qualified trainers capable of conducting training courses in productivity and of providing small-scale industry with an effective consultancy service. The Hongkong Management Association organizes annually a full course on smaller business management. This course consists of the study of the nature, characteristics and problems of small business, functions of business management, financial aspects and production techniques applicable to small business, sales and marketing, personnel management as well as case studies. Future courses will lay emphasis on case studies and practical training. A supervisory Training Section in the Labour Department has provided courses concerning training within industry covering job relations, job introduction, job methods and job accident prevention. Training is carried out primarily through trainers who attend courses and return to their sponsoring organizations to run their own courses. In the field of industrial training the Government has formulated certain policies regarding technical education and vocational industrial training, dividing the responsibility between various Government departments and between Government and industry. To coordinate efforts in the field of industrial training on Industrial Training Advisory Committee has been established.

In Laos, the private sector of industry does not have centres for training. But the Government has established two institutes, namely, the College of Technical Education, in which various artisans are trained in carpentry, masonry, electronics, electric wiring, and maintenance and repair of radio receivers. *In Japan,* the training programmes are divided into two categories, one intended for managers and the other for technical personnel. For training managers, the Training Programme for Managerial Personnel of Small Enterprises was initiated in 1963 to provide not only fundamental theories but also working knowledge on modern business administration. This programme consists of several courses, each requiring 95 hours' training and studies in such fields as general management, production control, marketing and financial management. It is conducted under the responsibility of prefectoral state governments and municipal authorities and financed by Government subsidizing one third of the whole expenditure, the rest divided equally between the training for technical personnel, the programme offers 380 hours' training each in such fields as mechanical engineering, metallurgical engineering, electrical engineering, dyeing, and

weaving. It is financed in the same manner as the training programme for managers.

In Thailand, the Thailand Management Development & Productivity Centre (TMD-PC) established in 1962 has conducted up to 1965, 190 training courses and seminars at which more than 2600 participants attended from some 370 private and government enterprises. The subjects covered include production management, marketing, management accounting, personnel management, and general management. In addition to the management courses proved by TMD-PC, the Department of Industrial Promotion also conducts each year a number of training courses for workers, technicians and schoolteachers in various subjects such as textile dyeing, doll making, paper making, basketry, etc.

In the Philippines, training of personnel in the field of small industries is being undertaken by the Bureau of Vocational Education for instructors and trainers and, at the University of the Philippines Institute of Public Administration for practising managers. Management training is more actively provided by private universities and professional organizations. The government, however, has lately taken appropriate measures in this direction by sponsoring under a bilateral agreement with the United States the Economic Development Foundation, a private organization engaged in conducting training and seminars for increased productivity, and by initiating the establishment of the Technological and Development Centres for cottage and small-scale industries and the Institute for Small-Scale Industries — the former, with the cooperation of the Government of Japan and the latter, under a bilateral agreement with the Government of the Netherlands. As the majority of the small industry producers cannot avail themselves of the opportunities for training, locally and abroad, NACIDA has a programme to provide a more intensified industrial extension services.

In Singapore, for purposes of up-grading the skill of existing workers and for improving the production and techniques of manufacturing, the Light Industries Services undertakes the organization of training programmes on short-term basis in the training and demonstration workshops that have been established. Other training facilities envisaged to be established in the near future are a Training Centre for electrical and electronic industries and a Prototype Training and Production Centre for metal and engineering industries. As a means of improving the management of smaller industrial enterprises, the Light Industries Services has from time to time conducted a series of seminars and short evening training courses in bookkeeping, cost accounting, and production management techniques.

The Working Party also heard with interest the statement of the *Netherlands* delegation regarding the Research Institute for Management Science at Delft established with the objective of training consultants for small-scale industries in developing countries and which gives a course combining theoretical knowledge with practical application. Out of 221 participants who have attended the past 17 courses, no less than 86 come from ECAFE region. The Working Party heard with interest the statement made by the delegation of *France* in which it was mentioned that France was organizing train-training courses in French enterprises which have been attended by more than 2,600 trainees from the ECAFE region. France is also sending out technical missions to assist the small-scale industries of developing countries, especially to ensure full utilization of their capacity for self-training at all levels. These expert missions are working in close cooperation with national counterparts in the frame-work of existing structures or in the launching of pilot projects undertaken with government support, if necessary.

It was also noted that a good deal of attention is being paid to the problems of

training small industry personnel by organizations such as ILO and APO.

The Working Party felt that although, from the statements made by many delegations, it was evident that much was being done in the matter of training in the field of small industries, there appeared to be certain areas and certain types of training which were perhaps not receiving adequate attention. The fact that small industry owner-managers had, on the one hand, to combine in themselves many functions such as that of managers, accountants, supervisors, etc. and on the other hand, did not possess resources to enable them to go and obtain training abroad involving extended absences from their units, added to the difficulties. The Working Party, accordingly, felt that there was scope in this field for regional cooperation and recommended that the ECAFE Secretariat may in consultation with other international organizations investigate the possibility of establishing an Asian Institute for management and consultancy training in small industries. The availability of help from friendly advanced nations for the purpose may also be investigated.

One of the results of poor management due to lack of training was under utilization of machinery capacities. The Working Party felt that this subject deserves attention and recommended that the Secretariat may take up a study on this matter.

An inventory of training facilities including training for experts in the field of small industries would be a very welcome aid to governments in planning training program and the Working Party recommended that the Secretariat may try to compile such an inventory and to give it adequate publicity.

C—Item 6—The role of small industries in decentralization of industry, industrial dispersal and regional balance

The Working Party considered dispersal or decentralization of industry was necessary and important for a variety of reasons and noted that many Governments in the region were paying attention to it. Dispersal was not only necessary as a measure of correcting regional imbalance but also as a remedy for such social ills as rural unemployment and urban migration of labour. Agricultural employment being mostly seasonal, a well-developed system of small-scale industries dispersal in the underdeveloped rural areas would, by providing employment during the slack period and allowing utilization of local resources and raw materials give a rapid lift to the rural economy.

The Working Party heard with interest the experience of certain countries in the region in this matter and also noted with interest the account of the experience in India as contained in the Secretariat Paper I&NR/CIWP. 8/9 and also of the reports produced by the special bodies that had been created in that country to study this problem. The Working Party observed that industrial dispersal or decentralization in regard to small-scale industries appeared to have the greatest chances of success if such industries were agro-based e.g. cotton ginning, vegetable oil extraction, small agricultural tools manufacture, etc. A great deal of necessary infra-structure such as good communications, provision of cheap electricity, training of rural manpower, etc. would be necessary prerequisites to the success of any plan to decentralize small-scale industries. Various specific incentives such as tax concessions, etc. would also appear to be needed to attract small-industries to go to and continue in regionally undeveloped or underdeveloped areas. The Working Party agreed with the opinion quoted in the Secretariat paper that small industry would not grow where nothing else does and felt that unless those important aspects were given due attention, such waste of effort and resources may result in providing incentives

which may not result in dispersal of industries.

The Working Party felt that as coordinated improvement of all the areas within a country would be the prime objective of all economic development, the problem should be approached from the overall point of view of "regional planning" in which all important demographic, sociologic and geographic factors would receive due consideration in addition to the purely techno-economic aspects of industrial location. The observations in the Secretariat paper on the need to develop areas midway between cities and villages were relevant. Such areas would act as "counter magnets" in excessive urbanization and slum-creation. The Working Party recommended the Secretariat which had the advantage of having within itself a section dealing with rural and urban planning, should study the subjects of Rural Industrial Areas Development further and disseminate the results of such study among the developing countries of the region by convening a Symposium at which industrial planners, regional planners, techno and socio-economists may participate and exchange views.

B—Item 7—Development of engineering industries on a small-scale basis

The Working Party considered that small-scale engineering industries had a definite part to play in the development of industrial sector in developing countries for the production of many essential items of domestic consumer goods, builder's hardware, durable consumer goods, and agricultural tools, etc. Also small-scale engineering industries provide a valuable training ground for technicians who would be necessary to man medium and large scale industries in due course.

The Working Party was gratified to note from the Secretariat paper (I&NR/CIWP. 8/8) and the statements that considerable attention is being paid in many countries of the region to the development of such industries by providing special facilities and incentives. The Working Party felt that although each particular case would have to be justified on economic merits, generally speaking the granting of special incentives may be worthwhile for this class of industry as a whole. The Working Party recommended that the secretariat should assist the developing countries of the region by bringing to techniques for development of engineering their attention; periodically, opportunities and industries designed to produce an increasing number of essential articles. The possibilities of regional cooperation in the development of such industries may also be studied.

E—Item 8—Export promotion of small industries products

The Working Party considered that small industries, particularly handicraft and small-scale industries, can play an important role in the promotion of exports. It reviewed the work done by the countries in this field and noted the various ways and means employed to promote exports such as the putting up of permanent display centers of products in commercial places, the participation in national and international trade fairs etc. and discussed the requirements of products for the export markets like quality, design, price, packaging, acceptability and utility. The Working Party also considered that governments may provide incentives in the form of credit support and subsidy to exporters and extend facilities for training of small producers in the production of articles for exports as well as in the marketing of their products.

The Working Party suggested that small industries be assisted by appropriate government agencies concerned in the following:

1. Market survey and research to assess the demand and preferences of overseas buyers,

2. Industrial research in the use of indigenous material for the production of goods with export potentials,
3. Publication of product catalogues and trade journals,
4. Establishing of a scheme for quality markings of products,
5. Study of packaging and crating of products for exports,
6. Simplification of exporting procedures and documentation,
7. Organizing cooperative associations to enable to handle the marketing of their products.

The Working Party also drew the attention of the industrialized countries to the decision of the Australian Government to eliminate tariff duties on small industries products exported to them by developing countries.

F—Item 9—Programme of work and priorities in the field of small scale industries

The Working Party considered the programme of work and priorities as approved by the Commission in document I&NR/CIWP. 8/10. In the light of the discussions, the Working Party recommended certain additions that may be made to the work programmed to focus attention on some immediate problems facing small scale industries in the region.

The Working Party viewed with deep concern the statement made by the Secretariat that the resources available at its disposal are very inadequate to carry out the revised and increased work programme. The Working Party felt that in view of the significant role of small industry development in the region adequate resources should be allocated to implement this programme.

Recommendations

The recommendations which were submitted to the ECAFE Committee on Industry and Natural Resources that were also adopted on June 9, 1966 are as follows:

1. Collection and compilation by the ECAFE secretariat of policies and measures for small-scale industry development adopted by and for circulation among the different member countries of the region.

2. Systematic study of available resources in the member countries, with particular attention to possibilities of making economic use of waste materials.

3. Investigation by the secretariat, in consultation with other international organizations, of the possibilities of establishing an Asian Institute for management and consultancy training in small industries.

4. Study by the secretariat of the results of poor management due to under utilization of machinery capacities.

5. An inventory of training facilities by the secretariat, including training of experts in the field of small industries.

6. Further study of rural industrial areas development and dissemination of results of such studies among the developing member countries by convening a symposium at which industrial planners, regional planners, techno and socio-economists may participate and exchange views.

7. Assistance to developing countries by bringing periodic opportunities and techniques for development of engineering industries designed to produce an increasing number of essential articles.

8. Government provisions of incentives in the form of credit support and subsidy to exporters and of facilities for the training of small producers in the production of articles for exports as well as in the marketing of their products.

9. Acceptance in due course of the work program and priorities in the field of small-scale industries development.

10. Date and place of the next session should be left to the executive secretary to decide.

A Brief History of Soil and Water Conservation in the Philippines [1]

by

Forester JOSE A. RAYOS[2]

INTRODUCTION

Water is the priceless resource on which all growing things depend. It is the life-blood of civilization. It is important to agriculture and industry by providing water for irrigation and as means of transportation and source of power.

On the other hand, soil, with very negligible exceptions, is the universal foot-hold of plants, without which no plant is expected to thrive. It constitutes the most basic and essential resource of any nation. It is indispensable to the continued welfare, social and economic stability and happiness of the people. The soil is useful to man for producing crops for food, clothing and shelter.

Soil, water and forest as natural resources, are closely interdependent, so much so that conservation of one would mean the conservation of the others. Hydrologically, soil is an agent which holds water or passes it on to stream flow, while trees shelter the soil from direct impact of rain and their root forming nets prevent soil erosion.

The importance of these major natural resources to the country can not be underestimated. If properly conserved, soil contributes greatly to the nation's stability in forms of plants and plant products. Water, if efficiently harnessed, gives continuous benefits in forms of goods and services at minimum cost.

If abused, however, their combined forces can cause havoc and misery to the people as manifested by the recent floods in Central Luzon and Mindanao and the avalanche in Mt. Malasimbo, in the border of Bataan and Zambales provinces, which buried almost an entire municipality (6).

Needless to say, these natural resources may be assets or liabilities whichever way we want them to be. A knowledge of how the Filipino has tried his best to make full use of soil and water in his daily battle for survival should help and point the way towards improving the ways and means of implementing soil and water conservation in the country.

HISTORY

A. *Pre-Spanish Period*

Soil and water conservation, prior to the discovery of the Philippines by the Spaniards is practically unknown. Except for the ancient rice terraces in Banaue, Mt. Province, nothing could be found in history regarding the early Filipino's attitude towards resource conservation. This may be attributed to the presence of bountiful resources — the verdant and seemingly inhaustible forests, clear streams and rivers and rich soil — so much so that their depletion was never considered.

[1] A paper in Seminar under Silviculture 103 read, discussed and submitted in partial fulfillment of the requirement for the degree of Bachelor of Science in Forestry U.P., College of Forestry, College, Laguna.

[2] Chief, Planting Stock Section, Technical Services Division, Reforestation Administration, Diliman, Quezon City.

B. *Spanish Period*

During the Spanish regime, there was neither a clearcut policy nor an effort on the part of the government to conserve these two basic resources. However, the following events are worth mentioning since these have contributed in many ways to the present soil and water conservation movement in the Philippines.

"As early as the 16th Century, the Royal Spanish Crown initiated the so-called "encomienda" system. Under this method, vast tracts of lands were awarded to the royal favorites as well as those who had served the crown as soldiers. Later on, this privilege was extended to religious orders. These land grants did not take into consideration the ideas of proper land uses, neither did it mention anything, salient or otherwise, about soil and water conservation.

The organization of "Inspeccion General de Montes" as per Superior Government Circular dated September 3, 1963, further aggravated the situation favorable to soil and water depletion for it was empowered to function, among other things: x x x 2) To open up virgin lands; 3) To grant concession of mountain lands. . . ."

C. *Early American Period*

In the 1900, when the Americans took over the government from the Spaniards, one of the most effective laws that temporarily put to stop the wanton granting of lands was the Spooner Amendment to the Army Appropriation Bill of March 21, 1901. This law provides ". . . that no sale or lease or other disposition rights therein shall be made x x x until the establishment of a permanent civil government x x x".

This law was further made more effective with the collaboration of the Organic Act of July 1, 1902 by the Congress of the United States, giving power to the then existing Forestry Bureau to certify first that a land is fit for agriculture and not needed for forest purposes before the delimitation of the land can be affected.

Immediately the following year (1903), the framework of the Bureau of Soils was created under the Department of Agriculture and Natural Resources. This Bureau was very instrumental in effecting the government's desire to implement soil and water conservation. Alicante (1) cites the history of the Bureau of Soils as follows: —

"The Bureau of Soil Conservation owes its creation to the pioneering work on soils undertaken by earlier offices under the Department of Agriculture and Natural Resources from 1903 to the present. From 1904 to 1920, very little work on soils was done. In 1921, however, the Division of General Inorganic and Physical Chemistry of the Bureau of Science, and in 1934, the Secretary of Agriculture and Commerce set up the Survey Committee. Soil survey work started with respect to the chemical, physical, and biological properties of the soil classified. Two years later, the Division of Soil Survey of the Bureau of Science was created as the mainstay of the Soil Survey Committee and the Agricultural Soil Survey was established in 1939 within a special division known as the Division of Soil Survey. The division was abolished during the Japanese occupation. After the liberation of Manila, and upon the reorganization of the Division of Soil Survey in July, 1945, it was deemed necessary to place added emphasis on conservation survey as a fundamental basis in laying down the principles needed to undertake soil conservation work. In view of the foregoing, the Reorganization Committee of the Government saw fit to adopt the more appropriate name "Division of Soil

Survey and Conservation" and the Congress of the Philippines passed Republic Act 622 creating the Bureau of Soil Conservation.

The Bureau of Soil Conservation is made up of five divisions, to wit: 1) Soil Conservation Surveys Division, which is responsible for conducting reconnaissance. detailed erosion conservation and special investigation surveys in different provinces of the Philippines; 2) Soil Conservation Operations Division, which undertakes soil-and water conservation work, irrigation and drainage, land reclamation, and conducts researches on soil-and farm management practices, including water conservation and flood control; 3) Division of Soil Laboratories, which takes charge of the analysis of soil sample for fertility evaluation for the Bureau and other government entities, as well as for interested farmers. In addition it undertakes researches on the physical, chemical and biological properties of Philippine soils, in order to establish a basis for proper soil treatment; 4) Fertilizer Investigation Division, created under MSA-PHILCUSA Project No. 10, which deals with the specific fertilizer needs of the Philippine soil through field experiments, and prescribes the quantity of fertilizer elements required by the soils for optimum production; and 5) Administrative Division, which handles all matters relative to Office Management, particularly the preparation of the budget, procurement, and maintenance of equipment and supplies, and general administrative functions.

Soil classification work in the Philippines began in 1934. The methods and techniques of soil mapping are based on the genetic and morphological characteristics of the soils patterned after that of the United States Department of Agriculture with some modifications. The Soil Classification surveys of 35 provinces having an area of 19,392,000 hectares; or 65.20 per cent of the total land area of the Philippines have been completed as per Bureau of Soil Conservation Report of 1951. Of this, the soil reports of 16 provinces (Bataan, Batangas, Bohol, Bulacan, Cavite, Davao, Iloilo, Negros Occidental, Laguna, Nueva Ecija, Pangasinan, La Union, Tarlac, Pampanga, Rizal and Zambales) were published and those for the provinces of Ilocos Sur, Cebu and Leyte are being printed. Soil erosion survey began in 1946 to obtain data on the extent of and ways to combat soil erosion in this country. So far 12 provinces with an area of 7,201,170 hectares have been surveyed. These provinces, are Antique, Bukidnon, Capiz, Cotabato, Masbate, Misamis Oriental, Negros Occidental, Ilocos Norte, Cebu, Albay, Negros Oriental and Sorsogon.

With the aim in view of enabling farmers to understand the methods and practices involved in soil conservation farming the Bureau in 1946, initiated the establishment of soil conservation projects in strategic places in the islands. The purpose of each of the existing research demonstration stations is to utilize the soils of the area according to their inherent capabilities, and to adopt such soil-conservation methods and soil-management practices as are suitable for the area, with a view to making the project concerned a show window for the rural population of the region. These stations are 1) Soil Conservation Region No. 1, Project 1, Buenavista Estate, San Ildefonso, Bulacan; and Project 2, Alabang, Muntinglupa, Rizal; 2) Soil Conservation Region No. 2, Project 3, Lahug, Cebu City; Project 5, San Pascual, Ubay, Bohol (newlyopen); 3) Soil Conservation Region No. 3, Project 4, Pangasinan, Ligao, Albay; and 4) Soil Conservation Region No. 4 (Eastern Mindanao); 5) Soil Conservation Region No. 5 (Central Mindanao); and

6) Soil Conservation Region No. 6 (Western Visayas).

In order to provide a basic guide to the judicious use of fertilizer, the Bureau analyzes soil samples collected from nearly all the agricultural soils of the country to determine their fertility level. To date, 9,521 soil samples have been analyzed for research purposes; for other government offices 704, and for private entities and individuals, 2,595. In soil microbiology, isolation of organisms from legumes has proceeded; of these 91 isolates have been prepared, 13 being promising. The number of isolates introduced from the United States is 282. The inoculants prepared total 238 liters.

Long-range experiment on fertilizer and lime requirements is a very important phase of activity of the Bureau. To systematize the activities under this program, the Philippines had been divided into eight (8) fertilizer investigation regions as follows: Region No. 1 (Central Plain of Luzon); Region No. 2 (Southern Luzon); Region No. 3 (Northern Luzon and Cagayan Valley); Region No. 4 (Bicol Region); Region No. 5 (Western Visayas); Region No. 6 (Eastern Visayas); Region No. 7 (Northern Mindanao); and Region No. 8 (Southern Mindanao).

The Bureau of Soil Conservation has widened its activities in cooperation with other government entities.

1. Bureau of Public Works: Soil Classification is an important phase of work essential in laying out both gravity and pump irrigation system. It has also had an important part in directing the course of roads traversing areas suited to agriculture.

2. Bureau of Forestry: Personnel of the Soil Bureau work jointly with those of the Bureau of Forestry in land classification work by delineating which lands are to be disposed of as agricultural lands.

3. Bureau of Lands: Occasionally, the assistance of the Bureau of Soil Conservation is requested by the Bureau of Lands in the subdivision of land according to what the land is useful for, whether as cropland, orchards, pastures, woodlands, etc.

4. LASEDECO, Agricultural Colleges and High Schools: The Bureau extends full cooperation in working out soil problems of these entities.

5. Other offices under the Department of Agriculture and Natural Resources:

— The Bureau of Animal Industry: The Bureau of Soil Conservation cooperates in selecting and determining the best forage materials and legumes for livestock.

D. *Commonwealth Period*

The year 1935 saw the birth of the Philippines Commonwealth as ratified by a national plebiscite on November 15.

Cognizant of the vital role of a nation, the framers of the Philippine Constitution included therein, among others: Articles XIII, which runs:

"All agricultural, timber and mineral lands of the public domain, waters, mineral, coal, petroleum and other mineral oil, all forces of potential energy and other natural resources of the Philippines belong to the state, x x x."

In addition to this, the Revised Administrative Code clearly specifies:

"Sec. 1816 — The Bureau of Forestry shall have jurisdiction and authority over the demarcation, protection, management, reproduction, reforestation, occupancy and use of all public forest reserves and over the granting of license for the taking of forest including stones and earth therefrom."

The idea here is to have all of this public lands be under government control for more uniform implementation of laws with the aim in view of conserving them for the benefit of future generations.

To solve the ever growing problems paused by the depletion of soil cover, especially in the mountain and important watersheds, the following Commonwealth Acts to came to pass:

1. Commonwealth Act 119.
2. Commonwealth Act 304 as amended by Commonwealth Act 436.
3. Commonwealth Act 2649.
4. Commonwealth Act 3283.

The above laws provided for the setting aside of various amounts for the reforestation and afforestation of watersheds, denuded areas, and cogon or open lands within forest reserves, communal forests, national parks and timberlands, sand dunes and other public forest lands in the Philippines.

In order to maintain the purity of water and prevent the filling up of river beds, Commonwealth Act No. 4035, as amended by Republic Act 383, otherwise known as the Anti-Damping Law was passes in 1939. This law seeks to punish the act of damping into any river of refuse, wastes matter or substances of any kind whatsoever that may bring about the raising or filling in a river beds or causing artificial alluvial formations. In the same year, Commonwealth Act No. 418 (Appendix B) came about due to the government's desire to permanently delimit the protection forests from agricultural land. Funds for this purpose were taken from the Oil Excise Tax Fund of the National Treasury.

E. *Japanese Occupation Period*

From January 2, 1942 to October 20, 1944, the Philippine Puppet Government was run under the control of the Japanese Military Forces. During this period wanton destruction of all out natural resources occured due to the following factors:

1. The basic policy of Japan is to exploit as much of natural resources as it could in the Philippines, to help the Empire wage the war.
2. The scarcity of food, clothing and medicine contributed a great deal to the construction of kaingins and other forms of forest destruction especially to the most important watersheds, leaving the soil on the hillsides bare and unprotected, stripped off their once verdant forests.

F. *Republic Period*

The period immediately after the return of the liberation forces to the Philippines saw no advancement in line with water and soil conservation. Instead, the rapid phase of national reconstruction, as our country frantically made efforts to rise and rebuild from the ravages of war, enacted a heavy toll on the country's natural resources.

In 1952, the five year (1952-57) U.S. Aid Program was started in the classification of land throughout the Philippines. Emphasis was fundamentally laid on the delimitation of lands needing immediate attention and reforestation to stop excessive erosion and surface run-off.

To make the conservation program more suitable to the demand of the time, the First Philippine Forest Conservation and Reforestation Conference of 1954 approved, among others:

"x x x 3. In the determination of the Protection Forests, give priority to the determination of watershed protection areas and still higher priority to watershed protection of our main rivers and lakes traversing big agricultural areas x x x;

7. The necessary legislation will be recommended for the reforestation and/or soil conservation of private lands within watersheds as above defined."

Nature aided in moulding sound public opinion towards forest, soil and water conservation. While the idea of conservations is cherished only by a limited few, the floods which started in Mabini, Pangasinan in 1958, followed almost immediately by those in Central Luzon, Mindanao and until recently in Zambales, Bataan, gave rise to the crystalization of general public opinion to the conclusion that these national maladies will not be minimized, unless our forest restored and our soil and water properly conserved.

Araneta (3) aptly underscores the importance of conservation in the following classic statement:

"The soil is the most important natural resources of a nation. Add forest and water and you have the triped upon which civilization have endured, if conserved, and have been extinguished, if dissipated."

PRESENT OUTLOOK

The most recent addition to the soil and water conservation groups is the *AD HOC* Water Resources Development Committee which formally announced its existence on December 24, 1962. This Committee is composed of top representatives from almost all offices under the Department of Agriculture and Natural Resources. This Committee plans to manage and develop rivers and river basins as a measure in the national water conservation movement.

It is still premature to predict what this group can contribute towards moulding public opinion towards conservation consciousness. However, the technical soundness of planning and developing river basins as units is now generally accepted. Since watersheds management rests on the principle that water flow is a product of the land, it is considered by many people as a chief requisite of a type of river basin development on which conservation with, or better still, in advance of engineering works for flood control, hydroelectric power, navigation or irrigation depends. Although it is evident that constant progress is being shown by in line with reforestation work, like the other newly created agencies, it has yet to accomplish more.

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The Relation between the Pulp and Paper Industry and other Forest Industries

by

JOSE A. SEMANA[1]

Perhaps many are not yet aware of the actual role of the pulp and paper industry in forestry and think of it merely as a tremendously wood-consuming one. A local news item, for instance, had associated a local pulp and paper mill with the "indiscriminate cutting of trees more destructive than logging".

Of course, no "indiscriminate cutting" has been done by the mill company, and while the company uses logs, a substantial part of the raw material requirements of the mill consists of sawmill slabs and plywood-veneer wastes.

Another report expressed the apprehension of some residents of a northern province that deforestation would result if a plan to set up a big pulp mill materializes.

It is perhaps pertinent to ask if the pulp and paper mills in the big pulp and paper producing countries such as the United States, Canada, Sweden, and others have actually brought about the destruction of their forests. Indeed, have these industries in the aforementioned countries been more wasteful of the forest resources than wood-using industries such as logging, sawmill, and veneer-plywood mills?

A comparison of the pulp and paper industry with other major wood-using industries is given by the United Nations (3):[2]

TABLE I. Selected ratios: World's primary forest industries (1960).

Industry	Gross value of output per unit or raw materail* $/cu. m.	Investment per person employed $1000	Investment per unit of raw material* $/cu. m.	Employment per unit of raw material* No./100 cu. m.
Sawmilling	27	2.6	15	5.7
Plywood	40	4.2	45	10.5
Board products	57	9.3	74	8.0
Pulp and paper	57	23.8	151	6.4

* Based on roundwood equivalent consumed annually.

The above table shows that pulp and paper mills require the biggest investment per unit of raw material used, while a sawmill needs only one-tenth of the amount. However, along with the board (fiberboard and particleboard) industry, the pulp and paper industry yields the highest gross value of output per unit of raw material. The UN data, however, do not give us the "value added" per

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[2] Numbers in parenthesis refer to those of the references cited at the end of this article.

unit raw material consumed. The concept of "value added" enables us to measure the amount of money available for the payment of wages, salaries, interest charges, profits, taxes, and depreciation charges. In short, value added is the difference between the value of the products sold and the cost of materials used by a factory.

Information is given in Table II for American forest industries (1958), and comparative data on local industries (1961-63) are derived from local sources (1, 2, 9, 14). Data on the local pulp and paper industry were not included since it did not produce wood pulp during the period covered.

TABLE II. Selected ratios: U.S. and Philippine forest industries.

Industry	Gross value of output/cu. m.		Value added/ cu. m.		Employment/1000 cu. m.	
	U. S. $	P. I. ₱	U. S. $	P. I. ₱	U. S.	P. I.
Sawmills and planning mills	23	47	7	18	1.7	3.6
Plywood and veneer mills	51	155	22	66	3.2	16.4
Pulp, paper, paperboard and fiber board mills	92	—	46	—	3.7	—

The U.S. and Philippine figures show that more value is added to the wood when it is subjected to more processing, — for instance, about 6 times more pulp and paper mills as for sawmills. The actual economic windfall is even greater than what the above figures indicate as other materials, such as chemicals which are used in pulp and paper facture. Even in the U.S., where the forest industries are usually efficiently operated, employment increases with greater processing.

Moreover, the pulp, paper, and board industries, in addition to using pulpwood, also utilize the residues from other forest industry operations such as thinnings, log ends, sawmill slabs and edgings, and veneer cores. Data on the utilization of the raw material by the important forest industries in the United States are given below (15):

TABLE III. Forest industry utilization in the U.S. (1952)

	Logging residues, % of timber cut	Plant residues			Total unused waste, % of timber cut*
		% of timber received at the mill	Unused, % of timber cut*	Used, %	
Lumber	15	47.9	18.3	55	33.3
Veneer-plywood	20	47.2	4.6	88	24.6
Pulp (including fiberboard)	4	7.5	—	100	4.0
All forest industries					26.0

* The percentages given in these columns are about 1 to 2 percent high as the plant residues include not only amounts from growing stock but also those from non-growing stock and imported sources.

Table III shows that the logging waste of the pulp industry is only one-fourth to one-fifth that of the sawmill and the veneer-plywood industries. Furthermore, waste of the raw material received at the mills is nil for the pulp mills. Wood waste from plywood and sawmills furnished 6 percent (3,110,000 cu. m.) in 1952, and 20 percent (20,050,000 cu. m.) in 1962, of the total wood requirements of U.S. pulp mills (15, 16). These represented 2.3 percent in 1952, and 17-8 percent in 1962, of the total wood wastes in the United States.

Wood waste utilization by the Japanese pulp and paper industry is even better. Usage of wood waste rose from about 0.2 percent (13,000 cu. m.) in 1954 to 38.8 percent (5,500,000 cu. m.) in 1962 of the total wood used (7).

In Scandinavia, the use of thinnings, (as small as 2 inches in diameter) and sawmill waste for pulp is also common practice. The pulp mills receive the wood wastes unprocessed or already in the form of chips since many of the sources have their own chippers to convert the waste into chips which are easier to handle.

Going back to Table 1, the costs reflect the complexity, size and number of equipment employed in the various forest industries. To protect its huge investment, the pulp and paper industry is obviously compelled to ensure itself a continuous and reliable supply of raw material. Its forestry operations are, therefore, geared on a sustained-yield basis. The question thus arises on the huge wood requirement of a pulp mill. Table IV shows the approximate forest area needed by pulp mills relying on pulpwood alone for their raw material under Philippine conditions. The data are based on 33,000 tons/year or 100 tons/day production, a wood specific gravity of 0.43 (the average value for Philippine Mahogany species which comprise the greater portion of our standing commercial timber), and the Philippine gross annual increment of 3.5 cu. m./ha. (4, 6).

TABLE IV. Forest areas needed for various types of pulp mills.

Type of mill	Approximate pulp yield %	Approximate minimum forest area required, hectares
Groundwood pulp	90	24,400
Semichemical pulp	70	31,300
Chemical pulp	45	48,840

Allowances must be made for felling losses (which should be negligible for pulpwood purposes) and contingencies like fires, typhoons, etc., on the actual forest area required may be somewhat higher than those given above. A 100 ton/day mill capacity has been mentioned as it is probably the minimum economic size permissible under Philippine conditions. Experience in other countries has shown that the investment cost/ton plant capacity (which, therefore affects production cost/ton) decreases rapidly in proportion to the increase in capacity up to about 100 to 150 tons/day. At still greater capacities, investment cost/ton tends to decrease very slowly. On the other hand, maximum economic mill size is limited by geographic and transportation factors.

The pulp and paper industries in the U.S., Scandinavia and other big pulp and paper

producing countries are today among the leaders not only in efficient wood utilization but also in forest conservation. The U.S. Forest Service, e.g., has classified 84 percent of the U.S. pulp industry-managed forests in the upper productivity class, and only 1 percent in the lower productivity class, as compared with 7 percent and 6 percent, respectively, for the lumber-industry-managed lands and 81 percent and 3 percent, respectively, for the national forests (15).

The pulp and paper companies, too, are very active in developing and managing their forests. They operate nurseries and constantly replant industry lands. Work is done on tree improvement or forest genetics, which includes the selection of outstanding parent trees and the establishment of seed orchards. Research is also being carried on by the same firms to develop premium seedlings which will produce faster-growing trees of high quality wood. Thus, while felling has increased, log reserves have also actually increased.

Consider now the implications of an expanded pulp and paper industry on Philippine forestry and other forest products industries.

The establishment of more wood-using pulp and paper mills (of economic size, of course) would probably be one of the best things that could ever happen to Philippine forestry. It could reduce significantly our present wood wastes. Data as comprehensive as those collected in the U.S. are lacking, but it has been estimated that our logging wastes in the forests are 20 to 33 percent of the total usable wood. Again, sawmill and veneer-plywood mill wastes are about 45 to 50 percent of the wood processed (4, 8, 10). Thus, the total wood wastes are from 50 to 73 per cent of the timber cut in Philippine forests. (Compare this with U.S. figures in Table III). The wood waste is obviously substantial and it was about 3,384,000 cu. m. in 1962 alone. Unfortunately, the existing hardboard, particle board and pulp and paper mills here can only use a fraction (about 215,000 cu. m.) of this waste yearly at full capacity.

Besides the conservation feature of wood waste utilization by the pulp and paper industry, another aspect, just as important, should be considered. By deriving additional income from the sale of their wood wastes to pulp and board mills, sawmill operators and veneer-plywood companies would be able to trade their products on a competitive basis in foreign markets. In Japan, for instance, the maximum use of wood wastes, among other factors, permits Japanese plywood using Philippine logs, to compete successfully against Philippine-made plywood in the U.S. market.

Above all, a well-developed pulp and paper industry could lead to much improved forestry practice, as have resulted in other countries, and to specialization in forestry. In the foreseeable future, we will continue to have slow-growing Philippine Mahogany trees supply the lumber and veneer-plywood industries. Wastes from these mills, and their forests are valuable raw materials for the pulp and paper mills.

Studies at the Forest Products Research Institute have shown that moderate sulfate pulping conditions can be applied to mixtures of these species. It has been found that the resulting pulp strength is satisfactory except for tear, which can be improved by the addition of long-fibered pulp (11). White lauan has also been found satisfactory for the production of good quality fine paper, and is even better than bleached imported pulps (12). The cold-soda process, one of the simplest pulping methods, is also suitable for our hardwoods. Several of these species produce pulp comparable in strength to commercial imported spruce groundwood pulp (13).

The major part of the wood requirements of the pulp mills, however, should come

(*Continued on page* 56)

Management Plan for Public Grazing Lands—A Proposal

by
NEPTALE Q. ZABALA

INTRODUCTION

Public lands are generally the most un- and mismanaged lands in the country today, especially forest lands. This fact maybe attributed to the out-balance proportion of land area to manage and the technical men to do the management and also in most cases due to the lack of land-use management plans. Consequently we are witnesses of and participants in the havoc brought by floods, droughts and food shortage.

Public grazing lands being considered public forest lands bear the brunt of neglect. Millions of grazing lands exist and majority of these lands are not producing at or near their potential level. Reason for this is that the government still takes grasslands for granted and gives them minimum considerations. It is further aggravated by the lack of competent grassland scientists who shall conduct programs of improvements, and the poor managerial schemes being applied to this resource. Most often areas allocated for pasture use are not being utilized for such purpose. There are times also when pasture or range areas are over used and under used. When overused, soil and vegetation were destroyed which resulted in poor livestock production and what is worse is that, it makes the water absorbent capacity of the soil and the ability of the vegetation to retain moisture very poor to nothing, causing surface runoff which results in floods.

Ranges or pastures when properly managed, that is, a good cover of vegetation is maintained the whole year-round, are as good watershed as the forest. It could also increase its carrying capacity thus increasing livestock production. And to make this resource more beneficial and productive a sound national grazing policy must be adopted with the sole objective, — to derive from the public grazing land the maximum advantage for the community over an unlimited period. A proposal is the development of management plans which will serve as the guiding tool for the execution and implementation of this policy. Such plan is not only of great importance to the conservation of the range but to the economic success of the land user.

PROPOSED MANAGEMENT PLAN

Preparation:

Primarily, the objective of the plan is to collect information pertinent to the management of a certain leased area or area under permit; then to outline efficient ways of using the range resource under principles of multiple use land management. The information needed for the preparation of the plan are the following:

1. General description of the area which includes vegetation types, existing improvements, location of rivers, creeks, and other sources of water, and boundaries; topography of the land, climate and soil, and areas suitable for grazing.
2. Range condition and trend of the area.
3. Production and utilization.
4. Tentative grazing capacity and forage use, and

5. Possible range improvements.

These informations can be obtained by conducting an analysis and inventory of the range resource: Maps (aerial or grid) and overlays of the area must be properly made and kept.

The Management Plan:

When all informations needed have been collected and properly interpreted, a management plan is prepared. Since the management plan is a working tool for the land administrator and which may affect the operation of the land user (livestock man), preparation of the plan must be a common concern of both administrator and land user. In other words, ***management plan must be developed with the knowledge and cooperation of the land user.*** The general plan shall consist of an office section, field section and permittee instructions. Each section will have written and graphic parts, the details of which shall vary as needed for efficient management.

A. *OFFICE SECTION*: This is the master plan for an area under lease or permit for grazing use. It should be kept by the District Forester or by the Division Chief. Included in this Section are summarized basic data and prescription for management. Field sections and permittee instruction are extracted from this section. Under the *written part,* the following elements are covered:

1. *Identification*

   a. Forest District office (office supervising grazing area).
   b. Name and address of leasee or permittee.
   c. Name of District Forester or Officer-in-Charge.
   d. Name of person (s) who prepared the plan and date of preparation.

2. *Brief description of the area under lease or permit*:

   a. Location — boundary description.
   b. Topography — State kind of livestock best suited.

3. *Objective* (*s*):

   a. Show what is expected of the area under lease or permit, particularly range use in relation to other resource planning.

      Example of objectives:

      1. To obtain a continuous supply of forage for the maximum production of livestock.
      2. To conserve and protect range resources for the benefit of the community.

   b. Show ultimate goals and dates for meeting objectives.

4. *History and current status*:

   a. Past actual use (if any) show date when use started. It would be preferable to tabulate records of use. Include forage production in the past years and utilization. Among other things the following should be stated:

      1. Kind and classes of livestock.
      2. Numbers (or animal months) of livestock.
      3. Seasons of use.
      4. Cases of trespass or cattle rustling, or boundary disputes, etc.

   b. Past management to date. Describe any previous boundary changes; system of use and distribution of livestock applied if any; permittee or leasee cooperation; appraisals or reappraisals of pastures or ranges.

c. Ranch operation — Describe briefly the overall livestock operations of the permittee and how it fits into his management of the range or pasture.

d. Range condition and apparent trend — Statement summarizing current status.

5. *Estimated Grazing Capacities*:
   a. Tentative animal months, season of use (yearlong, wet, or dry), and kind of livestock.
   b. Summary of current estimated carrying capacity by suitability (primary, secondary, and transitory) and condition class.

6. *Management System*:
   a. Describe system to be used, such as:
      1. Rotation grazing
      2. Deferred and rotation
      3. Yearlong grazing
      4. Rest-rotation
      5. Seasonal use

   Only the system which would seem applicable to the present and future range or pasture condition must be recommended.

   b. Outline action program to put system into effect.
      1. Initial livestock distribution plan.
      2. Planned livestock shifts during the grazing seasons.
      3. Herding and riding requirements.
      4. Salting plans (specify areas that should not be salted).
      5. Watering places to be used or developed.

   c. If a rotation system is proposed, show specific schedules of use for each unit.

   d. Indicate other needs, such as supervision, fencing and revegetation.

7. *Range Development Program*:
   a. List projects separately and by classes of range improvements.
   b. List of existing improvements and show maintenance responsibilities.
   c. List proposed improvements and priority. Show construction and maintenance responsibilities.

8. *Correlation with other uses*:

   Briefly state relationships of range management to other resource uses (timber production, watershed, recreation and wildlife). State what action will be required of range management to facilitate correlation.

9. *Administrative Problems*:
   a. Establish step-by-step schedules with target dates, and interim management programs to put the entire management system into effect (incorporate into permittee instructions). Consider such items as:
      1. Availability of funds and manpower.
      2. Cooperative follow-up with permittee or leasee.
      3. Most effective means of installing range improvements and management practices.
      4. Adjustments in stocking where needed.
   b. Describe specific problems and outline action programs to solve them. Set accomplishment dates and assign responsibility for solution of each problem.

10. *Inspection of Area*:

    Establish inspection schedule to secure adequate supervision. Indicate:

a. Frequency and time of year.
b. Number of days required.
c. Where to inspect.
d. Key species, key areas, and proper use standards to be used on each.
e. How, when, and where livestock maybe counted, marked, or tagged.

11. *Alternatives*:

Action to be taken, if not put into effect or does not accomplish objectives for unit.

12. *Appendix Material*:
    a. Aerial photographs or map of area under lease or permit. Proper identification of key areas, range improvements, permanent study areas, etc., must be made.
    b. Area analysis data summary sheet.
    e. Range inventory data.
    d. Historical data:
        1. Old study plot material
        2. Range inventory writeup sheets
        3. Old management plans
        4. Correspondence to permittee about management livestock on the area. Compliance by the leasee or permittee.

13. *Filing*:

Records pertinent to this plan must be well kept. This plan must be filed in a classifile or similar binder.

The *graphic* part of the plan will consists of the following:

1. Range vegetation type and condition and trend maps
2. Maps and overlays to show:
    a. Range area and management unit boundaries.
    b. Range condition classes and apparent trends.
    c. Range improvements (existing and proposed).
    d. Inspection points, study areas and demonstration areas,
    e. Management data.

B. *FIELD SECTION*: This section will contain only the information needed in the field to determine the adequacy of management and to plan additional action which maybe necessary. It will be prepared annually and kept current. This section should be made available to any forest officer who will inspect the area.

The *written part* will include:

1. Current instruction to permittee or leasee, including salt plans and planned movement of livestock.
2. Permitted and actual use forms. (Grazing permit or lease agreement).
3. Allowable use standards.
4. Forage production and utilization forms.
5. Inspection sheets.
6. Job list.

The *graphic part* will consist of:

1. Area analysis maps.
2. Maps or overlays to show:
    a. Range area and management unit boundaries.
    b. Management data.
    c. Inspection points.
    d. Range improvements.

C. *PERMITTEE / LEASEE INSTRUCTIONS*: These must be in the hands of the permittee well before livestock enter the range area. *Written*: This part will be prepared or revised annually and will include:

1. Clean, definite instructions for management of livestock on the range.

(*Continued on page* 98)

*Forest Management as Related to Pulp and Paper Industry**

by

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INTRODUCTION

Bold and decisive policies in forestry by the President of the Philippines have placed forestry in the limelight. For the past six decades no administration has shown keener interest to the practice of sound forestry than President Marcos' Administration. It has thrown a challenge to the forestry profession as these policies have the forest as their hub and around which the foresters' work rotates.

It is needless here to point that because of the effects of these policies, forestry is now a subject of intense conflicting interests and demands. And one of the subjects which stimulated so much dialogues is industrial forest development. One particular sector of the wood-based industry, the pulp and paper, is a subject now of careful analysis and scrutiny — if it is vital or not to the economy of the country to accept its program of development and expansion.

We hold this to be inevitable: A decision has to be made and firm economic and forestry policies on pulp and paper development be NOW formulated.

As a forester, I accepted with all humility to talk on forest management in this symposium (a subject which to all foresters is nearest their hearts) and its relation to the pulp and paper industry.

WHAT IS FOREST MANAGEMENT?

Forest management is the application of business methods and forestry principles in the operation of a forest property, (*17*)[2]

Forest history is replete with conflicts between forestry and the business aspects of forest management. At the extremes, the forestry aspect would like to preserve the forest while the business aspect would like to get the best out of it and leave.

The very nature of the forest and the continuing personality of the business interest reconcile these two aspects in a symbolic relationship.

The forest is a replaceable resource. If we can just balance growth and harvest, we can have our forest in perpetuity.

No business is better situated than one which has the opportunity to have a continuing source of raw material. A nominal decrease in profit to have this resource base in sustained production is afforded to all investors. Thus, because of continuing personality and often the capital intensive characteristics of forest industries, it is easy for them to accept and apply sound forestry principles and practices in their logging operation.

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* A talk given in a symposium of the Araneta University Foundation on February 1 & 2, 1967 at the National Science Development Board.

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[2] Underscored numbers in parenthesis refer to Literature cited at the end of this page.

How would forest management be viewed in the content of pulp and paper forest operations? This, I am going to discuss in (A) on the application of forestry principles, and (B) on the application of the business principles.

A. *On the application forestry principles:*

The forest manager must attain a full utilization of *all species grown* in his forest as well as the maximum use of the *area.*

We have in the Philippines some 3,800 wood species and so far 200 of them are found suitable for pulp but only six species are suited for plantation purposes, (*10*). About seventy-five percent are covered by Philippine Mahogany. The seven species are considered good for pulp and paper manufacture, (*12*).

The problem of the forest manager is to reduce the number of unusable species and be replaced by desirable ones. A more refined approach to this timber management objective is to have specie combination that could produce the mixture and quality needed in the desired paper products, (*2*). The specie structure greatly influences/determines the possible combination of pulping materials.

In view of the predominance of the dispterocarp species good for pulp and paper, it would not be untenable to have most if not all species in the stand to be suited for pulping purposes.

We have just finished the inventory of our forest in Mindanao. By volume, the dispterocarps species in Eastern Mindanao comprise 75.3 percent, Central Mindanao, 66.2 percent and Western Mindanao, 75.9 percent. In other words, all other species cover the range of 24.7 percent to 33.8 percent of the total volume. Correlating volume to area, it would be a fair estimate to assume that 1/4 of the growing space in the commercial forest is nonstock or occupied by shrubs, undesirable or noncommercial species. To bring this uneconomic portion of the forest into production calls for more intensified regeneration and stand improvement efforts, (*8*).

This brings us to the topic on management tools to improve species and area utilization.

We are using "selective logging" as to the major silviculture system to attain sustained yield production. The important facets of its implementation are the marking of trees to be cut and timber stand improvement.

Tree marking imposes a rigid control on the species and diameter classes to be left or removed; the residual inventory involves a 100 percent counting and grading of the trees marked to be left. Compliance to the marking procedures can easily be checked by the inventory. Timber stand improvement covers the killing of undesirable species competing against commercial species on the aerial and ground spaces; it also covers planting of usable species.

These mechanics would afford the forest manager to improve species structure and better area utility.

Furthermore, aside from having a good use of area and species there is the need to increase timber supplies substantially. Pulp and paper plant needs a tremendous volume of raw materials. And increasing the stand could be attained as follows, (*6*):

1. Closer utilization of residues and wastes in the forest as well as in the mills. According to the preliminary findings of the Forest Products Research Institute, there are 51 cubic meters of wood residues and wastes such as stumps, tops, branches, timmings, knockdown or injured trees, etc. for every hundred cubic meters removed, or around

[3] The most important event in the sawmill industry has been the appearances in the market of equipment which make it possible to process slabs and edgings to pulp chips (*14*). Another important event is that hardwoods have now become indispensable fiber for many grades of paper (*15*).

1/3 of the volume in the forest are left after logging.

In the milling[3] processes, aside from pulp and paper plants, the average mill utilization is about 50 percent.

In other words, the plywood or lumber that reaches the end-user represents about 1/3 of the volume of timber in the forests, 2/3 are left in the woods or in mills as wastes or residues.

2. Cultural treatments, special thinning and cultural works on younger stand. It calls for removal of trees to afford better spacing and incidentally the retention of favored species. (Uness the trees cut from cultural treatments are utilized the operation would be in the books as complete expense. It is the pulp and paper industry that can use products from cultural treatments economically.)

3. Accelerate regeneration and increased planting. The seed year of the desirable species should be known, especially the time seeds mature so that the forest floor will be prepared to receive the seeds for easier and higher germination percent. Understock areas such as cableways and landings should be brought back to their proper density of stocking. This falls under area utilization concept.

4. Planting the better sites on the non-stock or poorly stocked areas with short rotation crops would boost up timber yields and, furthermore, will enchance faster turnover of products.

5. Improved protection from men, animals, pests, fire and diseases. Under the Philippine condition, the most serious problem as regards to protection would come from men — shifting agriculture, squatting and illegal cutting or entry. Any areas in production is a decrease of the total timber stand.

6. Adequate road networks. Intensive timber management requires adequately developed roads. Areas needing thinning or other cultural works can not be done when roads are not maintained. Outlet for the products of thinning is critical in this operation.

B. *On the application of the business principles:*

Forestry is being widely accepted as a business enterprise for profit, (*5*), and, therefore, its proper practice could be stimulated by profit possibilities.

Let's look at the pulp and paper industrial profit possibilities, on the macro-economic angle:

The total recorded world production of wood pulp in 1963 amounted to 69.0 million, (*18*) metric tons or 93 percent increase over 1950-52 production, 42 percent over 1955-57 and 11 percent over 1960-62 (Table 1).

It will be noted that in developed regions such as Europe, USSR and North America where production is heavily concentrated, there is the increase on the rate of growth ranging from 3.7 percent to 7.0 percent, whereas in undeveloped regions such as Latin America, Africa and Asia-Pacific the rate of increase has a range of 11.5 percent to 21.1 percent or about *three times that of the developed regions.* Consequently, in a period of 20 years (1956-1975) the pulp and paper industry may grow to *more twice the figures* in 1956.

Let us look into the world consumption figures on paper and paperboard, (*3*). Between 1948 and 1955 the consumption rose from 36.5 to 56.1 million ton or annual rate of 6.4 percent; in 1956-65 the demand was expected to grow at the annual rate of 4.8 percent and in 1966-75, at the rate of 4.6 percent, reaching some 90 million tons in 1965 and 141 tons in 1975 (Table 2).

In Asia and the Far East where the Philippines is geographically located, forecasts, (*3*) of demand for paper and paperboards were made in relation to population and per capita income growth, (Tables 3 and 4). Demand by 1970 for these products is about three times 1956-58 figures (5,785 million metric tons in 1956-58 with 16.45 million metric tons 1970). By 1975 the demand may rise up to 24.87 million metric tons which is more than four times the index figure of 1956-58 (Table 5). The rate increase of 8.4 percent is relatively high.

How about our importation[4] of papers and paper products?

In 1958 we imported 80,854.8 metric tons; in 1961, 154,455.6 tons or 91 percent increase; in 1965, 174,915.0 tons or 13 percent increase (Table 6). There is a marked decline in the rate of increase[5] but the 1965 importation is still more than twice that of 1958 figures. And the major importations are *Kraftboard, newsprint,* and *wood pulp.* In fact in 1965 almost 2/3 of the importation comprised these products. And it is estimated to have cost us no less than 60 million pesos on kraft and newsprint, and 28 million pesos on the quality paper products.

Our position in the ranking of consumption, among 135 nations, is number 57, with 14 pounds per capita consumption; the United States is number one with 478.5 lbs.; Sweden, Canada, United Kingdom, Denmark, Switzerland, Netherlands, West Germany, Norway and New Zealand, occupy the next ten ranks in the order as they are listed with a per capita consumption ranging from 202 to 320 lbs. (Statistics on Per Capita Consumption).

[4] It should be noted that we had been and are still a steady importer of this kind of product, despite having in 1965 18 mills with a total rated capacity of 144,500 short tons.

[5] This decrease might be due to the increase in the number of mills from 5 in 1958 to 18 in 1966; the rated capacity rose from 68,000 - 144,500 short tons.

Most countries is Asia (Except Japan), South America and Africa have very low per capita consumption. Reckoning from the third quartile to the fourth where these countries are located, the range of consumption is 0.14 to 9.8 lbs. The world average is 64.6 lbs.

The FAO in its report on "Wood, World Trends and Prospects" has this comment on consumption, (*18*):

> "There is a clear and marked positive relationship between per capita consumption of paper and paperboard in relation to per capita income. . . ."
>
> "For a given rate of income growth, consumption of paper and paperboard arises much faster in the developing countries, than in the developed. . . ."

OUR POTENTIALITIES TO EXPAND THE PULP AND PAPER INDUSTRY

1. We have the materials. Based on the recently completed aerial forest inventory of Mindanao, (1) (for Mindanao figures) and on the "Raw Material Resources Survey Bulletin, (*13*) for Luzon and Visayas figures, we have a forested area of 11.6 million hectares with a stand of 1,538 million cubic meters (lowest diameter used in Mindanao is 15 cm., Luzon and Visayas, 25 cm.). The total allowable annual cut is 6.1 million cubic meters.

2. We have the following processing plants, (*11*) which could be sources of wastes and residues for pulping purposes:

a. Sawmills. There are 266 sawmills with a yearly capacity of 975 million board feet. Average estimated mill utilization is 45 percent.

b. Plywood plants. There are 24 in operation with a yearly capacity of 967 million board feet. Average estimated mill utilization is 50 percent.

c. Veneer plants. There are 11 operation with a yearly capacity of 763 million

board feet with an average estimated mill utilization of 60 percent.

At full operation, the wastes/residues of these plants are as follows: In the forest[6] 1,350 million board feet and in the mills[7] 1,325 million board feet with a total of 2,675 million board feet or 6.7 million cubic meters. Using a conversion factor of 25 percent (1 ton of pulp to 4 cubic meters of wood) there is a potential production from these wastes and residues some *1.7 million* tons of pulp.

3. We have the good prospect of boosting timber resources for pulp, veneer and pile uses in the discovery of the adaptability of a miracle tree — the kaatoan bangkal (*Anthocepahlus cadamba*) for these usese. This specie is well adapted as a plantation crop for the following reasons:

a. It is a prolific seeder, and bears fruit in the 9th year.

b. Germination percent goes beyond 90; survival, two years after planting, is also over 90 percent.

c. It could also be reproduced by sprouts, coppice system.

d. The rate of growth is relatively fast. Measurement on eight — 15 year old trees indicated the following average diameter is 16.28 inches or 1 inch per year and an average clear length of 30 feet.

e. It has an estimated short rotation of 20 years (with the dipterocarps — 90-100 years).

[6] In time it should be feasible for timber managers to improve their stand by marketing hardwoods that are not presently or prospectively suitable for exacting industrial products (*4*).

[7] It is predicted wayback in 1955 that slabs and edgings will be considered as primary products and will be channeled for processing by pulp mills, board or wood chemical plants. Much of the low grade lumber particularly hardwoods will find its way to chips and chemical plants. Every bit of materials delivered will be properly used (*16*).

ANALYSIS OF THE SITUATION AND INCENTIVES

Our forest stands — virgin as well as residual — are utterly wanting of an industry that could absorb non-commercial species or low quality timber. There is also the used to restock opened or understock areas. Furthermore, in our residual forest, time will come that we have to apply silvicultural treatments to hasten growth and to improve quality and to eliminate undesirable species. All of these activities call for no small expenses. Only when the products could be utilized that real silvicultural practices and plantations in extensive form are possible and *only the pulp and paper industry* is suited to do this. It is not a real wonder that in the United States, according to Willaim Creely, an eminent American Forester, the paper industry was the first to practice forestry. It is the industry that brought a market for *annual wood crop,* (7).

We have a heterogeneous forest of hardwoods. Coniferous species are only found in Mindoro, Zambales and Mt. Province in sizable volume, the latter province in commercial pulpable volume.

Recent advances in technology in processing, cooking as well as in chipping make it now economically possible to handle hardwoods, for pulping. Technology have also made it possible for the industry to be dependent on hardwood pulps. In some paper products, high strength is not required and some may contain 80-90 percent of cheap hardwood pulps, (*15*).

The Philippines is a developing country and with certainty the per capita consumption of pulp and paper will increase as we improve the per capita income. In this connection, we are happy to note in the recent message to Congress of the President that there is an increase in the gross national products (GNP) from 4 percent to 7.9 percent, (*9*). If there is anything that this indicates in relation to pulp and paper industry,

it is the expectation of increased demand for this product.

Normally, in a developing country as ours, the major needs (our major imports are kraftboard, pulpwood and newsprints) call for lower quality products, *which pulp materials could easily be produced from our forests.*

While we have eighteen paper mills which produce 144,500 short tons annually at full capacity, we are still spending large amount of dollars to meet our needs. A 14-pound per capita consumption is very much below the world's per capita average. The demand will surely rise beyond what our plants can stabilize.

REMARKS

A positive decision to develope and expand the pulp and paper industry is indeed the step to take now, considering deeply our developing economy. And if development is decided, it should be based on the following criteria:

1. The long-range projection of the need —both for local consumption and for export, especially to Asian and Far Eastern countries. Export potential to these regions is bright and vast.

2. Availability of raw materials. Estimate to be based in utilizing wastes/residues from sawmills, veneer and plywood plants, from logging operation. Possible sources from plantations of short rotation crops should be seriously considered. The potentiality of kaatoan bangkal as pulping material should not be ignored.

3. The overall benefits to the economy of the country, among which are:

a. The pattern of operation is well suited for vertical and horizontal integration. Pulp and paper making, paired with a plywood or veneer plant and a sawmill is an operation complex affording both types of integration. The end result of these integrations is *high degree of utilization.*

b. It subsidizes cultural treatments because it could utilize low quality and small sized timber which no other industry could make use of.

c. No doubt, it is a dollar earner.

d. More employment.

e. It contributes to literacy, social and business improvement, newspapers, books, communication through the written media, packaging or handling problem of products.

f. Proprietary interest on the forest is patent or inherent because of the capital intensive characteristic of its operation. To be economically profitable a 200-ton daily capacity of a hardwood pulping plant should be the minimum. This needs some ₱108 million for fixed investment and about ₱56 million for capital cost. Thus, the entrepreneur can not just get out and leave when the going is rough.

g. Definitely, it will help solve the socio-economic problem of kaiñgin making. Submarginal lands as a result of said denudation because of shifting agriculture could be planted with short rotation trees, with sure return expected.

ONE LAST WORD

Our thesis is evidently clear. The expansion and development of the pulp and paper industry is beneficial to sound forest management in both the forestry and business aspects.

As we said before — the industry is heavily capital-intensive. And as the pulpwood resources contributes immensely to the developing economy of our Country, the government or the Administration should now draw out a firm program of development and extend all possible incentives and encouragement to any agency which would venture in the pulp and paper industry. This is my personal and professional stand as a forester.

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Be glad of life because it gives you the chance to love and to work and to look up at the stars; to be satisfied with your possessions but not content with yourself until you have made the best of them; to despise nothing in the world except falsehood and meanness, and to fear bothing except cowardice; to be governed by your admirations rather than by your disgusts; to covet nothing that is your neighbor's except his kindness of heart and gentleness of manners; to think seldom of your enemies, often of your friends, and everyday of Christ; and to spend as much time as you can with body and spirit in God's out-of-doors — these are the little guidepaths to peace. — HENRY VAN DYKE

TABLE 1. — Recorded Production of Wood Pulp by Regions, 1950-52 to 1963

	Production				Average annual rate of growth	
	1950-52 (1)	1955-57 (2)	1960-62 (3)	1963 (4)	1951-61 (5)	1956-61 (6)
TOTAL WOOD PULP	1000 metric tons				Percent	
Europe	10,186	13,720	17,895	19,745	5.8	5.4
U.S.S.R.	1,750	2,615	3,475	3,907	7.0	5.7
North America	22,560	29,025	34,776	37,977	4.4	3.7
Latin America	237	334	705	874	11.5	16.1
Africa	23	67	156	228	21.1	18.5
Asia-Pacific	1,325	2,872	5,319	6,326	14.9	13.1
World Total	36,081	48,633	62,308	69,057	5.6	5.1

TABLE 2. — A Forecast of World Paper and Paperboard Demand, 1965 and 1975

Region	Total paper and paperboard demand (Million per metric tons)			Annual growth rate 1956-75 (Percent)
	1955	1965	1975	
North America	31.5	42.8	56.6	3.2
Latin America	1.8	3.5	6.5	6.6
Western Europe	13.2	21.3	30.2	4.3
Eastern Europe	1.9	3.9	7.1	6.8
U.S.S.R.	2.5	6.1	12.3	8.4
Africa	0.5	0.9	1.6	6.2
Near and Middle East	0.14	0.28	0.53	6.9
Far East	3.0	6.9	13.8	8.0
China Mainland	0.9	3.1	8.8	12.3
Oceania	0.8	1.3	1.8	4.5
World Total	56.1	90.0	141.4	4.7

Note: Figures may not add up because of rounding.

TABLE 3. — Estimates of Population 1955-1975 in Asia and the Far East
(Million inhabitants)

Region	1955	1975	Annual growth percent
1. Continental South-East Asia	63.9	93.5	2.07
2. Insular South-East Asia	104.0	169.3	2.46
3. South Asia	473.3	717.0	2.10
of which: India	382.4	569.0	1.95
4. East Asia	121.8	160.3	1.30
of which: Japan	89.0	102.7	0.71
5. West Asia	18.3	29.0	2.32
6. China Mainland	608.2	939.5	2.20
Sub-total	1,389.5	2,108.6	2.11
7. Oceania	11.4	16.0	1.71
Total: Asia & the Far East	1,400.9	2,124.6	2.10

TABLE 4. — Per Capita Economic Growth Rates Assumed in the Forecast
(Percentage rise in GNP at constant prices per year)

Region	Hictorical rate			Assumed future rates 1966-75
	Period	1958-65	Percent	
1. Continental South-East Asia			2.5	2.5
of which: Burma, Thailand	1952-57	3.5	3.0	3.0
2. Insular South-East Asia			2.0	2.0
3. South Asia			2.5	2.5
of which: India				
4. East Asia	1948-55	1.9	2.5	2.5
of which: Japan	1951-56	6.33	5.65[a]	5.33[a]
Others	1952-57	3.7[b]	2.5	2.5
5. West Asia (Iran)			2.5	2.5
6. China Mainland	1952-56	6.7	4.75	4.25
7. Oceania			2.5	2.0

[a] See chapter VIII re alternative forecast.
[b] Republic of China only.

TABLE 5. — A Tentative Forecast of Demand for Total Papers and Paperboard in Asia and the Far East
(1,000 metric tons per year)

Region	1956-58	1965	1970	1975
1. Continental South-East Asia	139	260	375	545
of which: Burma	24	48	70	101
Thailand	43	90	135	201
2. Insular South-East Asia	185	320	455	630
3. South Asia	445	885	1,300	1,890
of which: India	370	730	1,070	1,550
4. East Asia	2,920	5,580	8,040	11,160
	2,740	5,220[a]	7,470[a]	10,410[a]
5. West Asia	17	30	50	70
6. China Mainland	1,270	3,090	4,790	8,830
Sub-total	4,975	10,170	15,010	23,130
7. Oceania	810	1,170	1,440	1,740
of which: Australia		960	1,180	1,425
Total: Asia and the Far East	5,785	11,340	16,450	24,870

[a] See chapter VIII re alternative forecasts.
Note: Totals may not add up because of rounding.

TABLE 6. — Philippine Importation of Paper and Paper Products

Kind of paper	1958	1959	1960	1961	1962	1963	1964	1965
NOS	1,684.6	4,054.3	3,201.2	2,664.4	2,917.8	3,474.2	8,600.8	7,313.4
Blotting	67.0	46.8	18.8	39.9	25.9	23.9	146.4	19.2
Book	1,983.5	5,090.4	1,795.5	3,799.2	5,514.9	6,457.4	9,195.8	8,793.4
Boxboard	2,980.5	413.4	483.1	1,295.4	261.1	165.7	717.6	315.9
Bristleboard	—	—	—	—	—	63.9	199.3	307.1
Cardboard	9,556.4	8,672.9	21,436.8	35,745.7	19,466.7	4,330.6	23,185.3	11,232.4
Clipboard	—	—	—	—	—	9.4	—	—
Edibleboard	—	—	—	—	—	32.5	—	206.4
Kraftboard	—	—	—	—	—	19,670.5	19,226.3	26,315.4
Sulphite pulpboard	—	—	—	—	—	1,934.9	1,858.8	—
Tagboard	—	—	—	—	—	157.1	—	25.6
Cellophane	1,536.1	1,542.3	1,864.7	2,063.9	1,739.5	1,243.1	2,338.9	2,327.2
Cigarette	1,826.6	1,955.1	1,606.7	2,126.2	1,126.2	1,719.1	1,829.1	2,273.9
Coated	—	—	—	—	—	151.0	429.8	730.6
Crepe	25.9	170.1	102.2	93.1	6.9	26.7	9.4	32.3
Drawing	—	—	—	—	—	65.2	30.1	52.4
Embrossed	.7	—	—	.2	—	—	2.9	20.6
Filters	—	—	—		—	27.5	37.7	446.0
Foils, NOS	48.5	39.4	310.8	3.2	82.0	22.4	14.3	37.8
Foils, Aluminum	21.4	132.2	434.5	88.3	151.9	342.4	339.5	326.0
Glassine	420.5	397.7	429.0	464.8	354.2	401.9	436.1	307.2

TABLE 6. — Philippine Importation of Paper and Paper Products (*Con't.*)

Kind of paper	1958	1959	1960	1961	1962	1963	1964	1965
Draft	6,634.4	19,889.2	2,256.5	2,100.9	1,448.6	3,882.8	9,094.4	4,752.4
Lithograph	—	.5	—	—	.6	8.7	.7	—
Newsprint	23,712.4	40,889.2	35,791.2	52,907.5	43,380.7	39,984.7	46,836.7	68,677.3
Old News	1,670.4	3,853.7	1,822.1	767.0	1,678.2	8,099.4	1,618.4	3,450.5
Over-issue News	125.0	—	—	.1	68.0	—	90.7	1,880.0
Printing	11,710.6	10,995.1	8,528.3	9,186.8	1,106.3	4,132.9	5,632.5	6,353.1
Tissue	286.8	523.2	371.6	774.9	592.4	331.5	364.7	448.0
Tissue, Facial	15.6	1.3	—	54.4	.4	1.0	57.4	—
Tissue, Napkin	2.0	—	1.5	.2	—	—	—	1.1
Tissue, Toilet	9.2	5.9	2.2	—	30.5	95.3	2.7	149.3
Tissue, Towel	17.0	5.3	7.9	2.9	—	—	10.9	37.2
Wax	1,257.8	1,145.7	975.1	771.7	348.2	445.9	563.5	330.0
Wood pulp	7,347.9	24,978.5	24,636.7	33,804.4	19,867.1	30,737.7	24,009.6	21,482.5
Wrapper	4,415.1	2,666.3	2,612.0	3,085.0	1,649.3	3,327.5	3,775.1	3,983.0
Products, NOS	46.1	92.4	225.7	282.7	197.8	282.6	370.1	285.1
Products, Bags	2,978.7	2,337.3	1,893.3	1,742.1	1,740.1	1,122.1	1,338.8	1,119.6
Products, Boxes	27.7	143.1	78.7	41.4	41.8	22.6	71.3	653.4
Products, Cig. Wrapper	—	—	—	—	.5	1.2	—	5.6
Products Cups	22.6	27.9	3.2	1.6	—	—	1.8	2.9
Products Bummed Taps	126.3	485.2	199.4	413.7	151.3	144.5	73.5	49.6
Products Label	297.5	203.6	53.6	134.0	136.4	173.6	153.6	167.0
Totals (Metric tons)	80,854.8	130,782.0	111,152.3	154,455.6	104,586.0	133,113.4	162,864.5	174,915.0

Growth of the Philippine Industry

Year	Number of Mills	Rated Mill Capacity
1958	5	68,000
1959	7	78,600
1960	8	83,400
1961	9	93,400
1962	10	119,400
1963	15	140,000
1964	16	141,500
1966	18	144,500

Statistics on Per Capital Consumption

	Population in (thousands) 1964	Per capita consumption in lbs. 1956	1964		Population in (thousands) 1964	Per capita consumption in lbs. 1956	1964
1. United States	192,119	432	478.5	26. South Africa	17,245	51	70
2. Sweden	7,666	208	320	27. Hungary	10,135	24	57.3
3. Canada	19,916	280	305	28. Argentina	22,200	43	57
4. United Kingdom	54,066	180	264	29. Venezuela	8,650	9.6	57
5. Denmark	4,680	154	245	30. Poland	31,339	76	54
6. Switzerland	5,700	163	211	31. Bahamas-Bermuda	155	46	53
7. Netherlands	12,213	117	220	32. Lebanon	1,900	18	50
8. West Germany	58,300	128	208.3	33. Uruguay	2,500	47.7	50
9. Norway	3,700	159	205	34. Trinidad-Tobago	900	40	48
10. New Zealand	2,598	141	202	35. Taiwan	12,338	14.2	47.82
11. Australia	11,027	156	199	36. Spain	31,390	19	45.5
12. Finland	4,580	131	177.3	37. Yugoslavia	18,841	15	44
13. Belgium-Luxembourg	9,670	110	171	38. U.S.S.R.	229,000	24.4	40.3
14. Japan	98,000	60.1	163	39. Cuba	7,134	69	39
15. France	48,750	106	157	40. Greece	8,650	9.6	38.5
16. Iceland	187	93	157	41. Jamaica	1,750	9	37.5
17. Ireland	2,849	81	130	42. Mexico	39,500	26	37
18. East Germany	17,155	82	123	43. Bulgaria	8,078	22	36
19. Austria	7,200	72	122	44. Panama	1,200	20.2	34.5
20. Hongkong	3,500	42.5	102	45. Chile	8,416	24	33.9
21. Czechoslovakia	14,058	74	97	46. Rumania	18,813	37	30.8
22. Italy	51,600	43	96	47. Portugal	9,639	17	29
23. Puerto Rico	2,600	10	84.2	48. Columbia	15,434	12	28
24. Israel	2,600	53	84	49. Br. Guiana	601	26	24
25. Costa Rica	1,338	14.2	82	50. Honduras	2,163	4.1	24

	Population in (thousands) 1964	Per capita consumption in lbs. 1956	1964
51. Brazil	80,000	19	22.2
52. Surinam	325	—	22
53. Malaysia	10,673	—	21
54. Albania	1,670	—	20
55. Peru	11,800	7	18
56. Cyprus	590	20	16
57. Philippines	30,000	8	14
58. U. A. R.	27,500	10	14
59. Tunisia	4,290	6	13
60. Guatamela	4,000	8	12
61. Libya	1,300	5	12
62. So. Vietnam	14,040	4	12
63. Algeria	11,100	6	11
64. So. Korea	27,490	5	10.9
65. Dominican Republic	3,500	5	10.7
66. Morocco	12,500	6	10.4
67. Iraq	7,200	—	10
68. El Salvador	2,910	—	9.8
69. Turkey	27,755	7.7	9.7
70. Br. Honduras	95	33.7	9.5
71. Nicaragua	1,750	7.8	9.5
72. Jordan	1,860	3.7	9.22
73. China (Communist)	700,000	3.3	9
74. Kenya	9,000	6	8.9
75. Rhodesia	4,010	—	8
76. Angola	4,950	—	8
77. Ghana	7,400	5	8
78. Thailand	29,700	2.2	7.7
79. Ceylon	11,100	5	7.4
80. Senegal	3,300	—	7
81. Ivory Coast	4,500	—	6.8
82. Fr. Guiana	34	—	5.3
83. Paraguay	2,000	3.6	5.1
84. Syria	5,100	—	5
85. Iran	22,500	2.2	5
86. No. Vietnam	18,000	—	4
87. Laos	1,900	—	4
88. Sierra Leone	2,200	—	3.8
89. Gabon	456	—	3.5
90. Bolivia	3,950	3	3.3
91. India	464,000	2	3.2
92. No. Korea	9,000	2	3
93. Cambodia	6,000	3.4	3
94. Outer Mangolia	1,300	—	3
95. Malta	320	—	3
96. Burma	23,183	1.5	2.5
97. Swaziland	250	—	2.5
98. Liberia	2,500	5	2.5
99. Pakistan	98,700	2	2.5
100. Central African Republic	1,250	—	2.5

	Population in (thousands) 1964	Per capita consumption in lbs. 1956	1964
101. Sudan	13,350	2	2.4
102. Tibet	1,400	—	2.3
103. Yemen	5,100	—	2.2
104. Guinea	3,400	—	2.1
105. Saudi Arabia	7,000	1	2
106. Somalia	4,500	—	2
107. Kuwait	400	—	2
108. Nepal	11,000	—	2
109. Burundi	3,000	—	2
110. Ecuador	5,000	6.9	2
111. Bechuanaland	543	—	2
112. Nigeria	55,600	—	1.8
113. Congo (Leopoldville)	15,000	—	1.7
114. Indonesia	104,900	3.5	1.7
115. Malagay	5,862	—	1.6
116. Basutoland	880	—	1.5
117. Mazambique	6,800	—	1.5
118. Cameroons	4,000	—	1.5
119. Haiti	4,000	4	1.3
120. Congo (Brazaa-ville)	900	—	1.3
121. Tanzania	9,600	—	1.3
122. Uganda	7,016	2	1.3
123. Togo	1,600	—	1.1
124. Rwanda	2,700	—	1
125. Zambia	3,500	—	1
126. Thiopia	22,200	0.5	0.75
127. The Cambia	325	—	0.7
128. Dahomey	2,250	—	0.64
129. Malawi	3,500	—	0.6
130. Upper Volta	4,500	—	0.4
131. Mauritania	800	—	0.4
132. Chad	2,750	—	0.30
133. Afghanistan	14,684	0.2	0.2
134. The Niger	3,130	—	0.2
135. Mali	4,408	—	0.14
World, Except U.S.A.	2,998,877	28.1	41.2
Total World	3,190,996	50.4	64.6

Some Pulping and Papermaking Experiments made on Matured Abaca Stalks and Wastes from Albay [1]

by

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SUMMARY

The pulping experiments, conducted on matured abaca stalks and abaca plantation and stripping wastes from Albay by the sulfate and cold-soda pulping processes, showed different pulp yields which indicated the characteristic differences of raw materials. The abaca stripping waste produced the highest pulp yields on both pulping processes tried, and it consumed the least chemicals per ton of pulp. On the other hand, the whole abaca stalks exhibited the highest pulp-strength properties on both pulp handsheets and papers.

The major disadvantages noted were the bulkiness of these materials (abaca stalks and wastes), which resulted in the production of less pulp per unit volume of digester capacity, and the higher requirement for liquor-to-material ratio in the pulping process as compared to those for wood.

The major advantages that were evidently observed were the exceptional strength properties of the pulps, and the low power requirement of these pulps for strength development. The preparation of the stock and the strength tests of the papers produced from them further substantiated the advantages indicated.

The experimental wrapping papers, made from the sulfate pulps, gave higher strength properties than those of the commercial wrapping papers, tested at the Institute. The paper, (machine run 536), made from abaca stalks, gave the highest strength properties which even exceeded the U.S. Federal Specification requirements for Grade-A kraft wrapping papers.

The experimental bond paper, made from the bleached-sulfate pulp of the abaca stripping waste, gave higher strength properties than those of the commercial bond papers which were tested at the Institute and the U.S. Federal Specifications for Type IV chemical-wood bond paper.

The experimental wrapping papers, made from the cold-soda pulps, had high tensile strength but they were low in tearing resistance.

INTRODUCTION

The question, as to whether it is feasible to put up a commercial pulp mill to utilize abaca wastes in Albay, has been brought to the attention of the Director of the Institute by the Chairman of the Abaca Development Board. The answer to this question does not mainly concern the technical aspects of pulping and papermaking but it includes equally, as well, the economic study which involves, among others, the estimate or survey of the raw material supply.

In this report are presented data on some pulping and papermaking experiments on

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matured abaca stalks and wastes from Guinobatan, Albay.

PULPING AND PAPERMAKING EXPERIMENTS

The raw materials, as received from Guinobatan, Albay, had dry solid contents of 8.6 per cent for the matured abaca stalks, 12.3 per cent for the abaca plantation waste, and 16.3 per cent for the abaca stripping wastes. Apparently, the dry solid contents of these materials were very low, and they would increase the liquor-to-material ratio in the pulping process, unless these materials underwent predying. They were cut into 26--forestry leaves--some pulping and - - chips of ½ to 1 inch long in the fiber direction.

Sulfate Pulping

The sulfate or kraft pulping trials were conducted in an 0.8 cu. ft. steam-jacketed, stainless-steel rotary digester. After the desired digestion time, the pulp was discharged, washed and screened. Table 1 shows the data obtained on pulp yields, chemicals consumed, chemicals charged, and other pulping conditions.

Cold-Soda Semichemical Pulping

The chipped abaca materials were steeped in a caustic soda solution for two hours in an open tank at room temperature with occasional stirrings. Then, the chips were drained of the pulping liquor and passed through an 8-inch disk or attrition mill once for defiberization. The pulp was washed with tap water but it was not screened because it was almost free of fiber bundles. Table 1 shows the data on pulp yields, chemical consumed, and pulping conditions.

Papermaking

Wrapping papers were prepared from the unbleached pulps and bond paper was made from the bleached pulp from the stripping waste.

The papers were made on 8½-inch-wide experimental Four-drinier paper machine.

Data on stock preparation and properties of the experimental papers were shown in Table 4.

DISCUSSION OF RESULTS

Sulfate Pulping

Based on pulp-production-per-unit-volume of digester capacity, it was observed that the abaca materials produced about one-fifth of the amount of pulp producible from wood by the sulfate process. For example, on an 0.8 cu.-ft.-digester, an average of 0.3 kilogram of abaca-sulfate pulp was produced while, from wood of medium density, an average of 1.5 kilograms of sulfate pulp could be produced. This low pulp yield does not only affect pulp output per unit volume of digester capacity; it has also something to do with the size of digester to be used in commercial operation.

Pulping-liquor-to-material ratios were 12: 1 for matured stalks, and 8: 1 for plantation and stripping wastes while, for wood chips, this ratio is normally in the range of 2 to 5: 1. The higher the liquor-to-material ratio, the higher would be the steam consumption in the pulping proces because more liquor would be heated per unit weight of material.

Average screened pulp yields, using the "8-cut" screen, were 24.47 per cent for plantation waste, 33.29 per cent for abaca stalks, and 40.42 per cent for stripping waste while the corresponding average pulp rejects were 3.70, 3.89 and 3.44 per cent in the same order. The average chemical consumption, expressed as Na_2O per ton oven-dry screened pulp, were 525 kilograms for plantation waste, 424 kilograms for abaca stalks, and 325 kilograms for stripping waste.

Among the three materials, it seems that, with respect to pulp yield and chemical consumption, the abaca stripping waste is the most economical material.

Gold-Soda Semichemical Pulping

Pulp yields, using this pulping process, were 56.4 per cent for the plantation waste, 52.5 per cent for the abaca stalks, and 80.5 per cent for the stripping waste. This observation further confirms that there are more fibrous materials in the stripping waste than either the whole abaca stalks or the plantation waste.

The high liquor-to-material ratio employed in here may not be a disadvantage at all because the spent liquor can be reused by fortifying it with fresh caustic soda solution to the desired concentration.

Pulp-Handsheet Properties

Data on strength tests of sulfate-pulp handsheets are shown in Table 2.[3] It is evident that the strength properties of these pulps are comparable or even better than those of the softwood-sulfate pulps. Another significant observation is that these pulps required less power for strength development as shown by the relationship between beating time and freeness (table 2). The sulfate pulp of abaca stalk showed the highest strength properties.

Data on strength tests of cold-soda pulp handsheets are shown in Table 3. It is also evidently shown that these pulps have exceptional strength properties which are even comparable with the average Philippine hardwood-sulfate pulps and that these pulps also required less power for strength development. The cold-soda pulp of abaca stalk also showed the highest strength properties.

Papermaking

Table 4 shows the properties of the experimental papers made from abaca. Compared with the commercial bond papers which were tested at the Institute and with U.S. Federal Specifications for Type IV chemical-wood bond paper, the experimental bond paper, made from the bleached-sulfate pulp of abaca stripping waste had much higher strength properties. This experimental paper was also higher in brightness and opacity than those of the commercial bond papers which were tested at the Institute.

The three experimental wrapping papers, made from the sulfate pulps, gave higher strength properties than the commercial wrapping papers which were tested at the Institute. But the paper, (machine run 536) made from abaca stalks, gave the highest strength properties which even exceeded the U.S. Federal Specification requirements for Grade A kraft wrapping paper. The paper (machine run 530) which was made from the plantation waste had low tearing resistance. However, this was due to the low pulp freeness and the paper could possibly approach the tear requirements for Grade A kraft wrapping had this been made at a higher freeness.

The three experimental wrapping papers, made from the cold-soda pulps as compared with the commercial wrapping papers and with U.S. Federal Specifications for Grade B wrapping paper, were inferior in tearing resistance and burst, but they were comparable in tensile strength. Wrapping paper (machine run 535) made from cold-soda pulps of abaca stalks gave the highest strength properties.

CONCLUSION

Technically, it may be concluded that the abaca stalks and stripping and plantation wastes from Guinobatan, Albay are desirable pulping materials for making high-strength papers. From the economic viewpoints, the advantages and disadvantages, shown with the use of these materials for papermaking, should be evaluated on a common commercial basis to definitely establish their effects on the profitability of such venture.

[3] The U.S. Technical Association of the Pulp and Paper Industry Standard Testing Methods were used in the physical testing of pulp-handsheets and papers.

TABLE 1. Pulping data on abaca.

Cook No.	Description of sample	Pulping process used[a]	Chemicals charged[b]		Chemicals consumed[c]	Pulp Yields[b]	
			NaOH percent	Na_2S percent	percent	Screened percent	Rejects percent
1334	Abaca plantation waste	SO_4	15	5	12.32	23.88	2.59
1345	—do—	SO_4	15	5	11.80	23.05	2.59
1348	—do—	SO_4	15	5	13.30	27.40	3.57
1349	—do—	SO_4	15	5	13.30	27.40	4.08
1357	—do—	SO_4	15	5	13.60	20.60	5.68
1350	—do—	C.S.		—	—	56.40	—
1351	Abaca stripping waste	SO_4	15	5	12.56	41.70	1.87
1352	—do—	SO_4	15	5	12.56	41.80	3.48
1356	—do—	SO_4	15	5	13.55	40.45	4.20
1358	—do—	SO_4	15	5	13.60	41.60	4.00
1361	—do—	SO_4	15	5	13.60	36.82	4.46
1362	—do—	SO_4	15	5	13.06	38.90	4.35
1363	—do—	SO_4	15	5	13.00	41.25	2.52
1364	—do—	SO_4	15	5	13.10	40.90	3.09
1355	—do—	C.S.		—	—	80.50	1.60
1354	Abaca stalks	SO_4	15	5	15.10	32.50	3.24
1366	—do—	SO_4	15	5	13.60	34.68	3.39
1367	—do—	SO_4	15	5	14.40	34.20	1.33
1368	—do—	SO_4	15	5	14.40	33.38	4.65
1370	—do—	SO_4	15	5	13.56	32.80	3.29
1371	—do—	SO_4	15	5	13.62	32.20	7.44
1360	—do—	C.S.		—	2.7	52.90	—
1359	—do—	C.S.		—	2.7	52.10	—

[a] The sulfate cooking conditions are as follows: 1½ hours from room temperature to 170 deg. C. and maintained at this temperature for another 1½ hours, and liquor to material ratios are 12 to 1 for the abaca stalks, and 8 to 1 for both the plantation and stripping wastes. Steeping time in the cold-soda process is 2 hours, liquor to material ratios are 20 to 1 for the abaca stalks and 16:1 for both the plantation and stripping wastes, and sodium hydroxide concentration is estimated at 50 grams per liter at the given liquor to material ratios.

[b] Based on oven-dry weight of materials

[c] Expressed as Na_2O and based on oven-dry weight of materials.

TABLE 2. Physical properties of sulfate-pulp handsheets.

Test No.	Cook No.	Bleach No.	Sample (Species)	Time (Processed)	Freeness (CSF)	Basis weight	Thickness	Burst factor	Tear factor	Folds (double) (MIT)	Tensile breaking length	Density	Brightness	Opacity
				min.	cc.	gm/sq.m.	mils				meters	gm/cc	percent	percent
1147	1344 & 1345		Abaca plantation waste, sulfate	0	480	79.4	5.4	58	192	1300	9370	0.58		
				5	310	73.1	4.2	92	144	1700	11000	0.68		
				10	235	69.4	3.9	94	141	2200	10900	0.70		
				15	185	71.0	3.9	102	—	1710	10400	0.72		
1150	1353		Abaca stalks, sulfate	0	480	70.7	4.9	80	182	1780	9650	0.57	28.5	99.2
				5	325	72.1	4.5	84	161	2520	12300	0.63		
				10	215	70.2	4.3	96	140	2860	12900	0.64		
				15	130	67.4	4.0	91	108	3410	13400	0.67		
1152	1351, 1352, 1356, 1358, 1361, 1362, 1363 & 1364		Abaca stripping waste, sulfate	0	600	68.2	5.6	44	182	296	6870	0.48	33.5	
				5	360	67.6	5.0	62	128	787	9570	0.54		
				10	230	73.7	4.9	70	116	1330	9950	0.60		
				15	155	71.1	4.6	69	112	1080	10500	0.60		

TABLE 3. Physical properties of cold-soda-pulp handsheets.

Test No.	Cook No.	Bleach No.	(Species) Sample	Time (Processed)	Freeness (CSF)	Basis weight	Thickness	Burst factor	Tear factor	Folds (double) (MIT)	Tensile breaking length	Density	Brightness	Opacity
				min.	cc.	gm/sq.m.	mils				meters	gm/cc	percent	percent
1148	1350		Abaca plantation waste, cold-soda	0	620	71.5	4.9	28	84	142	5650	0.57	20.0	98.7
				10	450	71.5	4.9	28	84	176	7700	0.64		
				20	340	71.5	4.3	49	54	215	8520	0.66		
				30	260	69.7	3.9	45	54	443	7330	0.70		
				40	170	75.3	4.2	50	51	306	7060	0.70		
1153	1359		Abaca stalks, cold-soda	0	410	70.8	4.4	40	86	172	7840	0.63	19.5	
	&			5	305	73.8	4.3	50	82	387	7420	0.68		
	1360			10	250	71.4	4.0	54	82	238	9320	0.71		
				15	190	71.0	3.9	58	81	255	8970	0.72		
1151	1355		Abaca stripping waste, cold-soda	0	555	74.3	6.2	25	117	67	4880	0.47	21.5	
				10	305	73.1	5.8	38	93	69	6680	0.50		
				20	195	73.0	6.6	45	93	152	7120	0.44		

TABLE 4. Properties of experimental papers made from abaca.[a]

Machine run No.	Type of paper	Material used	Pulping process	Pulp freeness (Canadian Standard)	Basis weight	Thickness	Density	Burst factor	Tear factor	Breaking length	Folding endurance (MIT)	Brightness (G. E.)	Opacity	Porosityb (Gurley)
				ml.	gms./sq.m.	mils	gm/cc.			meters	double folds	percent	percent	ses/100 cc. air
537	Bond[c]	Stripping waste	Sulfate	280	61.9	3.7	0.66	29.1	91	4830	49	73.0	87.0	31
	—do—	Commercial (ave. of 4 samples)[d]	—	—	55.1	3.0	0.74	14.6	52	3370	8	71.8	76.2	81
	—do—	U.S. Federal Spec. (Type IV, Chemical wood)[e]			75.2						40			
530	Wrapping[f]	Plantation waste	Sulfate	250	64.7	3.0	0.86	41.1	114	7070	762			
536	—do—	Stalks	—do—	320	60.1	3.8	0.62	61.3	160	9210	1390			
532	—do—	Stripping waste	—do—	355	63.7	4.5	0.56	33.3	174	6130	424			
533	—do—	Plantation waste	Cold-soda	360	53.7	3.2	0.67	20.8	57	4940	132			
534	—do—	Stalks	—do—	355	57.4	3.2	0.70	25.6	66	6630	156			
534	—do—	Stripping waste	—do—	340	58.5	4.3	0.54	24.0	79	4170	89			
	—do—	Commercial (ave. of 6 samples)[d]	Sulfate	—	60.2	3.6	0.67	29.9	120	4480	217			
	—do—	U.S. Federal Spec.[e] Grade - B	—do—		65.1			30.2	115					
		Grade - A	—do—		56.9			39.5	149					

[a] Except as otherwise noted, all calculated values are expressed on moisture-free basis.
[b] All the experimental wrapping papers are practically non-porous.
[c] Added 4 percent clay, 3 percent titanium dioxide, 1.5 percent rosin and 2.5 percent alum to the pulp furnish.
[d] These commercial papers were obtained from different sources and tested at the FPRI.
[e] Values were converted to conform with units in the table and are expressed on conditioned basis.
[f] Sized with one percent rosin and 2 percent alum.

THE RELATION BETWEEN PULP . . .

(*Continued from page* 28)

from plantations stocked with rapid-growing pulpwood. Our present hardwood forests are rather inefficient producers of fiber. The average annual growth of local forests is quite low — 3.5 cu. m. per hectare. Compare this with that of the *Pinus radiata* in Australia and New Zealand, which is conservatively estimated to yield 15 cu. m./ha. a year. In ideal locations, this species yields up to 25 cu. m./ha./a year on a short rotation of 28 years (5).

Pulpwood species giving similar yields in the Philippines would be able to supply the wood requirements of the mills given in Table III with only 1/4 to 1/7 of their corresponding forest or, conversely, the given areas could support mills of 400 to 700 tons/day capacity, instead of only 100 tons/day. A hardwood species like *Albizzia falcata* gives even more extraordinarily high yields of more than 100 cu. m./ha. annually and thus requires even less forest area, only 1/30 of those given in Table III.

The pulp industry is more concerned with high overall growth (cu. m./hectare/year) than with high stocking density (cu. m./hectare). Pulpwood plantations should consist, ideally, of a single species only, instead of our present forests of heterogeneous composition. These plantations would simplify raw materials handling, transportation, and quality control during manufacture. It is possible, too, that improved silvicultural practice with our present hardwoods might increase their growth.

Now, instead of unduly condemning pulp mills for "indiscriminate cutting of trees more destructive than logging", a positive approach would consider the wood requirements of pulp mills as a stimulus for far-sighted enterprising people who would plant fast-growing pulp wood to supply a market. Inspite of the growth of the local pulp and paper industry, the Philippine imported in 1964, ₱89,000,000 worth of pulp and paper products). Eventually we may be able to boast, as other countries do, that we are growing more wood than what we cut.

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Age-Size Relation and Schedule of Sowing and Potting of Seedlings of Moluccan Sau[1]

By
IRENEO L. DOMINGO

The execution of the various operations involved in the raising of planting stock in the nursery needs proper timing. This is especially true in regions with pronounced dry and wet seasons. A delay in the sowing of seeds may bring about a situation where the seedlings will still be very small when the planting season comes. On the other hand, if sowing is done very early, the seedlings may become too large at planting time. It is, therefore, obvious that seeds should be sown in the nursery at such a time that the seedlings will attain just the right size during the planting season.

The proper time for sowing can be determined if one knows the age-size relations of the seedlings. The relationship of the age and size of seedlings of Moluccan Sau (*Albizia falcata* (L) Back.) were determined by regression method and presented in this paper. From these regressions the expected heights of seedlings at various ages were computed from which the approximate date of sowing can be determined for any given planting date.

PROCEDURE

Establishment of Study and Measurements

Seeds of Moluccan sau from Bukidnon were sown once every month for four months. After the fourth week from the date of every sowing, the seedlings were potted in milk cans and in 7" x 8" plastic bags using a 2:1 mixture of garden soil and sand. There were, therefore, four groups of seedlings potted in each kind of potting container. The four groups served as replications. The heights of one hundred seedlings in each replicate or 400 seedlings in all the replicates were measured once or twice every two weeks until the 20th week.

For every measurement date the average height was taken (Table 1). A logarithmic equation involving weeks after potting (X) and height (Y) was derived for each kind of potting container.

In a previous study conducted by Mauricio (1965) as reported in the *Lumberman,* weekly height measurements were also taken on all seedlings grown in three seedbeds. A logarithmic equation was also derived from the data and presented in this paper.

Computations:

The three sets of data were plotted in semi-logarithmic papers, with weeks (X) on the abscissa (equally spaced scale) and height (Y) at the ordinate (log scale). The curves were almost straight lines which means that they followed the exponential growth pattern, *i.e.,* the growth at any moment is proportional to the size already attained. In other words, the growth rate per week was not uniform but increasing and the rate of increase in any week was dependent upon the size of the seedlings at the beginning of the week (Snedecor, 1956).

[1] The study was conducted under the *Albizia falcata* research project of the College of Forestry which is being financed by the Philippine Match Co., Ltd., Manila. The author is Assistant Professor of Silviculture and Incharge of the Project.

TABLE 1. Observed Average Heights in Centimeters of Moluccan Sau Seedlings.

Weeks[1] after potting	In 7" x 8" Plastic bags	In milk cans	In seedbed[2]
1	4.25	3.32	1.5
2	4.51	3.95	2.0
3	5.05	4.30	2.6
4	5.42	4.56	3.0
5	5.46	— —	3.6
6	8.30	— —	4.3
7	8.80	5.24	4.9
8	10.20	— —	5.6
9	13.98	6.22	7.0
10	22.43	— —	7.5
11	23.49	8.66	9.2
12	25.12	— —	11.0
13	33.41	13.10	16.0
14	— —	— —	21.0
15	39.72	17.79	27.4
16	42.54	— —	— —
17	46.62	25.82	
18	54.91	— —	
19	57.82	34.14	
20	63.75	— —	

[1] In the seedbed, weeks after sowing.
[2] Data from Mauricio (1965).

It was decided, therefore, to fit exponential curves on the sets of data. For convenience, common logarithms were used *i.e.*, the data were transformed to common logarithms, and arrived with logarithmic equations.

The basic equation used was:

$$\text{Log } Y = a + b\,x$$

where:

$$a = \frac{\Sigma \log Yi}{n}$$

$$b = \frac{\Sigma\,[Xi\ (\log\ Yi)] - (\Sigma\ Xi)\ \left(\frac{\Sigma \log\ Yi}{n}\right)}{\Sigma\ Xi - \frac{(\Sigma\ Xi)^2}{n}}$$

$$x = Xi - x$$

Y = expected height

Yi = individual observed height

Xi = individual age in weeks

x = average of Xi's

This equation when plotted in a semi-log paper forms a straight line (Steel and Torrie, 1960).

RESULTS

Using the basic equation above, three logarithmic equations, one each for seedlings in 7" x 8" plastic bags, in milk cans, and in the seedbeds, were derived, namely:

1. *In 7" x 8" plastic bags*
   Log Y = .516 + .069X
   where: Y = expected seedling height in centimeters
   X = weeks after potting (age at potting: 4 weeks after sowing)
2. *In milk cans*
   Log Y = .420 + .055X
   where: Y = expected seedling height in centimeters
   X = weeks after potting (age at potting: 4 weeks after sowing)

3. *In seedbeds*

Log Y = .123 + .082X

where: Y = expected seedling height in centimeters

X = weeks after sowing

Substituting age of seedlings (X = 1 . . . 20 weeks) for X in the equations above, the corresponding expected heights (Y) were computed and summarized in Table 2. The regression lines fitted the data with unusual fidelity (Table 3). Age and size (height), of course, were highly correlated (plastic bags, $r_{xy} = .986$; cans, $r_{xy} = .981$; seedbed, $r_{xy} = .975$).

TABLE 2. Expected Heights in Centimeters of Seedlings of Moluccan Sau at Various Ages (derived from Logarithmic equations)

Weeks[1] after potting (1)	7" x 8" Plastic bags (2)	Milk cans (3)	Seedbed (4)
1	3.8	3.0	1.6
2	4.5	3.4	1.9
3	5.3	3.8	2.3
4	6.2	4.4	2.8
5	7.3	5.0	3.4
6	8.5	5.6	4.1
7	10.0	6.4	5.0
8	11.7	7.2	6.0
9	13.7	8.2	7.3
10	16.1	9.3	8.8
11	18.8	10.6	10.6
12	22.1	12.0	12.8
13	25.9	13.6	15.4
14	30.8	15.5	18.7
15	35.6	17.6	22.6
16	41.7	20.0	—[2]
17	48.9	22.6	—
18	57.3	25.7	—
19	67.1	29.2	—
20	78.7	33.1	—

[1] In the Seedbed, weeks after sowing.

[2] For seedbeds, figures for 16th week and longer periods can be derived from the corresponding equation but the figures so derived should be used with caution since these periods were not covered by the data from which the equation was derived.

TABLE 3. Analyses of Variance.

Source of Variation	*df*	*SS*	*MS*	*F*
7" X 8" Plastic bags				
Due to regression	1	3.115	3.115	623.00**
Residual	17	0.089	0.005	
TOTAL	18	3.204		
Milk Cans				
Due to regression	1	1.189	1.189	237.80**
Residual	9	0.047	0.005	
TOTAL	10	1.236		
Seedbeds				
Due to regression	1	1.893	1.893	946.50**
Residual	13	0.029	0.002	
TOTAL	14	1.922		

** Significant at the 1 percent level.

DISCUSSION AND APPLICATION

In a previous study on the efficiency of plastic bags and milk cans as potting containers, it was found out that the former was more effective in terms of both survival and height growth of the seedlings (Domingo, 1966). The difference may have been brought about by the difference of the sizes of the containers (plastic bags — 7" x 8"; cans — 7 cms. dia. and 10 cms. height) and the higher temperature in the cans at day time. In the present study, the seedlings in the plastic bags again grew faster than those in the cans. In view of this, it was decided

to derive one equation for each kind of potting container. A separate equation was also derived for the seedlings that were grown in seedbeds because the growth may also be different, i.e., faster than the potted seedlings if the seedbed is not overcrowded and slower growth if there is overcrowding especially during the later part of the growing period. The three equations, therefore, must not be used interchangeably.

The equations and Table 2 can be of practical use in the nursery in the determination of the approximate time of sowing and potting seedlings of Moluccan sau. Before this can be done, however, it is necessary to first make a decision on the appropriate seedling size for planting in the field.

It has been said that small-sized seedlings are preferred for planting since handling, transport, and planting are less expensive (Toumey and Korstian, 1942). In addition, the roots of small seedlings are injured less in lifting and transport, and therefore, they more easily survive the interruption of growth during planting. This is true, though, only on areas where site preparation before planting is very thorough as what is usually done in the United States. In that country, they use machine scarifiers, bulldozers, and tractors to prepare the site for planting. Consequently, there is very little chance of weeds in overcoming small-sized seedlings that are planted.

In the Philippines, the conditions are different. In view of the terrain of most reforestation areas, machines can not be used effectively for site preparation except in a few level areas. Consequently, site preparation usually consists only of cutting and/or pulling the weeds from the spot to be planted. In three to five weeks time, the planted spot is again covered with all kinds of weeds and if the seedling planted is small it can be smothered in just a very short time after planting. However, if the seedlings planted are taller, they take a longer time to be threatened by weeds. Consequently, the frequency of weeding after planting is very much less. Bigger-sized seedlings are, therefore, preferred in most of the planting areas in this country.

The criterion for the determination of the correct seedling size for planting is based largely on the size and/or growth of the host vegetation. The seedling to be planted should be taller than the average height of the weeds. (in most of the reforestation areas in this country the weeds are usually grasses).

For Moluccan sau seedlings, it was observed from experience of the writer that seedlings one to two feet in height are just about right for planting under Mt. Makiling conditions.

The moment the seedling size is determined, then one must have a target date for planting. After these two informations have been decided upon, then the dates of sowing and potting can be approximated. This can be done in the following manner: (Given: Seedling size for planting — 60 cms., Target date for planting—July 15., Seedlings to be potted in 7" x 8" plastic bags). In column 2 of Table 2, 60 cms. is nearest to 57.3. Opposite 57.3 is 18 in column 1. The date of potting is 18 weeks before July 15 which is March 10. Date of sowing is 4 weeks before March 10 which is February 10.

For seedlings to be grown in seedbeds without potting, the figure in column 1 opposite the size in column 4 indicates the number of weeks before target date for planting when sowing should be done.

It should be pointed out that the approximations that can be made in this table are applicable only in situations similar to those prevailing when the study was conducted. It can not be expected that when seeds are sown at a particular date that was approximated in the table, the seedling will give a height of exactly the same as the height that is given in the table. It is because so many factors are acting on the plants. How-

(*Continued on page* 97)

Wood Anatomy of the Manggachapui Group and their Identification

by

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SUMMARY

The anatomical features and some properties of the woods such as *Hopea acuminata* Merr., *H. foxworthyi* Elm., and *H. philippinensis* Dyer, have been investigated for correctly identifying and distinguishing one species from the others.

In the splinter test, *H. forworthyi* burned to brownish or tan-colored ash, *H. acuminata* generally to white ash, and *H. philippinensis* to whitish-grayish ash.

Microscopic observations showed distinct sheath cells in *H. acuminata* as well as the presence of fairly numerous rhomboidal crystals in the ray cells, which are absent in the axial parenchyma. Crystaliferous parenchyma strands are characteristic of *H. foxworthyi* and *H. philippinensis*. On the other hand, crystal deposits in the ray cells of the latter are more frequent than in those of the former, which are not always present. The multiseriate rays of *H. foxworthyi* have longer marginal rows of square to upright cells than those of *H. philippinensis*.

INTRODUCTION

The so-called "manggachapui" group are the softer woods of the genus *Hopea*, ranging from small to large trees, namely: *H. acuminata* Merr. (manggachapui), *H. foxworthyi* Elm. (dalingdingan), and *H. philippinensis* Dyer (gisok-gisok) which was reported by Reyes (1)[2] as one of the yakal species. Botanically, *H. acuminata* and *H. foxworthyi* resemble each other closely in most respects, although the latter can be distinguished by its fine and closely set under-leaf veins and by the prominent hairy glands at their axils (2).

The woods of these species are light to pale yellow in color, moderately fine-textured, and moderately hard and heavy (2). *Hopea acuminata* and *H. foxworthyi* are used for bridge construction and are also utilized for doors, window frames and sills, flooring boards, furniture and agricultural implements. *Hopea philippinensis*, inherently small in size, is seldom cut for timber but is generally used as hewn railroad ties.

The wood of each species has been described by Reyes (1). The presence of resin ducts in concentric arcs is common to them, which are filled with white deposits but often empty in *H. philippinensis*. The wood of *H. acuminata* can be distinguished from *H. foxworthyi* by its distinct sheat cells, while the latter has more aliform and vasicentric parenchyma. *Hopea philippinensis* is similar to *H. mindanensis* Foxw. in color, structure, and density, but the former does not have the greenish streaks of the latter.

Other diagnostic features of these woods are (a) the crystals are present in chambered parenchyma strands and the solitary ones in ray cells of some species of *Hopea*

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[2] Underscored numbers in parentheses refer to literature cited at the end of the report.

(3), and (b) the typically thick to very thick-walled fibers which, in some other species are moderately thin-walled (4).

Some general characteristics and properties of these woods can be found in previous published works (1, 2). Specific gravity of *H. acuminata* and *H. foxworthyi* are FPRI determinations (5) while that of *H. philippinensis* is otherwise (1). Their classifications, however, such as light, moderately heavy or heavy, conform with those of Panshin and De Zeeuw (6).

MATERIALS AND METHODS

Collection data of the species are shown in Table 1.

Macroscopic details for descriptions follow those of Dadswell *et al.* (7), and those of Tamolang *et al.* (8). Microscopic slides prepared in accordance with the procedure followed in the Institute (9) were availed of. Wood chips were macerated with the use of acetic acid-hydrogen peroxide (10) to determine the length of vessel elements and fiber dimensions. The "Standards and Procedures for Descriptions of Dicotyledonous Woods" (11), which cited papers devoted to specialized anatomical features, was used as a guide in microscopic examinations.

OBSERVATIONS

Hopea acuminata Merr. (manggachapui), *H. foxworthyi* Elm. (dalingdingan), and *H. philippinensis* Dyer (gisok-gisok)

Macroscopic Features

General. Sapwood of three species are pale white. Those of *H. acuminata* and *H. foxworthyi* turn to brown upon exposure while that of *H. philippinensis* becomes light colored. Heartwood of *H. acuminata* is light yellowish-brown when fresh, turning to golden brown while that of *H. foxworthyi* is also light colored but changes to dark brown upon exposure. In contrast, *H. philippinensis*' heartwood is light brown but turns to reddish-brown upon exposure. Wood texture is fine to very fine. Grain is straight to slightly crossed in *H. acuminata,* crossed or slightly wavy in *H. foxworthyi,* and crossed in *H. philippinensis.* Woods of all three species are moderately hard and heavy: *H. acuminata* (sp. gr. av. 0.64 green, 0.67 at 12% M.C.), *H. foxworthyi* (sp. gr. av. 0.62 green, 0.63 at 12% M.C.), *H. philippinensis* (sp. gr. av. 0.85, air dry). Wood splinters burn to complete ash. Frothing test is definitely positive in *H. philippinensis* but not in the other species.

Growth rings are absent or indistinct. *Pores* are moderately numerous, small to intermediate in size, indistinct or visible to the naked eye, predominantly solitary with radial multiples of 2 to 3, with tyloses, and simple perforation plates. *Axial parenchyma* are aliform to confluent (paratracheal) with diffused cells in *H. philippinensis* as seen under the hand lens. *Rays* are narrower than the pores and are either indistinct or visible to the naked eye. Except with the use of hand lens in *H. philippinensis,* they are hardly visible if at all. *Intercellular canals* are visible to the naked eye, in concentric arcs, axial in disposition and filled with white deposits except in *H. philippinensis* whose canals are often empty.

Microscopic Features

Growth rings are absent or indistinct. *Vessels* are moderately few to moderately numerous: 7 to 18 (mostly 8 to 12) per sq. mm. for *H. acuminata,* 10 to 20 (mostly 13 to 16) for *H. foxworthyi,* and 9 to 20 (mostly 12 to 17) for *H. philippinensis.* They are predominantly solitary and with few multiples of 2, rounded to oval in shape, diffuse porous, moderately small to moderately large in tangential diameter (78-211 microns in *H. acuminata*), and moderately small to medium-sized (67-167 microns both in *H. foxworthyi* and *H. philippinensis.* Vessel elements have very short to medium length (200-722 mi-

crons), simple perforation plates, and transverse to slightly inclined end walls, alternate and vestured intervascular pits, and with tyloses. *Axial parenchyma* are fairly abundant, aliform and diffuse in *H. foxworthyi* and *H. philippinensis*. They are less frequent in *H. acuminata* (scanty paratracheal, aliform and occasionally confluent or diffuse). Parenchyma bands are associated with intercellular canals in all species. Parenchyma strands consist of 2 to 4 cells. Chambered strands of *H. foxworthyi* and *H. philippinensis* have rhomboidal crystals but not those of *H. acuminata*.

Rays are moderately numerous to numerous, 5 to 8 per mm. in *H. foxworthyi* and *H. philippinensis*, but are few to moderately numerous, 4 to 7 in *H. acuminata*. Multiseriate rays are heterocellular with 1 to 3 marginal rows of square to upright cells in *H. acuminata*, slightly more in *H. foxworthyi*, but usually 1 to 2 rows in *H. philippinensis*. Sheath cells are distinct in *H. acuminata*, which are up to 5 or rarely 6 cells wide (mostly 3-to 4-seriate in *H. acuminata*, and 4-seriate in *H. foxworthy* and *H. philippinensis*). They are very fine to medium-sized (17-72 microns wide), extremely low to low (0.20-1.62 mm.), and homocellular uniseriates of square to upright cells (mostly 4-8 cells high in *H. acuminata*, 3-10 in *H. foxworthyi*, and 11-17 in *H. philippinensis*). Rhomboidal crystals are fairly numerous with occasional druse in the rays of *H. acuminata* but less frequent in *H. philippinensis* and absent or may be present in *H. foxworthyi*. Ray-vessel pits are simple, large, rounded to oval; with deposits. *Fibers* are thick-walled (av. 6-7 microns) in all species. They are mostly medium to moderately long, (av. 1.36 mm. in *H. acuminata*, av. 1.85 mm. in *H. foxworthyi*, and av. 1.34 mm. in *H. philippinensis*), nonseptate, and with minute bordered pits. *Intercellular canals* are smaller than the pores. *Vasicentric tracheids* are present.

DISCUSSION

It is difficult to identify the woods of the "manggachapui" group with certainty when based alone on macroscopic features. Their microscopic anatomy should be examined for more reliable criteria of distinguishing one species from the others in the group. Table 2 shows a summary of the important wood diagnostic features of the "manggachapui" group.

In the ash test, involving the burning of wood splinter of matchstick size in still air, the color of the residue may be of help in wood identification. Although, this may not always be successful, it is a promising criterion for *H. acuminata* which generally produses white ash, as compared with *H. foxworthyi* (brownish or tan-colored ash) and *H. philippinensis* (whitish to grayish ash).

Microscopically, *H. acuminata* can be recognized by its distinct sheath cells (Fig. 1), conforming with the findings of Reyes (1). Also, it is distinguished by the presence of fairly numerous rhomboidal crystals in the ray cells (Fig. 2), and by their absence in the axial parenchyma. On the other hand, rhomboidal crystals are common in chambered parenchyma strands, a characteristic feature consistent in all samples of *H. foxworthyi* (Fig. 3) and *H. philippinensis*. Crystals are more frequently found in the ray cells of *H. philippinensis* but are either absent or present in some specimens of *H. foxworthyi*.

There is close similarity between *H. foxworthyi* and *H. philippinensis* as shown by their multiseriate rays that are usually 4 cells wide (except *H. foxworthyi* BF 17256 mostly 2 to 3 cells wide), and by the presence of crystals in the axial parenchyma. In their multiseriate rays, the uniseriate margins, consisting of square to upright cells, are longer in *H. foxworthyi* (Fig. 4) than in *H. philippinensis* (Fig. 5).

The size and number of pores, though not diagnostically striking, also help in iden-

tification. Based on the average pore tangential diameter, it is largest in *H. acuminata,* decreasingly followed by *H. foxworthyi* and *H. philippinensis.* Conversely, based on the average frequency of pores per sq. mm., *H. philippinensis* has the most pores, decreasingly followed by *H. foxworthyi* and *H. acuminata.*

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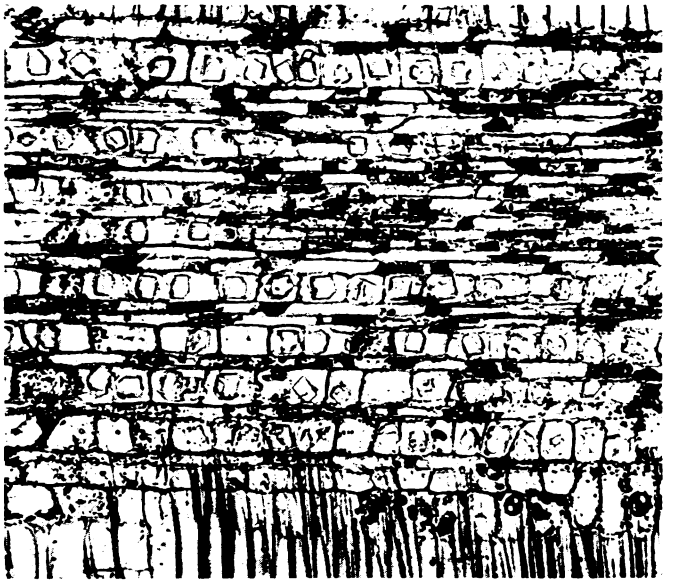
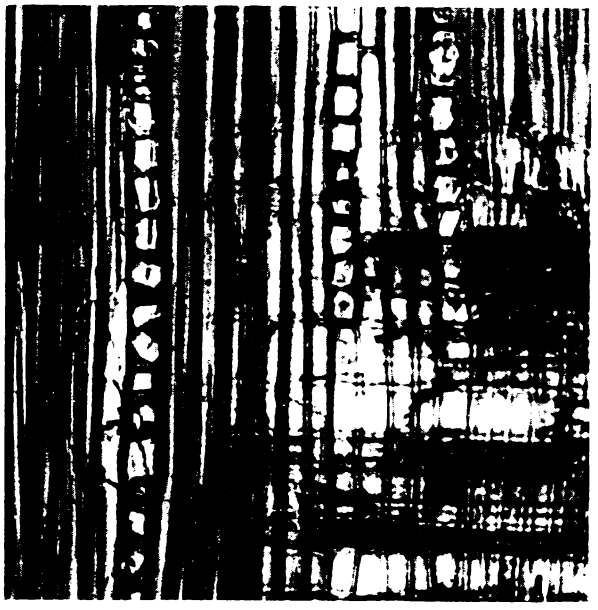


Fig. 1 & 2. *Hopea acuminata* Merr. (Manggachapui) Fig. I. Tangential section to show distinct sheath cells. X80. Fig. 2. Radial section showing fairly numerous rhomboidal crystals in ray cells, X150.



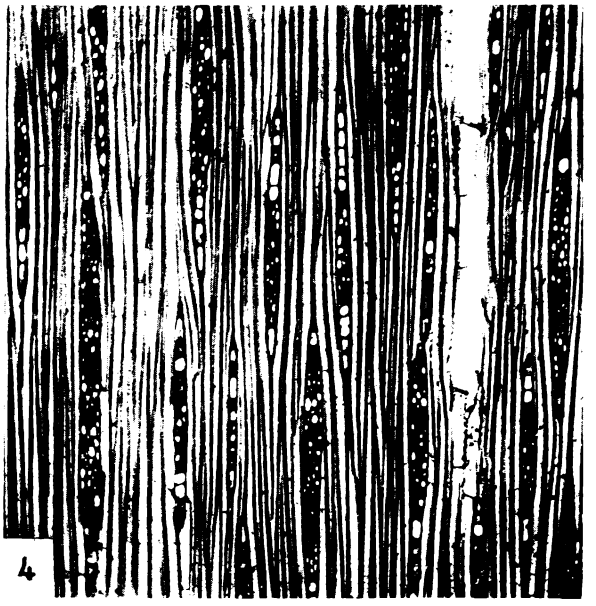


Fig. 3 & 4. *H. foxworthyi* Elm. (Dalingdingan). Fig. 3. Radial section showing rhomboidal crystals in chambered axial parenchyma strand. X250. Fig. 4. Tangential section showing heterocellular multiseriate rays with uniseriate margins composed of square to upright cells, and usually longer than those of *H. philippinensis* X80.

Fig. 5. *H. philippinensis* Dyer (gisok-gisok). Tangential section showing heterocellular multiseriate rays with uniseriate margins usually shorter than those of *H. forworthyi*. X80.

TABLE 1. Collection Data of Species Studied

Species	Collector	Origin	Field or catalogue No.	Location of vouchers
H. acuminata Merr	F. L. Pray	Misamis	BF 15472	not available
	M. Oro	Samar	BF 23523	" "
	N. Peñas	Cagayan	BF 26706	" "
	A. de Mesa	Davao	BF 27621	" "
	M. Lagrimas	Laguna	FPRI 267	CLP[a]
	M. Lagrimas	Quezon	FPRI 393	"
H. foxworthyi Elm.	H. M. Curran	Laguna	BF 10150	not available
	H. M. Curran	Cagayan	BF 17256	" "
	H. M. Curran	Laguna	BF 17645	" "
	M. Lagrimas	Quezon	FPRI 47	CLP
	M. Lagrimas	Laguna	FPRI 266	"
	M. Lagrimas	Laguna	FPRI 284	"
H. philippinensis Dyer	R. Rosembluth	Quezon	BF 12516	not available
	R. Rosembluth	Leyte	BF 12738	" "
	H. M. Curran	N. Occidental	BF 17496	" "
	F. W. Darling	Quezon	BF 18662	" "
	M. Ablaza	Camarines	BF 27374	" "

[a] International abbreviation for Forest Products Research Institute herbarium College, Laguna (Philippines).

TABLE 2. Significant Features to Compare the Wood of the "Manggachapui" Group

SPECIES	MACROSCOPIC FEATURES	MICROSCOPIC FEATURES			
		PORES/VESSELS	RAYS	CRYSTALS	
	Splinter test	Tangential dia. (most frequent range & av. in microns)	Predominant width of multi-seriates (no. of cells) etc.	Rays	Parenchyma
H. acuminata Merr.	generally white ash	100-167 (av. 134)	3-4 distinct sheath cells; 1-3 marginal rows of square to upright cells	rhomboidal crystals fairly numerous	absent
H. foxworthyi Elm.	brownish or tan-colored ash	100-133 (av. 119)	4-seriate usually 1-4 marginal rows of square to upright cells	absent or may be present	rhomboidal crystals in chambered
H. philippinensis Dyer	whitish or grayish ash	89-144 (av. 116)	4-seriate usually with 1-2 marginal rows of square cells	rhomboidal crystals present	rhomboidal crystals in chambered

FIG. 1 RELATION BETWEEN MODULUS OF RUPTURE AND SPECIFIC GRAVITY.
(GREEN CONDITION)

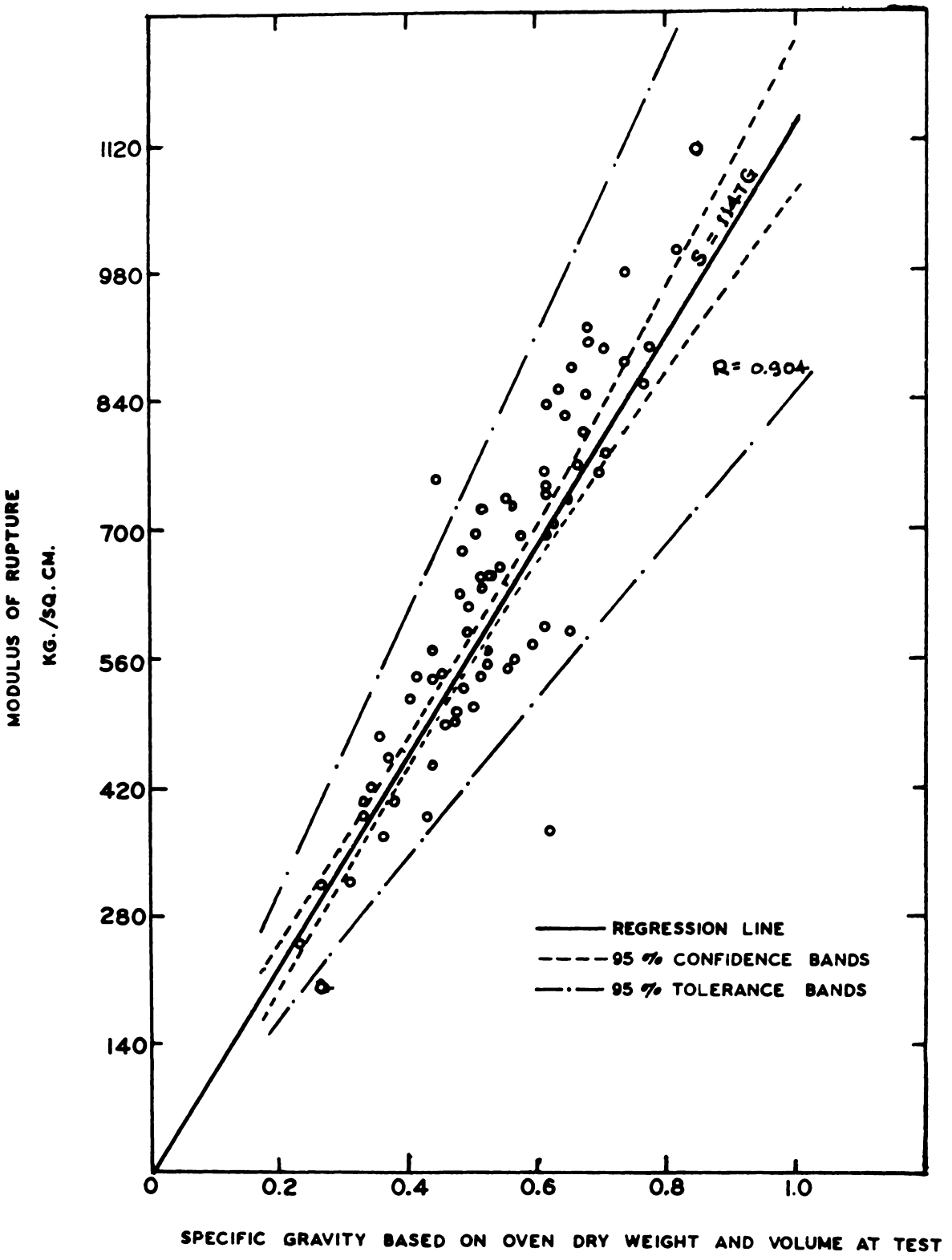


FIG. 2 RELATION BETWEEN MAXIMUM CRUSHING STRENGTH AND SPECIFIC GRAVITY
(GREEN CONDITION)

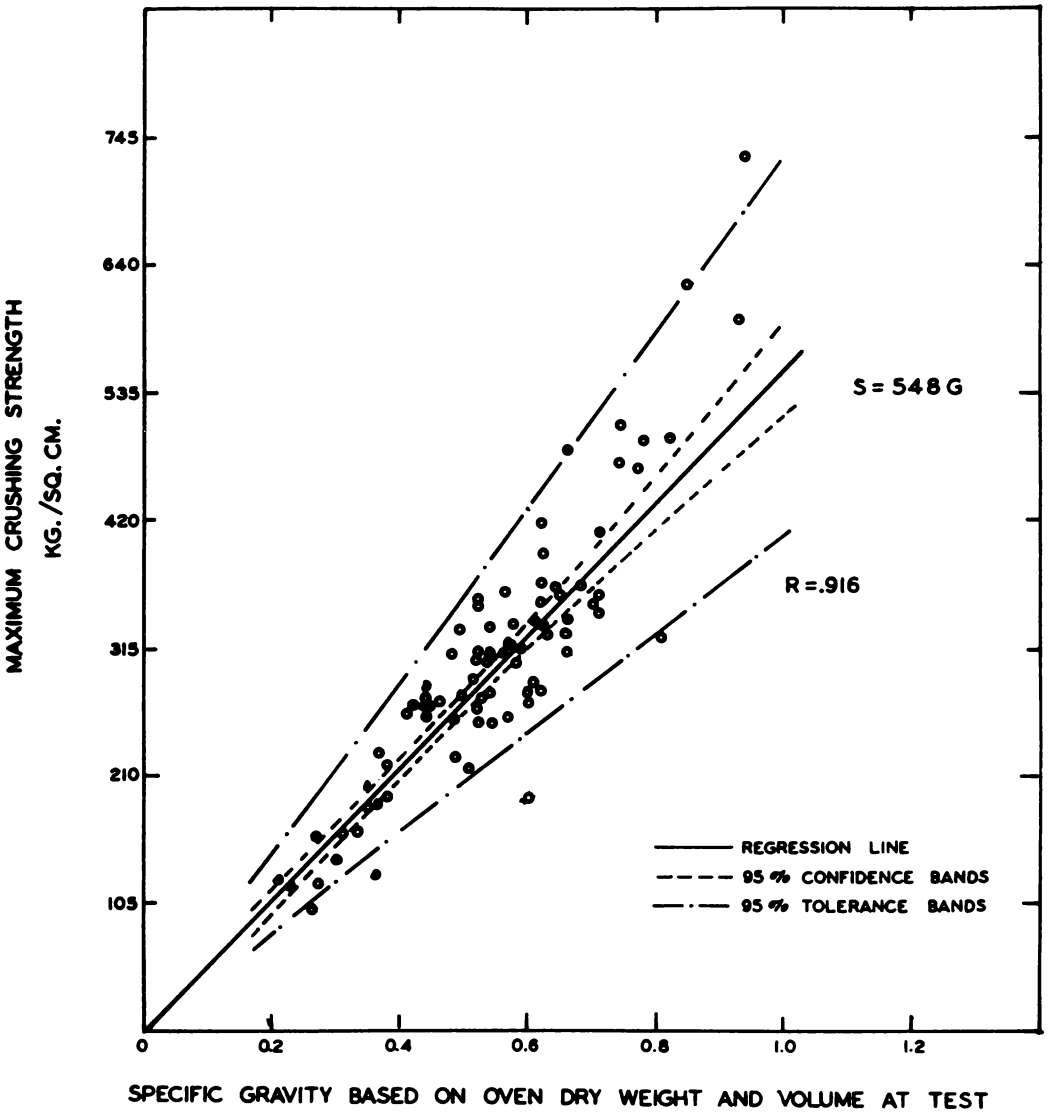
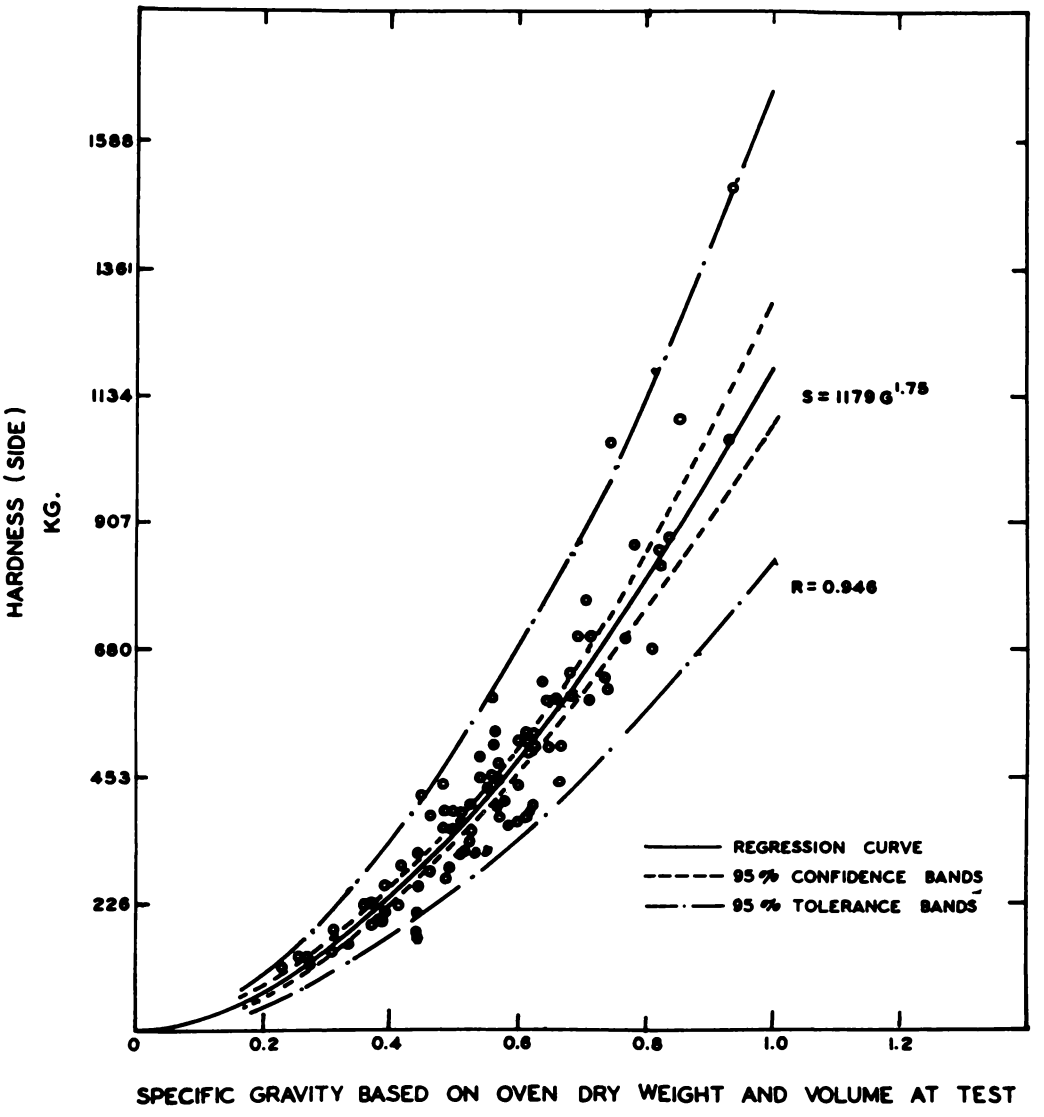


FIG. 3 — RELATION BETWEEN HARDNESS AND SPECIFIC GRAVITY
(GREEN CONDITION)



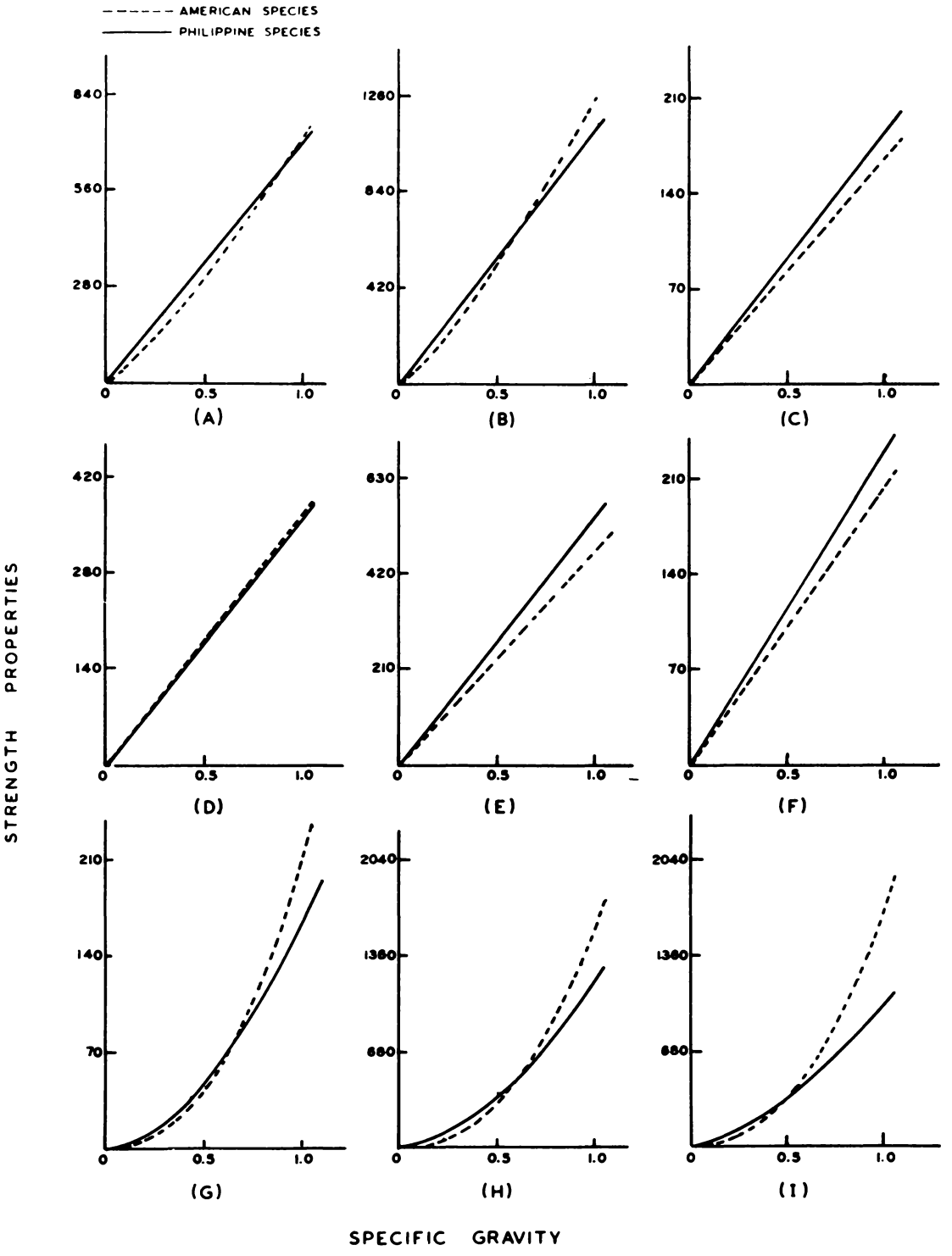


FIG. 4 — VARIATION OF STRENGTH WITH SPECIFIC GRAVITY IN GREEN CONDITION OF PHILIPPINE AND AMERICAN SPECIES.

(A) — STRESS AT PROPORTIONAL LIMIT IN STATIC BENDING (KG./SQ CM)
(B) — MODULUS OF RUPTURE (KG./SQ. CM.)
(C) — MODULUS OF ELASTICITY (1000 KG./SQ CM)
(D) — STRESS AT PROPORTIONAL LIMIT IN COMPRESSION PARALLEL TO GRAIN (KG./SQ. CM.)
(E) — MAXIMUM CRUSHING STRENGTH (KG./SQ. CM.)
(F) — MODULUS OF ELASTICITY IN COMPRESSION PARALLEL TO GRAIN (1000 KG./SQ. CM.)
(G) — STRESS AT PROPORTIONAL LIMIT IN COMPRESSION PERPENDICULAR TO GRAIN (KG./SQ. CM.)
(H) — HARDNESS (SIDE) KG. (I) — HARDNESS (END) KG.

Specific Gravity-Strength Relation for Philippine Woods

by
R. J. MICIANO, N. J. SANTOS and S. B. BELLOSILLO[1]

SUMMARY

The relationships between specific gravity and the various strength properties of 100 species of Philippine timbers were analyzed. Results indicated that strength properties are highly correlated with specific gravity. The average relationships obtained were compared with those of the species found in some temperate and tropical countries.

The general equations obtained in this study may provide a fairly reliable estimate of the strength properties of Philippine woods when the specific gravity is known.

INTRODUCTION

Among the factors that affect the fundamental properties of woods, the specific gravity, when considered as a single factor, has the most significant influence. For this reason, wood technologists and researchers consider specific gravity as the best index for comparison of the strength qualities of wood in the absence of actual test values. Other information such as expected pulp yields, charcoal yields, suitability of species for certain types of veneers, dryness of wood mass for production of various industrial chemicals may be obtained from specific gravity data of increment cores from standing trees (*10*)[2]. This report treats on the relationship between the specific gravity and the strength properties of the various local wood species which is essential to understand better the qualities of wood as a raw material and its efficient utilization.

The relationship between specific gravity and strength properties has been reasonably well-defined for North American woods (*13*) as a result of extensive studies made on 160 American species (*4*) in the United States. This study disclosed that the different strength properties of wood increase proportionately with varying degrees in specific gravity. For example, the maximum crushing strength parallel to grain is one property that varies directly with specific gravity. Modulus of rupture, on the other hand, varies from one species to another as the 1¼ power of specific gravity, while hardness varies with a still higher exponent of specific gravity.

In view of the marked differences in conditions that influence tree growth in the tropics and in temperate regions, there is a good reason to believe that the degree of relations between specific gravity and strength properties in Philippine woods may differ markedly from other woods grown in the temperate zone regions. Clarke (*1*) has shown that the compressive strength parallel to grain of timbers grown in the tropics is greater than those of the temperate zone but weaker in impact bending of comparable specific gravity due to the heavily lignified cell walls of tropical woods. Wangaard (*14*) also observed that some tropical woods of Latin American countries differ slightly in strength characteristics from American woods of the same specific gravity. Furthermore, a similar study conducted earlier by Espinosa (*3*) on a few species of Philippine woods in the air dry state indicates that Philippine

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[2] Underscored numbers in parentheses refer to literature cited at the end of this report.

woods are intermediate in strength between American woods and Dutch East Indian woods of the same specific gravity. Although this study may not have yielded a representative relationship among Philippine woods because of the limited number of species covered in the study, it nevertheless, gave an indication of probable differences in property relationship inherent in different groups of timber species. The present study, therefore, is considered important to examine the actual relationship between specific gravity and strength properties existing among the different species of Philippine grown timbers.

The general trend of relationship between specific gravity and the various strength properties are presented in the form of regression equation. They were established by the method of least squares using the most recent data on the strength and related properties of about 100 species of Philippine woods (*8*). These equations are of general application to Philippine woods and should be one of the basis for comparing the strength qualities of wood species of known specific gravity.

MATERIAL

No new test was conducted for this study. The data used were based entirely on an existing survey of the Forest Products Research Institute on the mechanical and related properties of Philippine woods. The average values of specific gravity and strength properties of 100 species, in green and air-dried conditions, were analyzed statistically to determine trend of relationship.

METHOD OF ANALYSIS

A cursory examination of the graphical presentations of test data, with the specific gravity as *abscissa* and the various strength properties as *ordinate,* showed a general mathematical relation of the form:

$$S = aG^b \qquad (1)$$

Where S = average value for a particular strength property of any species.

G = the average specific gravity of the species.

a and b are arbitrary constants whose value depend on the inherent dispersion of the plotted coordinate points.

The values of a and b for every particular specific gravity-strength relation is conveniently derived from the linear logarithmic transformation of Equation 1 in the form:

$$\text{Log } S = \log a + b \log G.$$

The resulting values for *b* were rounded to the nearest 1/4 and the corresponding values of *a* adjusted accordingly.

The regression of the following strength properties on specific gravity were determined; stress at proportional limit, modulus of rupture, modulus of elasticity in static bending, stress at proportional limit, maximum crushing strength and modulus of elasticity in compression parallel to grain, stress at proportional limit in compression perpendicular to grain, hardness, shear parallel to grain, and toughness.

RESULTS AND DISCUSSION

The derived equations are presented in Table 1. Correlation coefficients, R, which indicate the degree of association between the variables are included. Correlation coefficients in the unseasoned condition ranged from 0.749 to 0.946 and in the air dry condition from 0.825 to 0.964. The coefficient of determination, R^2, which indicates the fraction of variation in one variable that is accounted for by the variation in the other, ranged from 0.560 to 0.896 in the green condition and from 0.681 to 0.929 in the air dry condition. Thus, the total variability in strength properties attributable to specific gravity, if quoted in per cent, ranged from approximately 56 to 93 per cent. Other investigators have observed a similar degree of association between specific gravity and

some strength properties of wood. Schniewind (*11*) noted that the variation in modulus of rupture and modulus of elasticity in bending of California red fir is attributed largely to variation in specific gravity. Kellog and Ifju (*5*) observed that specific gravity accounts for the very high percentage of variation in tensile strength and modulus of elasticity of the words studied. Littleford (*9*) likewise noted that specific gravity accounted for almost twice as much as the variation in elasticity and bending strength of Douglas fir as do ring width and width of late wood combined. So with Sekhar and Negi (*12*) who obtained highly significant correlation ($r = 0.83$) between specific gravity and Izod toughness values among 140 species of Indian timbers tested in both green and air-dry condition, and Kelsey (*6*) who also obtained a high degree of correlation between unit volumetric shrinkage and specific gravity for some species in Australia and in the Pacific Island. These findings showed that specific gravity as a single factor, influences considerably the strength as well as the other important properties of wood.

The result of the present study shows that the relation of specific gravity to bending strength, compressive strength parallel to grain and shear parallel to grain in both green and air dry condition may best be represented by a simple linear regression and that of specific gravity to compressive strength perpendicular to grain and hardness by a curvilinear regression. Toughness of green wood varies directly with its specific gravity but air dry toughness varies with the 1.25 power of its specific gravity. Typical of these relationships are illustrated in Figs. 1 to 3. The narrower bands in the figures indicate the fiducial limits or confidence bands, the wider bands show the tolerance limits. The former gives the 95 per cent confidence interval for estimating the means while the latter show the 95 per cent tolerance limit for individual predictions.

Of interest is the evident superiority in compressive strength parallel to grain particularly in the green condition of Philippine timbers over other timbers of comparable specific gravity grown in the temperate zone. For instance, the relationship between compressive strength parallel to grain and specific gravity for softwoods and hardwoods in green condition from both northern temperate and tropical regions of Europe according to Kollman is expressed in the following form: $S = 450\ G$ Kg./cm.^{2}) or $S = 6400G$ (psi) and for German beech the compressive strength parallel to the grain in green condition is related to specific gravity by the expression: $S = 442\ G$ (Kg./cm.^{2}) or $S = 6290G$ (psi). In a similar study at the Forest Products Laboratory in Princes Risborough (*2*) on 1000 specimens of beech from 36 trees collected from 6 localities the relationship obtained for compression parallel to the grain and specific gravity is in the following form: $S = 492\ G$ (Kg./cm.^{2}) or $S = 7000G$ (psi), a relationship which was found to be also true for ash, oak willow, and sweet chestnut. The regression coefficients for temperate grown woods when compared to Philippine timbers are evidently lower in magnitude. This conforms to the strength characteristics of other tropical timbers of comparable specific gravity as cited earlier in the works of Clarke and Wangaard (*1, 14*).

The comparative relationship of Philippine and American woods is shown in Table 2. Figure 4 shows a graphical representation of the relationship between strength properties and specific gravity in Philippine woods as well as in American woods. In bending and compression parallel to grain, Philippine species are generally either comparable or superior in strength than American species of comparable specific gravity. In compression perpendicular to grain and hardness, the heavy Philippine species are inferior to American species of corresponding specific gravity while the light Philippine species are slightly stronger than corresponding American species.

The general equations obtained in this study should provide a fairly reliable estimate of the strength properties of any Philippine species when the specific gravity alone is known. The range of specific gravity values (0.23 to 0.94 in the green condition and 0.24 to 1.11 in the air dry condition) included in this study is wide enough to represent a large number of species found in Philippine forest, so that, the regression equations derived may be considered representative of the general relationship between strength properties and specific gravity of Philippine wood species.

CONCLUSION

Strength properties of Philippine woods are highly correlated with their specific gravity. Variation in strength properties is due mainly to variation in specific gravity. Strengthwise, Philippine agencies are, generally, either about the same as or superior to American woods of comparable specific gravity in static bending and compression parallel to grain. The compressive strength perpendicular to grain and hardness of the heavy Philippine species are very much inferior to the American species of corresponding specific gravity while the light Philippine species are slightly stronger than the corresponding American species. The compressive strength parallel to grain of Philippine woods in green condition is evidently greater than other temperate-grown species, a characteristic that conforms to the findings of Clarke in his study of the properties of tropical and temperate grown timbers. Philippine woods of comparable specific gravity likewise possess greater strength in compression parallel to grain than most softwoods and hardwoods grown in the northern temperate and tropical regions of Europe.

The general relationship obtained in this study provides a rational basis for estimating and assessing the strength properties of wood species of known specific gravity.

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TABLE 1. — Regression functions, correlation coefficient, R, and coefficient of determination, R^2, for the relation of specific gravity and strength properties of Philippine woods.

Property	Moisture condition	Regression Function	Correlation Coefficients R	Coefficient of Determination, R^2
STATIC BENDING				
Stress at proportional limit, Kg./cm²	Green	$S = 700G$	0.891	0.793
	Dry	$S = 1060G$	0.926	0.858
Modulus of rupture, Kg./cm.²	Green	$S = 1150G$	0.904	0.817
	Dry	$S = 1730G$	0.955	0.911
Modulus of elasticity, 1000 Kg./cm.²	Green	$S = 180G$	0.810	0.655
	Dry	$S = 220G$	0.878	0.772
COMPRESSION PARALLEL TO GRAIN				
Stress at proportional limit, Kg./cm²	Green	$S = 365G$	0.833	0.694
	Dry	$S = 510G$	0.859	0.738
Maximum crushing strength, Kg./cm.²	Green	$S = 550G$	0.916	0.838
	Dry	$S = 855G$	0.960	0.922
Modulus of elasticity, 1000 Kg./cm.²	Green	$S = 230G$	0.799	0.638
	Dry	$S = 260G$	0.849	0.721
COMPRESSION PERPENDICULAR TO GRAIN				
Stress at proportional limit, Kg./cm²	Dry	$S = 1630G^{1.75}$	0.896	0.802
	Green	$S = 1015G^{1.5}$	0.909	0.826
HARDNESS				
Side — Kg.	Green	$S = 165G^{1.75}$	0.946	0.896
	Dry	$S = 190G^{1.5}$	0.964	0.929
End — Kg.	Green	$S = 1180G^{1.75}$	0.918	0.843
	Dry	$S = 1550G^{2.0}$	0.907	0.823
SHEAR PARALLEL TO GRAIN				
Maximum crushing strength, Kg./cm.²	Green	$S = 145G$	0.885	0.784
	Dry	$S = 190G$	0.898	0.806
TOUGHNESS				
Kg.-cm./specimen	Green	$S = 668G$	0.749	0.560
	Dry	$S = 572G^{1.25}$	0.825	0.681

S — Stress.
G — Specific gravity based on oven dry weight and volume at test.

TABLE 2. — Comparative specific gravity-strength relation of Philippine and American woods.

Property	Moisture Conditions	Regression Function	
		Philippine Woods	American Woods (13)
STATIC BENDING			
Stress at proportional limit, Kg./cm.^{2}	Green	700G	$717G^{1.25}$
	Dry	1060G	$1174G^{1.25}$
Modulus of rupture, Kg./cm.^{2}	Green	1150G	$1237G^{1.25}$
	Dry	1730G	$1807G^{1.25}$
Modulus of elasticity, 1000 Kg./cm.^{2}	Green	180G	166G
	Dry	220G	197G
COMPRESSION PARALLEL TO GRAIN			
Stress at proportional limit, Kg./cm.^{2}	Green	365G	369G
	Dry	510G	615G
Maximum crushing strength, Kg./cm.^{2}	Green	550G	473G
	Dry	855G	858G
COMPRESSION PERPENDICULAR TO GRAIN			
Stress at proportional limit, Kg./cm.^{2}	Green	$165G^{1.25}$	$211G^{2.25}$
	Dry	$190G^{1.5}$	$326G^{2.25}$
HARDNESS			
Side — Kg.	Green	$1180G^{1.75}$	$1551G^{2.25}$
	Dry	$1550G^{2.0}$	$1710G^{2.25}$
End — Kg.	Green	1015G.	$1696G^{2.25}$
	Dry	$1630G^{1.75}$	$2177G^{2.25}$

S — Stress.
G — Specific gravity based on oven dry weight and volume at test.

ABOUT WORK

Work is love made visible.

And if you cannot work with love but only with distaste, it is better that you should leave your work and sit at the gate of the temple and take alms of those who work with joy.

For if you bake bread with indifference, you bake a bitter bread that feeds but half a man's hunger.

And if you grudge the crushing of the grapes, your grudge distils a poison in the wine.

And if you sing though as angels and love not tha singing, you muffle man's ears to the voices of the day and the voices of the night.

— KAHLIL GIBRAN

A Method of Estimating the Lumber Content or Squared Volume of Log

by

ADOLFO S. DECENA[1]

INTRODUCTION

This article, the first of a series, treats of an aspect of the author's observations during his 22-month training in lumber processing industry in West Germany. It dwells, in particular, on some sawmill practices observed among the lumber producers of that country, which may serve as good pointers to help improve local sawmill operations.

OBJECTIVE

The object here is to give the sawyer or foreman a working knowledge on how to determine log diameters ideal for sawing certain lumber sizes. In calculating this so-called "ideal log diameters to lumber sizes" relationship, certain numerical constants are necessary.

PROCEDURE

In theory, the cross-section of a desirable lumber size with kerf allowance is fitted exactly to the log end, just as in practice, the shoe industry has all along been doing. Shoe sizes, for instance, are oriented up to the edges of the leather and hard rubber material leaving only thin strips to maximize its utilization. Likewise, a log of a certain diameter can also be fitted with desirable lumber sizes to reduce wood wastage in sawkerf.

For instance, if 2" x 2" is the lumber size desired, a square section can be formed consisting of four (4) pieces of two by two's, the sides of which are summed equal to 10 centimeters (25 millimeters = 1 inch). The summation divided by 0.7 will give the smallest diameter log ideal for sawing minus the sawkerf. If the sawkerf allowance is to be included in the summation, then the product of the maximum saw thickness plus swage and sawpasses is added.

The system was developed and used in West Germany in custom-sawing pine poles and small logs that are almost perfectly round. Trial tests made in sawing pole-size trees (10 to 15 cms. diam.) to standard-size mine props obtained workable results from this numerical constant.

The procedure here is to saw two opposite sides of the log, first by means of a gangsaw to produce two parallel sides, followed by the same procedure on the other two adjacent sides to make the complete square as shown in Fig. 2. The other constant of 0.60 was found to estimate fairly the diameter of a log which could be sawn to a given dimension with a waned feature (Fig. 1) following. Soft woods, particularly pine trees, are often sawn in this manner for temporary beams, mine props and other uses in construction work.

A concrete sample on numerical constant 0.70 (Fig. 2) in estimating the diameter of a log in relation to lumber content is presented below. The computed log diameter obtained represents the smaller diameter of the log.

Given here is an order of 180 pieces of 5 cm. x 10 cm. (2" x 4") lumber, a saw

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gauge of 1.8 mm. and swage of 0.6 mm. on one side. The first analysis is to draw the dimension of the piece to have an idea as to what cant size approaching a square can be obtained. (See Fig. 3)

5-centimeter side

5 cm. x 6 pcs. = 30 cm.
1.8 mm. sawblade thickness
1.2 mm. swage
3.0 mm. x 7 = 2.1 cm.
30.0 cm.
2.1 cm.
32.1 cm.

10-cm. side

10 cm. x 3 pcs. = 30 cm.
1.8 mm. sawblade thickness
1.2 mm. swage
3.0 mm. x 4 = 1.2 cm.
30.0 cm.
1.2 cm.
31.2 cm.

Summation of side *5* centimeters and *10* centimeters

32.1 cm.
32.2 cm.
63.3 cm. x 0.7 = 44.31 cm.

From the results, a log having a diameter of 44.3 cm. will give 18 pieces of 5 cm. x 10 cm. lumber, so that 10 logs of this diameter will give 180 pieces.

This constant is also workable in estimating the potential lumber content of a log if its diameter is given by reversing operational computation and giving allowance for the number of sawpasses, saw thickness and swage.

Limitations

In the non-square form, as in the rectangular cant size, results showed that within a 4-cm. difference in the measurement of the two perpendicular sides of the cant, a fair estimate of the log diameter can be ascertained. The estimate does not hold true, however, if the difference is greater than 4 cm. Other limitations are: (a) logs must be essentially cylindrical or nearly approaching so, or when non-cylindrical, the average minimum diameter measurements should be the deciding diameter; (b) logs must be strictly sound; (c) log diameter selected shall be measured at the small end; (d) logs showing side defects should be discarded and avoided.

Applicability and benefits

Survey conducted in Philippine sawmills revealed that, in most sawmills, the storage of green lumber creates problems in handling, transporting and storage in a yard with a limited space. This is aggravated by the fact that the sawmill crew is paid on production basis and, as such, a tremendous volume of lumber, waste and rejects is accumulated within a limited space provided for this purpose. Consequently, the cost of handling becomes expensive, what with the rejected pieces of lumber due to mismanufacture, storage and other defects, plus the difficulty of looking for buyers.

At this stage, the capital investment is frozen if no immediate remedy is formulated. The value of the invested capital then, instead of earning interest, is depreciated since lumber degrade intensity increases in open-air lumber storing. To minimize such calculable wood losses in sawing and storage, this constant can be put to use to calculate the expected lumber recovery of a given log or vice versa, so that the excess cut lumber, which may otherwise be stored and later go to waste, may be avoided.

This system is used in diverting big-diameter logs which, if sawn to thinner thickness, will increase wood waste due to kerf.

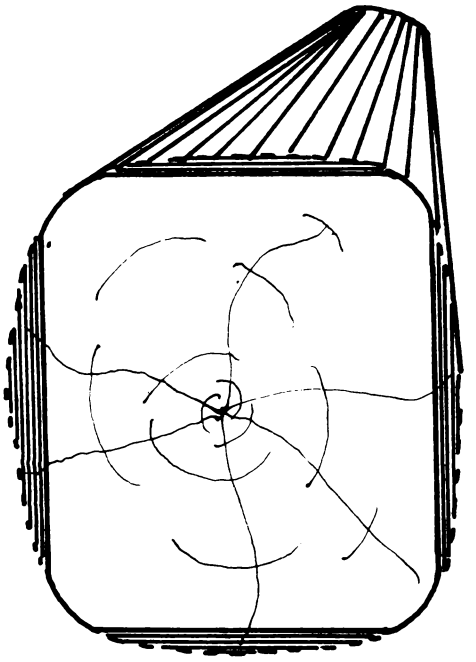


Fig. 1 Waned dimension constant 0.60

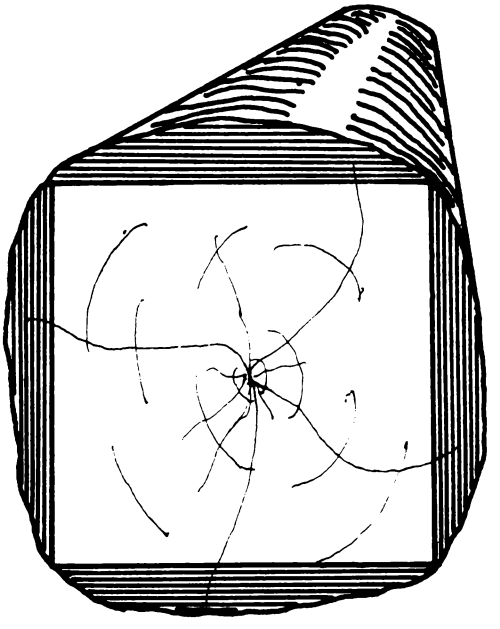


Fig. 2 A square cant

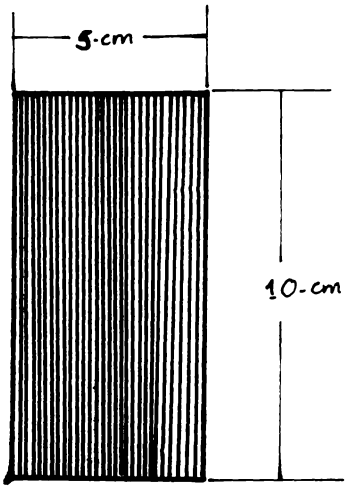


Fig. 3 Dimension* (2" x 4")

*One inch is equal to
25 millimeters

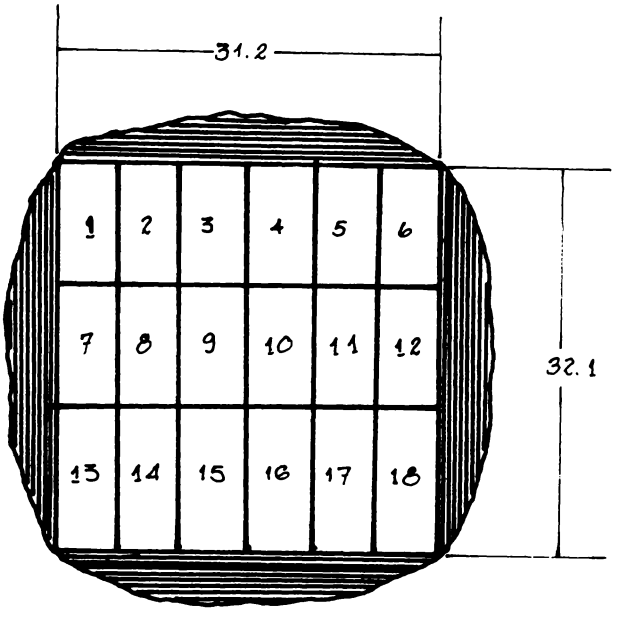


Fig. 4 Showing the cant size.

(32.1 cms. x 31.2 cms)

Message to the Youth

by MANUEL R. MONSALUD
Director, Forest Products Research Institute
U.P. College, Laguna

(Speech delivered at the Induction Ceremonies of the LOBYRA (Los Baños YMCA Residents' Association) Officers held at the Magsaysay Hall, Community Development, College, Laguna in the evening of September 9, 1966.)

Distinguished Guests,
Ladies and Gentlemen:

I am happy to be here with you tonight. I consider it an honor to be invited to address this promising and energetic group of young men and women, typifying what our great National hero, Dr. Jose Rizal, once called the "hope of our Fatherland."

Truly the destiny of our country in the years to come lies in the hands of our youth that this group represents. We, of the older generation, will soon pass or fade away and, surely, as the day follows the night, you will take our places in the scheme of things in our beloved Philippines.

FOODS FOR THOUGHT

This evening I would like to give you some foods for thought.

I. *Your purpose here —*

I believe that all of you are here in Los Baños for a definite purpose, i.e., to learn the principles of scientific agriculture and other related matters with the fervent hope that you will be able to apply them in your daily lives and work later on.

II. *People back home —*

At this juncture, it is but fitting and proper for you to think of your parents, relatives and others supporting you in your present studies. Remember those at home, perhaps working in the fields, stores, markets or factories trying to earn enough money with which to support you in this university. It is hoped that you will live up to their expectations. Please do not let them down. When you encounter rough sailings, always remember those who are pinning their hopes on you, and then strive harder than ever to reach your goal.

For most of you, this is your first and, perhaps, last time to be in a university and so make the best out of your stay in this great institution. Be attentive in your classes. Learn as much as you can from the lectures and laboratory or field work conducted by your professors or instructors. Discuss with your friends or classmates essential things of mutual interest and make the best use of your College library and other facilities.

In the library is stored the knowledge gathered through the ages. Have patience to read voraciously on, and take notes of, subject matters pertinent to your chosen field. As college students, you should be wide readers, but do not devote all your time solely to the subjects covered by your particular curricula. You must keep yourselves posted also on current events, both local and international. Do not sacrifice the main courses that you are taking in college. If you constantly flunk, then you will be expelled from this university for good. It is important that you finish your course, ending with a degree in four years or so. In

many cases, graduation from college is an important milestone towards success in life. It is oftentimes the key to good job opportunities in colleges, where you may apply to teach, or in offices, factories, or plantations where you hope to work afterward.

III. *Attention to your health* —

It is incumbent upon you to keep yourselves always healthy for health is one's greatest wealth. To keep oneself healthy is not a very difficult job to do, provided one follows certain proper practices of living, such as "early to bed and early to rise, which makes a man healthy, wealthy and wise." By engaging regularly in moderate outdoor exercise, to eat regularly a balanced diet and to refrain from smoking and drinking alcoholic liquors; not indulging in night life, gambling and the like. Also keep yourself away from bad company. People are oftentimes judged by the company they keep.

IV. *Factors affecting man* —

The ultimate make-up of man is mainly attributed to a combination of heredity, education and environment. For example, if the parents of a boy are talented or brilliant, other things being equal, that boy will surely be brilliant too, if given the chance to develop his potentials. But if you confine that boy in a place where there's no means for improvement, where he has no chance to learn the 3 R's, that boy will certainly grow up to be ignorant. He can never hope in his later years to be an Einstein, Alexis Carrel, Wöhler, Louis Pasteur, or Rizal.

If an individual is raised in the filth or slums amidst criminals, he will not be of good moral character, other things again being equal. Unusually he will not be healthy, too.

V. *Smoking and drinking* —

Now let us go to the topic of smoking and drinking alcoholic liquors.

Recently published articles gave preponderant evidence that regular and prolonged smoking is dangerous to health. It may eventually result, in many cases, to lung cancer. Consider also that whenever one smokes, aside from the dubious pleasure that he derives from it, he can not help but spend money. Literally, he burns money. The smoker forgets that that money he is burning, through smoking, can surely be channeled to better purposes, such as buying a good book to read or an item of value to one's health such as milk, fresh fruit and the like, which no sane individual will consider as foolish acquisitions.

I heard this funny story from a die-hard advocate of smoking:

Two men were one time riding on a bus in New York. One fellow, a non-smoker, remarked to the other that "smoking is no good for it makes one spends his money uselessly. If the smoker saves the money that he spends from day to day on cigarettes, perhaps he can buy a mansion like that one," pointing to a beautiful mansion that they just passed by.

"Do you know who owns that building?" asked the smoker. "All my life," he continued "I have been smoking heavily, but I own that building."

Please do not let that anecdote influence you to indulge in smoking for, on the other hand, there are very many true stories that can be told negating the so called pleasures of smoking. Scientific findings have shown beyond the shadow of doubt that regular and heavy smoking predisposes an individual to lung cancer. Do you want to be one of the countless millions who are victims of this frightful disease? Please read the article appearing in the August, 1966 issue of the Readers Digest entitled, "The man who wrote his own obituary." It advises the die-hard smokers, in effect, to stop smoking before it is too late.

Consider again the plight of the ordinary worker, earning ₱6.00 daily, who buys a pack of cigarettes a day, let's say, costing ₱0.30. Will it not be better for this fellow, instead of buying cigarettes, to buy any of the following — s small tin can of milk, sugar, eggs or fresh fruit for himself or his family to consume? The same thing can be said of the fellow who regularly drinks alcoholic liquors such as beer, tuba, gin, rhum, or siok-tong. These alcoholic drinks cost money. What real advantages does the drinker get from such drinks? In many cases, especially when he gets drunk, the drinker becomes quarrelsome and often comes into trouble. Medical findings have shown that regular and prolonged drinking will ultimately render the fellow alcoholic and not a good citizen at that. Both smoking and drinking undermine the health of an individual — lowers his stamina. Many persons who have been smoking or drinking alcoholic liquors heavily for long time wind up to have diseased liver, kidney, lungs, or they develop high blood pressure, sometimes causing their being invalid for life. Knowing all these adverse results, does any sane individual want to follow the examples of those unfortunate beings, who do not have the moral fiber and will-power to resist the temptations of drinking or smoking?

VI. *Being alert and militant —*

It is hoped that you, the youth of the land, be militant in the crusade against graft and corruption in the government and private sectors. If you believe that a certain practice is immoral, illegal or improper, it is your moral obligation to expose such things. You must have the guts to voice or register your united condemnation and appeal to the conscience of those concerned, so that remedial steps to improve the situation can be taken. In other words, summon enough courage to effect moral reform to do away with malpractices in this country, otherwise, this country will go to the dogs. We often read or hear that there is too much graft, corruption or too many crimes committed in our midst, yet it appears that none seems to have the moral strength to expose with proofs these malpractices. In this case, who will help us clean our Augean stables? One can do very little, but collectively and persistently you can generate enough energy to move mountains and fight off graft and corruption in our government service or anomalies of one form or another in the private sector.

VII. *Ostracizing or ignoring the smugglers—*

Take the case of smuggling. Smuggling thrives best in places where people are indifferent, tolerant and misguided. Here some people amass wealth illegally or immorally, yet nobody seems to care to ask where this wealth came from or how it is acquired. Instead the crooks are lionized, worshipped, made to feel very important, etc. Smugglers or crooks have lots of influence. They can bribe their way out, or by hook or by crook silence the ones crossing their way. These smugglers usually push their weight around. But supposing one of us decides to ignore them, in spite of their wealth and power; that we ostracize them from our society; that we denounce them with proofs to the proper authorities? If many of us will do these things, smuggling or any crookedness, for that matter, will not prosper in our midst as long as citizens therein are watchful and ever ready to denounce such evils.

VIII. *Cockfighting —*

Many advocate that laborers and ordinary folks must have at least a day in a week for relaxation and, in many cases, this day falls on Sunday, which is often synonymous to cockfighting day. Perhaps out of ten adult persons in our country four are addicted to cockfighting, going to the "sabungan" to try their luck every Sunday. It is estimated that out of these four, two or three go home in the afternoon losers — broke, irritable,

tired, hungry, fault-finder and, for all we know, already carrying active tuberculosis germs.

In the cockpit, please take note, conditions are very conducive to the spread of tuberculosis where so many people strain their vocal cords shouting right and left to their hearts' content, "logro diyes, doblado." The atmosphere therein being hot and humid, the tubercle bacilli being exhaled, spewed, and spread all over the cockpit charging the atmosphere with germs, what other place can you imagine more ideal for the propagation of the white plague? Those men who have weak bodily resistance may, sooner or later, catch this dreaded disease accompanied by heartaches and misery to be subsequently experienced by them and their loved ones. Those who return home losers are ill-tempered, irritated easily; find fault with the wives and children.

It is much better for those people, instead of going to the cockpit or to gambling dens, to spend their time in wholesome outdoor group recreations, such as playing softball, baseball, tug of war, or executing a community project, like putting up a feeder road in the barrio or constructing simple bridges across creeks in their communities, or these folks should better take their families to the nearby mountains or beaches for an excursion, swimming, picnic or for other healthful ways of active living.

IX. *Greatness of a nation* —

The nation is great in proportion to the greatness of each individual citizen. So if all the youth of the land lead good lives, are strong mentally, physically and spiritually, there is no doubt that this nation of ours will be great.

Why should we, Filipinos, when seated side by side with foreigners such as Caucasian, Japanese, etc., appear interior when it is not impossible or difficult for us to render ourselves to be equal to or if not better than any of the other peoples.

X. *Not to beg* —

We should not be mendicant. If we desire something, we should be ready to pay for it, or we forego the things we want until we are ready to pay the price for them. Let me point out to you, ladies and gentlemen, that in this world of ours, nothing can be had for absolutely free.

The water we drink at home, we have to pay for it. We either have to get it from the well ourselves or pay for the services of a water carrier. When we go to movies, we must pay for our seats therein. We must not hope for a friend to come by and pay for our seats.

XI. *Living within one's means* —

It is normal to be ambitious. One may dream of owning a car, a television set, of going abroad or of sending his children to exclusive colleges; but if the money to be spent on these things is acquired illegally or immorally, then it is wrong. One must first earn his wage and spend his savings or a portion thereof that he can afford on such desires; this is perfectly moral and legal. If you can not afford a luxury, do not buy it. Delay, if possible, the buying of anything until you have accumulated sufficient cash to pay for it. It is better to buy on cash than on installment basis because of the high rate of interest involved in the latter.

XII. *Being honest in all undertakings* —

You, as students in this great university, must realize that to cheat in the examinations is bad, for it will ultimately boomerang on the cheater. It is not bad nor improper to ask questions prior to examinations. For example, you may ask your professors, instructors, classmates and friends certain questions, the answers to which you do not

know. In that way, you acquire knowledge honestly. However, during actual examinations, you must not rely on anybody but yourself. Answer the questions honestly and to the best of your ability. The same holds true with thesis students who may be tempted to fabricate their data or observations. Almost always, they may be exposed later on and it will be too bad or embarrassing for them.

XIII. *Being a good athlete and at the same time a good student* —

Now to those who have ambitions to excel both in athletics as well as in their scholastic activities, I have these suggestions to make based on my own personal experiences during my student days:

Ordinarily, a good college athlete has poor scholastic records because a student-athlete, upon reaching his dorm or home in the afternoon after practicing heavily, is usually dog-tired and easily becomes sleepy. He hits the hay early. Therefore, he has no more time to study his lessons, prepare for his assignments or examinations for the following day. The next day, he will not be in a position to excel in his class. So my suggestion for these athletes is for them to sleep early and wake up in the middle of the night. After sleeping from 7:30 P.M. to 1:30 A.M., you may wake up and study your lesson till 4:00 A.M. and you will feel refreshed and raring to go; then you can go to sleep again from 4:00 to 5:30 A.M. Later you can do some road work or perform simple exercises. In that way, you can have sufficient sleep, not neglect your studies and athletics, which are important to you. At the outset, you may experience some inconvenience, but as days shall pass by, you will get accustomed to this regimentation.

XIV. *Being ready at all times* —

You must prepare yourselves from day to day, for sooner or later, opportunity may knock at your door. When that time comes, you will then be ready to welcome it. In life it is always the survival of the fittest, whereby the strong survives and the weak falls out.

Our nation can surely be great if we, Filipinos, are determined from this day onward to prepare ourselves to be strong morally, physicall, and mentally in the true sense of the word.

Education is the acquisition of knowledge for use in one's everyday work in life.

Let us educate ourselves in every possible way.

XV. *Conducting properly oneself* —

Let us always bear in mind that the Philippines is the only country God has given us. Let us conduct ourselves therefore in such a way that we shall not be a disgrace to our Motherland. We should always deal with people the way we like them to deal with us, with dignity, justice, and humility. Let us, if necessary, defend this country of ours even unto death, as many of those before us fell in the lnight, so that our country can thrive in an atmosphere of freedom and be respected in the council of nations.

XVI. *Helping those needing help* —

In our journey through life, we often come across people in need of help. Let us, if necessary, go out of our way and help them, for we may find ourselves in the other men's shoes at other times.

XVII. *Learning a trade or avocation* —

If you have time to spare, do not lose any opportunity to learn a trade or avocation, especially during vacation. It is true that vacation is for relaxation but a part of it can be spent usefully in learning some trade. One can catch up also in his readings of worthwhile books or magazines.

Spend your free time usefully and not just while it away foolishly or uselessly, for time that is gone is time that will never come back. A day that passes makes a man one day older and if one does not use it fruitfully, that much of an opportunity is lost forever.

Please remember always that, in dealing with your fellow human beings, if you can not say something good of them, you better shut up and not say anything against them, especially at their back.

XIX. *Re - God —*

I may not be very religious but, in my own humble way, I believe in the existence of a Super Being, Who, in the absence of a better term, many call Almighty God. To me he is omnipotent, omniscient, and omnipresent, and He knows our deepest and most secret thoughts. If one commits a crime, for example, in total darkness thinking that it is a perfect crime, in many cases such a crime is soon discovered and the guilty punished. A man may talk during his sleep of the unwitnessed crimes he committed in the past. By this or by the slip of his tongue at times, his crime is thus exposed.

Ladies and gentlemen, I hope that your residence and study in this great UPCA will be crowned with success and that your efforts will bear desirable fruits in due course of time so that those who help you through college will not be disappointed. Never, even for a moment, lose sight of the fact that success does not come your way easily. You must strive hard and work for it.

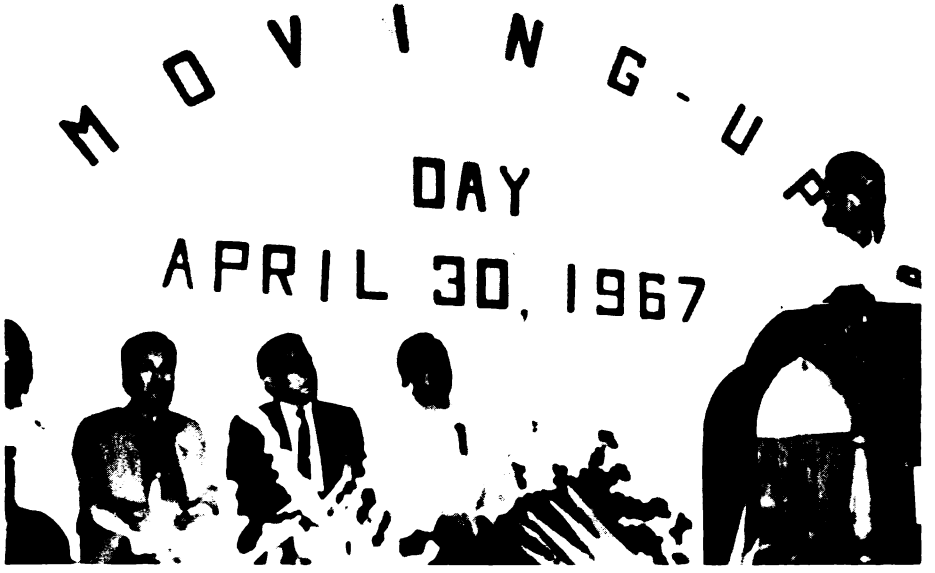
Lastly, I sincerely wish you all the best of luck.

Moving-Up Day Scene

The Alumni getting off the bus in front of the College Bldg.

Some of the old Alumni greeting one another at the lobby, while the others are registering.

The Alumni, the old and the new, at the Moving Up Day convocation program.



Forester Valentin Sajor, Class '17, speaks on behalf of his class.

Dr. Joseph Madamba, Director of Business Affairs, pinchhitting for Vice President Umali, of the U.P. Los Baños colleges, pins Ahern Medal for scholarship and leadership, on Manuel Bonita, B.S.F. *cum laude* graduate.

Dr. Madamba pins medal donated by the Society of Filipino Foresters on Allen Torrenueva for leadership.

Dean Domingo Lantican reads scroll before presenting the U.P. Alumni Association award to Director General of the Royal Forest Dept. of Thailand for outstanding achievements in forestry.

Mr. Jose T. Pardo, Assistant to the NEC Chairman, reading the speech of Mr. Alfonso Calalang, before the Ranger and BSF graduates.

For. Nicolas Lansigan, Executive Forester of Bislig Bay Lumber Co., and President of the U.P. Forestry Alumni Association, explaining the different wood samples of the FPRI exhibits on Moving Up Day to Dir. Banijbatana as a Thai Forester and Dean Zamuco look on.

Regent Tamesis, Dean Emeritus of the College of Forestry and General Manager of the Nasipit Lumber Co., congratulates the Golden Jubilarians (Class '17).

Portion of the audience at the Moving Up Day Convocation Program.

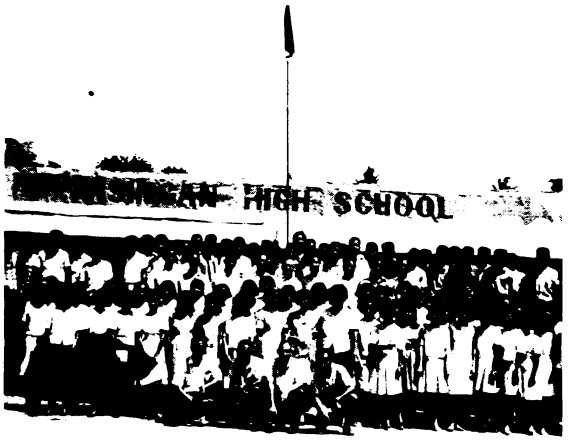
with the Recruitment Team

At the Rizal Academy, Asingan, Pangasinan, Mr. A. Esteban, H.S. Principal, with some members of the graduating class.

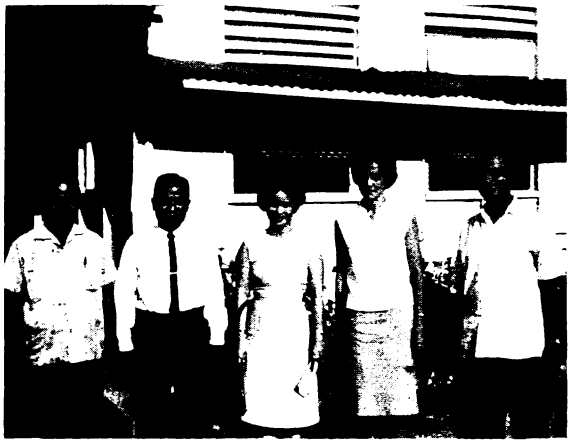
At the La Union South High School, Agoo, La Union, Principal Ventura introduces the C.F. Recruitment Team Members, Capt. R. Fabro and Prof. Blando and Prof. Jacalne to the students.

Principal Esteban of the Rizal Academy and Prof. Blando in front of the Rizal Memorial Trees, from seeds of the Mother Narra Tree planted by Dr. Rizal while in exile in Dapitan. The seedlings came from the C. F. nursery at Los Baños and planted by Secretary of Foreign Affairs, the Hon. Narciso Ramos (former Congressman for the 5th Dist. of Pangasinan), on Rizal Day, 1931.

Graduating Class of the Urdaneta Community High School listen to one of the speakers of the Recruitment Team.



Members of the graduating Class of the Asingan Community High School, with principal B. de la Cruz, members of the



At the Binalonan Community High School, Principal Donato Hernandez Prof. D. Jacalne, Miss Edna Flor Sanedrin, Miss Jose-

Here & There

U.P. Regent Pio Pedrosa awards to Director General of Forestry (Thailand) Dusit Banijbatana, a plaque for the most outstanding U.P. Alumnus in forestry (1967).

U. P. President Carlos P. Romulo congratulates Manuel Bonita, B.S.F. *cum laude* graduate '67. Following him is Terencio Sarigumba, another *cum laude* graduate. Both Bonita and Sarigumba, from Bohol, are Reforestation Administration Scholars. Incidentally, two weeks before the final examinations, Bonita fractured a left leg, in an interclass softball game, had to confined at the U. P. Infirmary, and had it not been for the mishap, would have graduated *magna cum laude.*

Picture showing President Marcos (third from left), pinning a bronze medal on Dimas Micosa, Laboratory Technician of the FPRI (second from left), for his improvement on antiquated cottage scale rope-making equipment and other gadgetry. Picture taken during the First Filipino Inventors' Society Week held at the NSDB Pavilion. Herran St., Manila. Extreme right, Dr. Juan Salcedo, Chairman of the NSDB, and extreme left, Dr. Gregorio Y. Zara, just recently retired Vice-Chairman of the NSDB and immediate past president of the Filipino Inventors' Society.

From left to right: — Mr. Maximo Sagrado of FPRI, FPRI's Director R. Monsalud, Ex-Dean Gregorio Zamuco of the UPCF, Mr. Joseph Turbang of FAO, Rome, Dr. William Webb and Dr. Carl de Zeeuw, both from the Syracuse University, USA; and Mr. Antonio Valino of the FPRI. Picture taken at a cocktail party held at the Lake View Resort, Los Baños, Laguna in honor of the participants at the ILO-FAO Sponsored Forest Workers' Training Course held in the Philippines last year.

FPRI Director Manuel R. Monsalud briefing researchers and technologists of the NIST, who visited the Institute last year, on the activities of the Forest Products Research Institute.

SABAH INVITATION — Sabah (North Borneo) Finance Minister Inche Harris bin Mahammed Saleh invite Filipino businessmen to invest in joint ventures in his country. Addressing the Philippine Lumber Producers' Association at a luncheon-conference at the Philippine Columbian Clubhouse, Salleh promises fair treatment by his government. Others in photo are (from left): Hilario Henares, former Chairman, National Economic Council: Don Carlos P. Fernandez, executive Vice President, Nasipit Lumber Company; Senator Gaudencio E. Antonino, president, Western Mindanao Lumber Co., Inc.; Nicolas Capistrano, Jr., President, PLPA; Don Antonio de las Alas, honorary president, PLPA; Robert Clifford, U.N. Economic Adviser to Sabah; Jose G. Sanvictores, 1st Vice President, PLPA; and Dean Domingo Lantican of the College of Forestry, U.P.

A symposium on structural pest control was held at the Institute under the joint sponsorship of The Shell Co. (Phils.), Forest Products Research Institute and Pest Control Assn. of the Phils. (PCAP), to help local pest control firms attune themselves with the latest trends along this field. Those in photo include Gen. Manager D. O. MacDougall of Shell Chemical Co., G. Platon, PCAP president, Regent F. Tamesis, F. Lucero, J. Reyes, Jr., J. Gonzales, Jr., S. Briguera, F. Breis and Pat Alcudia, all of PCAP; Director Monsalud, Dr. F. Francia, L. Ynalvez, Dr. A. Ramos, Jr., E. Jaranilla, E. Mendoza and A. Valino, all of the Institute.

Nicolas Capistrano, PLPA president and concurrently vice-president of the Plywood Manufacturers' Association of the Philippines congratulates graduating participants of the plywood seminar conducted recently at the Institute under the joint sponsorship of the PMAP and the FPRI, during the closing rites held at the Philippine Columbian. Others in photo include FPRI Director Monsalud, Mr. Batenga, PMAP executive secretary; Mr. Diong of Alcantara and Sons, E. Jaranilla, R. Saraos and P. Manzo of

TO OBSERVE FIRSTHAND various research projects related to the preservation and protection of Philippine woods being undertaken by the Forest Products Research Institute, officials of the Atlantic, Gulf & Pacific Co. (AG & P) recently toured the laboratories of the Institute in College, Laguna. In above photo, Charles Harper, AG & P vice-president (with tie), is shown observing the operations of the Institute's high-pressure treating cylinder, the only equipment of its kind in the Philippines used in the experimental treatment of woods with chemicals to prolong their service life. Others in photo are Messrs. Andaya, De los Santos, and Talusan of AG & P, Asst. Director F. N. Tamolang and Dr. F. Francia of the Institute.

TEACHERS AND students of St. Catherine's Military Academy of Quezon City recently made a tour of the different research laboratories of the Forest Products Research Institute, U.P., in College, Laguna as part of their orientation course in Philippine science and technology. Above photo shows FPRI Director Manuel R. Monsalud (center) briefing the visitors of the Institute's research activities geared primarily to the efficient and maximum utilization of Philippine woods.

Supervising scientists of the National Institute of Science & Technology (NIST) and Philippine Atomic Energy Commission (PAEC) headed by Mrs. Luz Baens Arcega recently visited the laboratories of the Forest Products Research Institute (U.P.) in College, Laguna. Photo above shows FPRI Director Manuel R. Monsalud briefing the scientists on the setup of the Institute, which is devoted to basic and applied research on the properties and utilization of Philippine woods.

FPRI Highlights

FPRI GETS PATENT FOR BAMBOO PARQUET BLOCK

A utility model of a bamboo parquet block designed and composed by a ranking technologist of the Forest Products Research Institute was recently granted a letters patent by Director Tiburcio S. Evalle of the Philippine Patent Office.

According to Emilio Jaranilla, its designer-inventor, the patented utility model relates to a commercial product of composite construction, particularly in parquetry as block flooring.

The object here, he said, is to provide a new industrial product for building construction made of bamboo, preferably for parquet flooring over wooden or concrete sub-floors.

The bamboo here, as parquet material, is in the form of thin slats, assembled rigidly with a strong and solid base of waste veneer and installed as a parquet block.

In having bamboo and waste veneer as main materials of the utility model, Jaranilla said that he wanted as much as possible to avail himself of the abundance of the versatile bamboo as well as that of veneer wastes which simply remain practically unused in most plywood mills here.

Jaranilla, who is assistant chief forest products technologist at the Institute, added that bamboo as parquet material, when combined with wood or waste veneer, will gain not only added strength but also improved form and composition and balanced construction.

He said that the suitability as a floor block or tile of his utility model, the patent of which has been assigned to the government research agency, adequately meets standard tests for strength, durability, hardness and beauty.

* * *

DR. TAMOLANG OVERALL RESEARCH COORDINATOR

Dr. F. N. Tamolang

Director M. R. Monsalud of the FPRI has nnounced the designation of Dr. Francisco N. Tamolang, assistant director, as overall research coordinator of the Institute.

As research coordinator, Dr. Tamolang, who returned from abroad a few months ago after pursuing a two-year post-doctoral studies in wood science and technology at Yale University under a Guggenheim Fellowship and a Yale Associate in Research Grant, will supervise the various research projects being undertaken by the Institute's five technical divisions.

This, according to Director Monsalud, will put to full advantage the wide range of research techniques and technical know-how, including the use of IBM computers, Dr. Tamolang has acquired from various research institutions abroad.

A Ph.D. holder in wood technology from Yale University, Dr. Tamolang has published scores of technical articles on the various aspects of wood in scientific and trade journals here and abroad.

Director Monsalud said that the new designation of Dr. Tamolang will be in addition to his regular duties as assistant director.

* * *

FAST-GROWING WOOD SPECIES FOUND PROMISING FOR PULP AND PAPER MANUFACTURE

Prospects of the fledgling local pulp and paper industry was given a big boost when Director Manuel Monsalud of the Forest Products Research Institute (U.P.) revealed that eight Philippine fast-growing wood species were found promising for the production of pulp and paper.

In a special technical paper Director Monsalud presented during the last day of the Araneta University Foundation symposium, held at the NSDB Science Pavilion in connection with the Foundation's 21st Anniversary celebration, he said that the findings following a series of studies conducted at the Institute were based on their fiber dimensions, derived values and actual pulping and papermaking experiments.

The eight fast-growing broodleaved species studied were African tulip, Anabo, Gubas, Hinlaumo,

Ipil-ipil, Kaatoan-bangkal, Kapok, and Moluccan sau.

Monsalud explained that the experiments on these woods are part of the research agency's major projects to determine which Philippine cellulosic raw materials are suitable for conversion into pulp and paper. He said that the Philippines still imports the bulk of our pulp and paper needs worth around ₱100 million annually, and his Institute aims at reducing, if not eventually eliminating, such costly importations by first finding the suitable woods thru research.

The FPRI Director also noted that aside from their papermaking potential, their availability, regeneration and plantation characteristics should also be investigated. He explained that a continuous supply of these species is essential for sustained pulp and paper manufacture and they can best be propagated thru tree plantation methods.

He singled out Kaatoan-bangkal, one of the fastest-growing trees in this country, as a very promising species for plantation and reforestation purposes. Aside from being a fast grower, this tree is said to withstand fairly strong typhoons; its wood which is very easily treated with chemical preservatives such as creosote, can also be used for veneer and plywood manufacture, wood carvings, pencil slats, wooden shoes and match sticks.

* * *

FPRI BARES NEW WAY OF TAPPING OLEORESIN

An end to the perennial importation of rosin and the flourishing of the local naval stores industry are two possible developmnts in the near future with the exploitation of the Benguet pine tree for its oleoresin, this was revealed by Director Manuel R. Monsalud of the Forest Products Research Institute (U.P.).

According to him, a year-long research study of the Institute, in cooperation with the Reforestation Administration, on the best method of tapping oleoresin from Benguet pine, led to the discovery of a new tapping method that would increase the yield by as much as three times.

The pine's oleoresin, upon distillation, yields turpentine and rosin, which find many uses in such industries as the manufacture of paint, varnish, drug, insecticide, soap, paperboard, ink, wax and many others. Naval stores refer to the pine tree chemicals, specifically turpentine and rosin from pines.

Until now, Director Monsalud said, the Philippines has been importing these chemicals worth hundreds of thousands of pesos since long before the war, and that more and more of these chemicals are needed by our fast-expanding industries.

With the new method of tapping oleoresin, as discovered by FPRI researchers and technologists, he said, our local needs for this industrial chemical could be adequately met by proper tapping of the Benguet pine, which abounds in Mt. Province and surrounding regions.

The extensive oleoresin tapping research study, which was conducted in Pacdal Reforestation Administration Station in Baguio City under the supervision of Foresters R. R. Valbuena and F. Lopez, mainly involved the application of sulfuric acid in three different concentrations on the freshly-chipped barks of scores of pine trees chosen at random for the experiment. Rain or shine, daily throughout the year, oleoresin yield per tree was determined.

Results of the experiment, Monsalud said, showed that for the 50-cm. diameter pine, the average annual yield of oleoresin per tree by 60% sulfuric acid treatment was 4.74 kilos, as against only 1.76 kilos for the untreated tree. For the 30-cm. diameter class, by the same treatment, the average yield was 2.90 kilos per tree, and only 0.85 kilo for the untreated pine, or more than three times that of the latter.

Unemployed or underemployed persons in the pine regions may find gainful occupation by tapping the big pine trees following these methods developed by the FPRI. Of course, permission must be obtained from the Bureau of Forestry or the Reforestation Administration. The FPRI can offer technical help to any one interested in this new industry.

* * *

135 RESEARCH STUDIES ON TAP FOR THE YEAR

Some 135 research projects on the various aspects of wood utilization are scheduled for the current fiscal year's research activities of the Forest Products Research Institute (U.P.), according to Director Manuel R. Monsalud.

He said that these research projects, upon which the Institute's five technical divisions are currently concentrating, are geared to the current needs of Philippine wood-using industries and the consuming public and in line with our forest conservation policy.

According to Director Monsalud, these wide-ranging projects generally cover chemical and industrial investigations of Philippine woods, their basic

structures and characteristic properties, as well as various methods or treatments by which these species may be preserved against insect and fungal attack.

Specifically, he said, chemical investigations range from the chemical analyses of fibrous and non-fibrous materials to studies on wood tannins and extractives to pulping and papermaking qualities of certain woods. Industrial investigations cover studies ranging from the utilization of wood waste to veneer and plywood manufacture to wood machining and bending.

Important researchers for the current year, Monsalud said, include the determination of the effectiveness of wood preservatives, studies on the biology and ecology of wood-boring insects, studies on wood and fiber identification and Philippine barks and useful plants of our forests. Some basic researches include property relations and factors affecting the strength of wood as well as design stresses of various indigenous woods.

* * *

FOREST PRODUCTS ENTOMOLOGY RESEARCH IN THE PHILIPPINES AND ITS PROBLEM

By

DELIA G. CALORA

Forest products entomology is probably one of the least known branches of entomology. Its study is often integrated with the general fundamentals of economic entomology so that a general view rather than a specific one is usually arrived at the end of the course with the resultant "know little of everything" maxim.

The establishment of the Forest Products Research Institute provided a fertile start towards the direction of forest products entomology development, but problems basic to its inception must be fully overcome for a more solid foundation. These problems are:

(a) *Personnel.* — Research is a specialist's field, and team work is a "must" for more effective and forceful research. Making each member of the team a specialist is one problem requiring thorough conditioning and self-assertion requiring time and dedication. A career attitude towards the chosen specialty is a must. An honest-to-goodness decision must be arrived at because it could be a life-long career.

Inherent to the personnel problem is the motivation problem, which is environmental in nature. Basic to this is the organizational structure under which the group moves. While the bureaucratic system has its own merit, as exemplified by most government institutions, it has some pitfalls in a research organization. The pulling out of a highly trained specialist from the research group to reward him with a higher paying position, which more often than not carries mostly administrative function, is one sad example. It is research's crippling move and could be a discouraging blow to a would-be specialist. This problem, while definitely not entomological, is no less trivial.

(b) *Public attitude.* — The public and those engaged in the forest products field alike must be made aware of the importance of insect problems. It must be realized that insect damage on forest products is far greater than on standing timber in the forest since this necessarily cuts into the cost of production. The total damage caused by destructive insects amounts to millions of pesos annually, and accounts for a substantial proportion of the annual drain on our forest. The mistaken notion that we have inexhaustible supply of forest products usually belittles the damage by forest insects. Every practical effort must then be made to avoid the unnecessary waste of wood and to provide maximum conservation of our forests.

(c) *Studies on the life history, biology and ecology.* — On biological studies, there has not been any single species of insect important to forest and forest products which has been fully studied in detail. The studies on termites, ambrosia beetles and powder-post beetles are yet incomplete, hence there is a need for more intensive work along this line. It is, of course, recognized that the insects involved in forest products research is quite difficult to handle since most of their destructive life are spent inside the wood.

(d) *Studies on the prevention of insect damage.* — Studies on the prevention of insect damage to forest products must be vigorously pursued. Chemical attractants and repellants must be thoroughly studied. Whatever information available on these subjects mostly refers to the results of studies in other countries with environmental condition different from ours.

(e) *Studies on the control of pest when infestations are already manifested.* — The problem of control is compounded when cost has to be considered. There could be no "rule of thumb" to this. Controlling forest and forest products pest is also done by physical, biological and chemical methods. The present knowledge existing in our country is merely an adaptation of foreign information by enterprising persons engaged in forest and forest products business. Any local information on this is mainly the result of meager research in the insect pest. It is

undoubtedly important, therefore, to intensify efforts on this subject.

While all these problems of research in the forest products entomology are recognized by entomologists of the Institute, vigorous pursuance of projects along this line is constantly hampered by meager financial support. It is almost impossible to engage in research activities without sufficient funds. Like any research activity, entomological research is an expensive venture.

It can be concluded that the areas of research in forest and forest product entomology are wide and varied. Obviously, they need proper atmosphere, motivation and financial support.

* * *

A FOOD FOR THOUGHT

Pavlov....on the demands of science

Facts are the air of science. Without them the man of science can never rise. Without them your theories are vain surmises. But while you are studying, experimenting, observing, do not remain content with the surface of things. Do not become a mere recorder of facts, but try to penetrate the mystery of their origin, seek persistently for all laws that govern them. And then — modesty. Never think you know all. Though others may flatter you, retain the courage to say, 'I am ignorant.' Never proud... Pride will make you lose objectivity... And lastly, science must be your passion. Remember that science claims a man's whole life. If you had two lives they should not suffice. Science demands on undivided allegiance from its followers. Your work and your research must always be your passion.

— Testament of the Academic Youth of his Country, 1936.

The fungi are not degenerate organisms which are on their way out in a scheme of evolution, and so of little economic importance and scientific interest. The fungi, on the contrary, are progressive, ever changing and evolving rapidly in their own way so that they are capable of becoming readily adapted to every condition of life. We may rest assured that as green plants and animals disappear one by one from the face of the globe, some of the fungi will always be present to dispose of the last remains.

— B. O. Dodge

* * *

There is an ancient legend which tells us that when a man first achieved a most notable deed he wished to explain to his tribe what he had done. As soon as he began to speak, however, he was smitten with dumbness; he lacked words, and sat down. Then there arose — a masterless man, one who had taken no part on the action of his fellow, who had no special virtues, but afflicted — that is the phrase — with the magic of the necessary words. He saw, he told, he described the merits of the notable deed in such a fashion, we are assured, that the words "became alive and walked up and down in the hearts of all his hearers". Thereupon the tribe seeing that the words were certainly alive, and fearing lest the man with the words would hand down untrue tales about them to their children, they took and killed him. But later they saw that the magic was in the words, not in the man.

— KIPLING

FPRI Technical Notes

KENAF FOR PULP AND PAPER

The kenaf (*Hibiscus canabinus* Linn.) was introduced into the Philippines from Cuba. It is an annual plant easily propagated from its seeds and harvestable within four months after planting. It belongs to the Malvaceae or gumamela family. Its bast fiber is generally used in the manufacture of sacks used as containers for sugar, palay, rice, copra and many others. The ordinary kenaf varieties found in the Philippines, such as *viridis* and *vulgaris*, have prickly trichomes, very irritating to the skin of laborers working on them, such as during retting.

The kenaf plant is best harvested when in bloom or when its capsules have appeared. The plants are cut at the base, bundled together, and retted in water from 1-1/2 to 2 weeks. Afterwards, the fibers are washed and dried in the sun. This fiber is woven into sacks, which are just as good as jute sacks.

Sometime ago, Dr. Nemesio B. Mendiola, noted Filipino plant breeder and former Professor of Agronomy of the U.P. College of Agriculture and now a technical consultant of the National Science Development Board, conducted breeding studies to produce trichomeless varieties of kenaf.

Dr. Mendiola sent to the Forest Products Research Institute bundles of whole kenaf stalks with the request that pulping and papermaking studies be conducted on them. The results of the Institute's experiments showed that the whole stalk of kenaf is a promising material for the manufacture of pulp and paper.

* * *

RESEARCH PROVES COCONUT HUSK VALUABLE

The lowly coconut husk, long relegated to waste dumps, has something highly valuable in both its coir dust and coir fiber.

Research findings at the Forest Products Research Institute (U.P.) show that the formulation of a water-resistant adhesive can be made out of coir dust, as prepared by the FPRI process, while several types of paper can also be made out of coir fiber only or when mixed with other fibrous materials.

According to Lauro Ynalvez, who heads a team of FPRI researchers trying to exploit the potentialities of the coconut husk, their findings, which are considered a scientific breakthrough, bear good prospects of having them channeled into a number of industries.

Research results for the coir dust alone, he said, can go for the manufacture of: a) water-resistant adhesives, which could be a new industry in these parts, b) particle board, c) molded products, and d) charcoal and sawdust briquetting.

Based on fiber-characteristics of the coconut coir, the coconut husk coir can be "successfully produced" into several types of paper, otherwise called "abacoco papers," such as a) book paper — a blend of husk and abaca fibers; b) bag paper — also a mixture of husk and abaca fibers; and c) wrapping paper — a blend of abaca, husk and bamboo fibers.

Ynalvez, who heads the chemical investigations division, said that all these fibers are strong and can meet all standard requirements for each class.

He added that considering the abundance of coconut husks which largely remain wasted, their fibers could instead be profitably utilized to supply the raw material needs of a number of moderately-sized pulp and paper mills.

* * *

RATTAN POLES PLAGUED BY STAINING FUNGI

Staining fungi, the ancient bane of rattan suppliers, exporters and rattan products manufacturers alike, are degrading, if not completely destroying, commercial rattan poles worth hundreds of thousands of pesos annually.

This fact has been confirmed during a survey of rattan furniture firms in the Greater Manila area conducted recently by a research team of the Forest Products Research Institute (U.P.).

Their survey findings show that practically all of some 25 factory plants visited had their stocks of rattan poles, usually the palasan type, discolored by staining fungi in varying degrees, rendering them of little value to rattan products manufacturers and of no value to exporters.

For one leading exporter alone, he reported that in a shipment of 13,000 poles he received recently from Agusan, only 700 were stain-free or of export grade, leaving the rest useless for export.

According to the survey team, a badly stained pole sells for only ₱0.30, while a bright, stain-free one sells from ₱0.80 to ₱1.10, or about thrice the price of the former.

To prevent fungal discoloration of rattan poles, the FPRI researchers recommend the following:

1. Harvesting of rattan is best done during the dry season when weather conditions are favorable for the cutters to treat the poles with fungicides.

2. Newly-cut rattan canes should be brought, as soon as possible, to a treating depot where they should be dipped for about two minutes in an anti-stain chemical solution (usually Dowicide G at a ratio of 7 lbs. of the chemical to 100 gals. of water). Dipping should be done within 24 hours or, better yet, 12 hours after cutting to insure complete protection against staining fungi.

3. When the poles are thoroughly dried (by end-racking) following the dipping treatment, they should be scraped, then dipped once again, then air-dried for about a month to reduce moisture content to below 20%.

* * *

THE CAUSES OF FAILURE OF RAILWAY TIES IN THE PHILIPPINE NATIONAL RAILWAYS

By
MELENCIO G. LAXAMANA

The Philippine National Railways (PNR) has about 1,020 kilometers of railroad track, 479 kms. in the North and 541 kms. in the South. Based on not less than 1,600 ties per km. the railroad network has a total of 1,632,000 ties. The tie (5" x 8" x 7') commonly used in the PNR track is molave, but yakal and ipil and other denser wood species are now also being used. According to the PNR, about 70 ties are replaced per km. annually, or a total of more than 71,000 ties. This amounts to a total annual replacement cost of ₱568,000.00, at ₱8.05 per molave tie, as of September, 1966.

One problem now confronting the PNR is the difficulty of getting enough supply of cheap, good molave ties, as evidenced by the use of yakal, narig, and dangula ties to substitute for molave ties, which are expected to give just as good service performance as the molave.

Although enough stands of molave may be available in the Visayas and Mindanao, it would be uneconomical to use them because of the added cost of transporting them to Luzon. In view, however, of the increasing demand for replacements of destroyed ties as well as the projected extension of the PNR railroad track to the Cagayan Valley and Sorsogon, more and more ties will be needed.

The problem is compounded by the fact that practices necessary to increase the service life of ties are not locally adapted or, if any, are limited. At any rate, the Forest Products Research Institute, aware of this problem, is conducting a cooperative study with the PNR to determine the causes of failure of some durable wood species when used untreated as railway ties so that desirable practices may be recommended to improve the performance of ties.

For this purpose, more than 9,000 ties of akle, dangula, dungon, molave, narig, yakal and yakal-saplungan were installed in 11 experimental areas of the PNR railway tracks, extending from Damortis, La Union to Libmanan, Camarines Sur, and their conditions are inspected at 6-month intervals. The causes of failure of each destroyed tie inspected are termed either as decay, rail-seat deterioration, splitting, spike-kill, rail-cut, or breakage at the rail seat.

The accompanying table shows the percentage causes of failure of the six species used as experimental railway ties. The principal cause of failure of the species in this study is decay, followed by rail-seat deterioration or splitting. Highest percentage of decay goes to yakal and narig, and lowest in molave. For splitting, however, molave shows the highest percentage of failure.

The premature failure of most ties due to decay is attributed to the presence of too much sapwood, which deteriorates earlier than the heartwood.

Rail-seat deterioration may be associated either with decay or splitting or a combination of both. Except in few isolated cases, tie failure due to spike-kill, rail-cut, and breakage at the rail seat is insignificant. The type variation of cut (whether boxed-heart or half-heart cut), volume of sapwood, and possibly the test site have a great influence on the performance of the different species of ties.

One of the major factors governing the performance of a railway tie is its natural durability. Durability is termed as the resistance of the untreated timber against decay and insect attack and other wood-destroying organisms. The most effective method to prevent decay and insect attack is pressure treatment of ties with an effective wood preservative, say coal-tar creosote. However, not all wood species equally respond to treatment. Some are easy to treat and others are refractory or remain impervious to commercial pressure treatment, as in the case of most of the heartwood of the wood species for railway ties used in the PNR.

Prior to pressure treatment of the refractory species, studies should be conducted to find the most effective treatment schedules. Experience shows that majority of the PNR ties contain large amounts of sapwood which are permeable under ordinary pressure treatment. If creosoted, the sapwood could be as durable as the heartwood of molave ties. Or, should the refractory species be used untreated, they should be matured and free from sapwood.

For better performance, ties laid on a track should be ballasted with gravel instead of soil. The track should, if possible, be elevated to effect proper drainage and to reduce tie decay. Since decay is controllable through preservative treatment and the adaption of generally accepted practices, the mechanical protection of a tie cannot simply be neglected. Also, the use of tie plates and anti-checking iron to reduce end-splitting is one of he measures that can be adapted to improve the mechanical performance of a tie.

* * *

Species	Causes of Failure														Total
	Decay		Rail-seat deterio-ration		Splitting		Spike-kill		Rail-cut		Breakage at rail seat		Other[a]		
	No. of ties	%	No. of ties	%	No. of ties	%	No. of ties	%	No. of ties	%	No. of ties	%	No. of ties	%	No. of ties
Dangula	102	55.0	40	21.5	37	19 9	2	1.0	1	0.5	—	—	4	2.1	186
Dungon	74	86.0	7	8.2	3	3.5	—	—	2	2.3	—	—	—	—	86
Molave	10	35.7	—	—	9	32.2	—	—	2	7.1	—	—	7	25	28
Narig	573	96.0	14	2.3	7	1.2	1	0.2	—	—	—	—	2	0.4	597
Yakal	864	96.0	14	1.6	17	1.9	—	—	2	0.25	2	0.25	—	—	899
Yakal-saplungan	21	75.0	3	11.0	4	14.0	—	—	—	—	—	—	—	—	28

[a] Includes breakage at center of tie or destruction by man.

STAINING IN RATTAN AND ITS CONTROL

By
CRISOSTOMO V. ARENAS

One major problem affecting our rattan industry is the fungal discoloration of rattan canes. In a recent survey of the rattan-using industries in Manila and suburbs, one exporter of Philippine rattans reported that out of 13,000 poles shipped to him from Agusan, only about 700 poles, or 5.4% were classified as export grade. The rest were partially or totally infected with stain. This staining problem of export-grade poles could be a significant economic factor, considering the huge monetary loss due to the downgrading of infected poles.

Although it is generally conceded that in quality Philippine rattan is as good as those obtained anywhere in Southeast Asia, poor methods of gathering and processing it from the forests and the lack of proper care and handling during seasoning and storage, often reduce the quality of the poles and, subsequently, its price. A badly stained pole of about 5 meters long, for example, would cost only ₱0.30 or less, while a bright and stain-free pole of the same size may cost ₱0.80 — ₱1.10, or more.

Nature and Cause of the Stain

The stains. — The stains responsible for the heavy losses in rattan are fungal in nature, similar to that of the sapwood stains affecting logs and lumber. Freshly cut rattan poles are highly susceptible to the staining fungi.

Both scraped and unscraped poles are generally affected by stains. On scraped poles, the stains in various forms can be recognized as discolorations of different shades of gray, light blue to dark blue and near black. They may appear as minute specks resembling mildews, streaks, spots, blotches or blemishes of indefinite and irregular patterns. They are indiscriminately scattered over the surface and inside the poles.

For the unscraped poles, the presence of stain infection is indicated by the development of raised and somewhat erumpent (eruptive) bodies under the rind and the transformation of the rind into scale-like configuration. When such a pole is scrapped, all the tissues underneath the erumpent and scaly rind are intensely and deeply stained and assumes a dark color resembling ebony. Stain develop more

intensively in unscraped poles than in scraped ones. In the drying or seasoning process, unscraped poles dry slower than the scraped poles, thus exposing the former longer to conditions conducive to the growth and development of the staining fungi.

Causes of stain. — Blemishes in rattan are caused by certain fungi (*Ceratocystis* spp. and *Diplodia* spp.) which heavily infect the rattan tissue with colored vegetative structures known as hyphae. These thread-like structures concentrate at various points in the center and in the near outer surface of the poles. Heavy concentrations of the colored hyphae appear as stains on the rattan surface. The discoloration is firmly intermixed with the cell tissue which cannot be removed by either brushing or scraping.

The staining fungi produce abundant spores and may be carried to the poles at the cut ends by wind or insects. Once introduced into the cut end of the poles, they readily germinate and rapidly grow vegetative hyphae, which are capable of penetrating the poles horizontally to a distance of as much as 50 mm. within 24 hours. Hyphal penetration spreads continuously and vigorously as long as the moisture content (from 25% up) of the poles remains favorable to fungal growth. Reduction in the moisture of the poles below 20%, which is close to the minimum requirement of the fungi, will inhibit their growth. However, as soon as the cane absorbs moisture from the air or from other sources above the minimum requirement, fungal growth will again occur.

Pointers in Preventing Staining of Rattan Poles

1. The harvesting of rattan should, when possible, be done during the dry season when conditions are favorable for the cutters to treat the poles with fungicides. Many rattan cutters leave their poles in the forest for as long as three weeks without treatment, causing heavy losses due to staining.

2. Rattan canes should be transported immediately to the treating place for dipping in anti-stain solutions before they are dried and processed. If dipping is made within 24 hours after cutting, the effectiveness of the anti-stain solution is high, and if done within 12 hours after cutting, complete protection from staining fungi is assured. Further delay in dipping may reduce the effectiveness of the chemical treatment against stain infection.

The poles to be treated should preferably be scraped, then dipped from one to two minutes in the anti-stain solution. To maintain a relatively consistent concentration of the anti-stain solution, the dipping tank should be kept from getting below 80% of its full working volume by adding fresh solution regularly. The dipping tank should also be kept under cover to prevent rain from diluting the solution.

3. If the harvested poles cannot be brought to the treating place on the day they are cut, preliminary dipping in the chemical solution should be done in the cutting area immediately after cutting to minimize the risk of infection.

4. Clean and sanitary conditions in the treating place should be observed strictly. Rattan trimmings or scrappings should be burned, otherwise, they provide excellent means of harboring and propagating staining fungi.

5. The treated poles should be air-dried to below 20% moisture content in a well-ventilated and sheltered storage place by end-racking. While being air-dried, the poles should be protected from rain to prevent the washing away of the anti-stain chemical solution. Once the poles are dried, they should always be kept dry, especially when they are in transit.

It should be borne in mind that once the staining fungi have penetrated rattan poles beyond the reach of the recommended chemical solution, cure and prevention of fungal staining become impossible. In principle, the best way to prevent stains in rattan poles is by prompt use of anti-stain chemicals, quick drying, and subsequently keeping them dry.

Anti-stain Chemicals

Below is a list of recommended anti-stain chemicals to control staining in rattan.

Chemicals	*Suggested No. of lbs. per 100 gallons of water*
Borax	32
Dowicide G	7
Dowicide H	6
Lignasan	2
Melsan	4
Noxtane	10
Permatox 10-S	10
Santobrite	7

For severe seasoning conditions, these proprietary chemicals may be used profitably at a higher concentration, preferably at 50% or more of the recommended concentration.

Of the eight anti-stain chemicals, four are locally available. They are Dowicide G and Dowicide H, at ₱2.50/lb.; Borax, at ₱3.00/lb. and Santobrite, at

₱8.00/lb. Prices are as of the first week of October, 1966.

Protective Measures for Workmen Handling Chemicals

In the dry form, all of the fungicidal products mentioned above, except borax, may cause severe burns if allowed to remain on the skin. In solutions at recommended concentrations, some of the chemicals may irritate susceptible skins particularly affecting those who do the dipping by hand. This malady may also be encountered at any point in a treating place where a considerable amount of the dipping solutions from the canes are found. Usually, by the time the stock reaches the seasoning yard, little or no trouble is experienced.

Some precautionary measures may be taken when using these chemicals:

1. Protect the workmen with rubber gloves and waterproof aprons. Canvas gloves or palm pads of leather or belting worn over the rubber gloves reduce the amount of wear and often aid in handling the stock. The gloves should be washed free of chemicals at the end of each working shift. Hooks for handling the poles are helpful where it is practicable to use them.

2. Carefully follow the recommendations of the manufacturer or distributor concerning the use of a particular product.

3. For the treating work and for handling the wet stock, always be on the lookout for those who may be allergic to the treating chemicals and remove them from the hazard.

4. While dipping the poles, use particular care to keep the chemical away from the face. When pouring the powdered chemical into the dipping tank, avoid inhaling the dust as it irritates the nasal membranes and causes sneezing.

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THE WPD FORUM

Compiled by E. D. Bello

(We invite our readers to send in their problems on the subject of wood seasoning, preservation, entomology and pathology for the benefit of others who may share the same problems. Send them to WPD Report, FPRI, College, Laguna).

Question: What is the Boulton process (boiling under vacuum) as applied in seasoning or conditioning wood for preservative treatment?

Answer: The process might be explained this way: the timber is placed in a treating cylinder, then hot creosote, usually at temperature of about 190°F., is introduced so as to cover the wood, leaving enough space for foaming. The temperature is maintained or slightly increased, while a vacuum of not less than 22 inches of mercury is gradually drawn. This vacuum is maintained at its maximum for a period varying with the size and end-use of the wood being treated. While the vacuum is being applied, the temperature of the oil is also evenly or slightly raised, usually not above 210°F. The oil serves to keep the wood hot, while the vacuum lowers the boiling point of the water in the wood and causes part of it to evaporate. The water given off by the wood in the form of water vapor passes through a condenser and is collected and measured. The amount of condensed moisture varies with the initial moisture content, size and shape of the wood, the proportion of sapwood present, and the temperature and vacuum conditions employed.

Question: Aside from the unsightly discoloration which staining fungi impart on the affected wood, what other bad effects do these fungi render to the wood?

Answer: The stained wood is made more porous, making it more susceptible to decay fungi attack. Also, the stain fungi will reduce the toughness property of the infected wood to as high as 50%.

Question: What is meant by resistance of insects to insecticides?

Answer: Resistance in this sense is an added ability to withstand insecticides acquired by breeding from those individuals which survived exposure to a particular toxicant, which is sufficient to wipe out the whole population. To illustrate this situation, suppose a particular insecticide is applied to a population of insects and that it kills only 98% of the insects. The 2% of the population which survived will then make up the breeding stock from which the next generation will arise. When the same insecticide is used to treat the second and succeeding generations, percentage of insects that will be killed decreases up to a point where it is negligible. Resistance appears first in local situations and may become general throughout the geographical range of an insect either by continued development in new local situations or by migration of resistant individuals.

* * *

WHAT'S NEW IN WOOD RESEARCH . . .

Crooked, knotty, low-quality logs also make beautiful products.

Bruce G. Heebink, engineer in charge of special products research at the Forest Products Laboratory in Madison, Wisconsin, U.S.A., has developed a unique production process of converting cheap, low-quality logs into elegant panelling.

The revolutionary process consists of two steps:

1. A highly-accelerated drying method of seasoning green wood that produces attractive colorations.

2. A new simplified system of sizing lumber that makes possible truly randomized installation of paneling pieces of different sizes.

The seasoning process, known as press-drying, was developed by Heebink some years ago for drying thin veneers. However, it was found also suitable for drying paneling sawn from logs to a thickness of 0.6 inch. The lumber is pressed at high temperatures, and its moisture is dispelled rapidly in a cloud of vapor through flutes in the steel press plates above and under the lumber. Press-drying seasoned lumber pieces takes one hour, while matched pieces takes 13 days to dry in a combined forced-air and conventional kiln-drying. Thinner stock kiln-drying with an elevated temperature schedule dries in 2 to 3 days.

One advantage of press-drying is that boards remain flat, which eliminates splitting. Another is that press-dried lumber shrinks less in width than when kiln-dried. It has also been determined experimentally that press-dried lumber is more dimensionally stable than kiln-dried lumber. That is, it does not shrink or swell as much as kiln-dried lumber does under fluctuating humidity conditions.

Press-drying also imparts a pleasant coloring effect, ranging from light to dark brown. The color is uniform throughout the thickness of the material, not just surface coloration. Conventional finishes such as oil stains, lacquers, varnishes and even sealers enhance the natural beauty of the wood.

Because of these advantages, other products envisioned for the new unique process are drawer sides and parquet flooring, to utilize short-length material rejected for paneling.

The new simplified system of sizing calls for full measure sizes of 2, 3, 4, and 6 inches in face width when dry, planed and ready to install. This facilitates joining end-to-end in a single course of paneling a 6-in. wide piece with two 3-in. pieces, three 2-in. pieces, or a 2-in. and a 4-in. piece. Paneling pieces come in assorted lengths and widths so that horizontal installation is just as practical as vertical installation with the new system.

The pieces are tongued and grooved all around so that they can be "blind nailed" to join snugly end-to-end or side-to-side.

* * *

VENEER CUTTING, DRYING, AND GLUING PROPERTIES

Almon (*Shorea almon* Foxw.) is abundant in most regions of the country, except in Mindoro and Palawan. It is a large tree that attains a diameter of 120 centimeters. The straight cylindrical trunk attains about 40 meters to the first branch.[1] The wood is cross-grained, coarse-textured due to large pores, moderately low in density, and dull-surfaced when dry. It takes stain readily and is susceptible to a high finish. The light-gray sapwood is not sharply marked off from the light pink to light red heartwood.

Logs and Lumber

Six logs were used in the veneer cutting, drying, and gluing studies. All these logs measured about 15 feet in length. The logs used in the gluing study were collected by the Institute from Tag-Kawayan, Quezon. The logs used in the other experiments were donated by the Lianga Bay Logging Co., Inc., Lianga, Surigao. Particulars about these logs are shown in Table 1.

The lumber used for wood lamination experiments were random pieces remaining from those used in other research work at the Institute. These pieces were sound plain-sawn heartwood.

Veneer Cutting

The veneer cutting tests were conducted on unheated almon bolts, using the 54- by 56-inch lathe at the Institute. Veneers of 1/8-, 1/16-, and 1/32-inch thicknesses were cut.

The ranges of lathe settings that yielded acceptable quality veneer of these three thicknesses are shown in the upper part of Table 2. The lower part of this table contains the lathe settings used in cutting moderately tight veneer for the veneer drying study.

[1] Tamesis, F. and L. Aguilar. 1953. Important commercial timbers of the Philippines. Popular Bull. No. 32 (DANR), Bureau of Printing, Manila.

TABLE 1. Description of test logs.

Kind of study	No. of logs	Average diameter	Average sapwood (width)	Eccentricity of the pith	Average moisture content	Average specific gravity	External appearance of the logs
		inches	inches	inches	percent		
Veneer cutting	1	30	1½	1¼	114	0.41	Peeler grade
Veneer drying	3	23	1½	1¼	66	0.39	Veneer grade
Veneer gluing	2	24	1	7/8	83	0.44	Veneer grade

TABLE 2. Lathe settings for almon veneers.

Veneer thickness	Knife angle (range)	Vertical nosebar opening	Horizontal nosebar opening (range)
inch	degrees-minutes	inch	inch
1/8 (0.124)	89-45 to 91-15	0.030	0.1080 to 0.0894
1/16 (0.062)	90-00 to 91-15	0.015	0.0533 to 0.0480
1/32 (0.032)	90-30 to 91-15	0.008	0.0264 to 0.0250
1/6 (0.168)	90-00	0.035	0.1375
1/10 (0.100)	90-00	0.020	0.0802
1/20 (0.050)	90-15	0.010	0.0390

Fuzzy veneer was obtained in the cutting of the inner portion of the log and the severity of this degrade increased as cutting approached the brash center. Because of this degrade and of defects in the form of small loose knots and resin pockets near the center of the bolts, veneer of face quality could not be produced from the inner portion. Face quality veneer was, however, cut from the outer portion of the log.

Since the tests were made on a single tree, the recommended lathe settings do not fully represent those of the species. Inasmuch as these settings substantially satisfy other species that have been tested such as tangile, manggasinoro, apitong and bagtikan, they will probably be generally acceptable in cutting almon.

Heartwood veneer from the almon log had a light reddish color, which is intermediate between the colors of red lauan and white lauan. The good grade of veneers produced in different thicknesses, except in the inner zone, has shown that the unheated bolts of the species are suitable for making rotary-cut veneer.

Veneer Drying

Cold-cut heartwood veneers, 1/20-, 1/10-, and 1/6-nch thick, were dried separately in a Coe roller-type dryer under a temperature range of 250 to 320 degrees F. using drying times which would give the veneers average final moisture contents between 6 and 10 percent. Internal air velocity was fixed at about 1200 feet per minute with the venting stack closed during the entire drying operation.

Moisture Content

Green moisture content of individual specimens ranged from 61 to 75 percent and the average of all individual values was 66 percent. Because of the small variation in the initial condition, differences in dry moisture content of veneers within a test group was found to have insignificant effect on the average value between groups. Also, because the green moisture content was quite low, the time used in drying the veneers to a certain level of moisture content was comparatively short. In general, the veneer was easy to dry. The combination of drying variables used in drying the three thicknesses of veneer to average moisture contents of 6 to 10 percent are tabulated below:

TABLE 3. Drying schedules for almon veneer.

Veneer thickness	Temperature in dryer	Time in dryer	Average dry moisture content	Dry shrinkage	
				Tangential	Radial
inch	degrees F.	minutes	percent	percent	percent
	250	3.8	8	5	4
1/20	285	2.7	9		
	320	2.1	9		
	250	10.3	7	5	4
1/10	285	7.3	8		
	320	5.2	9		
	250	24.8	6	5	4
1/6	285	17.2	6		
	320	12.4	8		

In drying the same thickness of veneer, increasing the dryer temperature from 250 to 320 degrees F. eventually increased drying capacity by about 85 percent. Conversely, doubling the veneer thickness prolonged the drying time to 2.7 times, all other things being equal.

Dry Veneer Quality

The presence and extent of splits, checks, waviness, and buckling were the basis in evaluating the quality of dry veneer.

Regardless of drying temperature used, no split or check was noted during the entire drying run except the presence of very few and short end splits in the 1/20-inch veneer. Also, buckling occurred in the thin veneers only to a very slight degree. No serious problem regarding these defects arose in drying the three thicknesses of veneer with any of the temperatures used.

End waviness was noted to be a characteristic degrade in 1/20-inch veneer. But as veneer thickness increased, end waviness gradually disappeared. Outward curling[2] was observed to be the only defect present in 1/6-inch veneer. The severity of end waviness and curling was also influenced by drying temperature; at higher temperatures, end waviness was reduced while curling was more pronounced.

Generally, commercially acceptable quality of 1/20-, 1/10-, and 1/6-inch dry veneers was obtained when either temperatures of 250, 285, and 320 degrees F. were used to dry each thickness.

Shrinkage

The range of temperature and veneer thickness used did not have any effect on shrinkage. Radial and tangential shrinkages from green to eight percent moisture content averaged 4 and 5 percent of the green dimension, respectively (Table 3).

Physical Features of the Dry Veneer

Disregarding natural wood defects such as knots and resin ducts, the appearance of almon veneer after it was dried was very suitable for plywood face and other veneer-faced products.

Plywood Gluing

Three-ply plywood panels were fabricated from 1/16-inch veneer as faces and 1/8-inch as cores. The specimens were conditioned to eight percent moisture content before gluing.

The glue used was powdered urea-resin (Kaurit 285), with hot press catalyst (Hardener 500) extended 50 percent with wheat flour (water-taking capacity 1.30). The gluing conditions employed included a closed assembly time of 10 minutes and a spread of 40 pounds per thousand square feet of single glue line. The pressing conditions comprised all combinations of three levels of specific pressure (100, 175 and 225 psi.), pressing temperature (215, 250 and 285 degrees F.) and pressing time (2, 4 and 6 minutes).

Compression was taken for each treatment combination before pressure was released. Compression-

[2] Outward curling is the curving of the veneer away from its tight face. It is actually a special case of end waviness in which only a portion of one-half of one wave cycle occurs.

set was measured after conditioning the test panels to 12 percent moisture content. The bond quality was evaluated by the dry shear, wet shear, hot-and-cold-soak shear, and 15-cycle delamination tests.

The effects of specific pressure and pressing temperature were highly significant on compression. Compression increased when either the specific pressure or the pressing temperature was increased. The resulting compression-set was affected by the specific pressure, pressing temperature and pressing time The interaction effects of specific pressure and pressing temperature as well as specific pressure and pressing time on compression-set were also found highly significant.

The results of the bond strength tests showed that only panels pressed under a combination of 100 psi., 215 degrees F., and 2 minutes pressing time failed in the 15-cycle delamination test. It was also evident that the quality of the bond strength was not attributable to the effect of any one pressing variable. The resultant quality of the bond strength was dependent upon the combined effects of the different pressing variables.

Based upon the requirements as to bond strength and allowable compression and compression-set, the optimum ranges of pressing variables were as follows:

Specific pressure	— 140 to 190 psi.
Pressing temperature	— 250 to 285 degrees F.
Pressing time	— 2 minutes

Solid Wood Lamination

Almon was investigated for ease of gluing and suitability for lamination. The wood laminae were glued and cold pressed for 18 hours under room conditions. The glues used were Kaurit 285, a urea-formaldehyde resin glue in powder form with a separate cold setting catalyst and yellow hardener (HGE) powder, and RS 240 M, a resorcinol-phenol glue marketed in liquid form with a separate cold setting hardener (FM 124) in powder form. The gluing procedures recommended by the respective manufacturers were followed.

The laminated assemblies were conditioned to constant weight at 15 percent moisture content before cutting them into test specimens. The specimens were subjected to glue-block shear and delamination tests, to measure their shear strength and glue-joint durability, respectively.

The results of the tests and observations showed that almon is easily processed for gluing. The wood laminae formed strong bond with both glues but, for exterior use, the glue bond was found durable only with RS 240 M glue. The criteria for this classification were:

(a) The laminae were processed without special care.

(b) The shear strength of the laminated assemblies was similar to that of clear solid wood of the same species at the same moisture content. Almost all failures along the shear area were in the wood.

(c) Those bonded with Kaurit 285 glue failed in the accelerated vacuum-pressure delamination test, while those with RS 240 M passed the test.

* * *

RED LAUAN VENEER CUTTING, DRYING, AND GLUING PROPERTIES

Red lauan (*Shorea negrosensis* Foxw.) is an important Philippine commercial wood species. Trees of this species attain diameters up to 200 centimeters (80 inches) and heights of about 50 meters (165) feet). They generally have strong buttresses with average bole lengths of 20 meters (65 feet).

Red lauan is primarily a low-altitude species found in regions where there is an abundance of rain with short or no dry seasons.[1] It is estimated that this species constitutes about 10 percent of the total commercial timber stand.

Logs and Lumber

The materials used in the investigations were collected from several regions of the Philippines. The sources and descriptions of the logs are presented in Table 1. All these logs were peeler grades.

Sapwood or brashy materials were excluded from the best samples but slightly crossed and interlocked grain were allowed.

[1] Tamesis, F. and Aguilar, J. 1963. The "Philippine Mahogany" and other Dipterocarp Woods. Popular Bull. No. 44 (DANR) Bureau of Printing, Manila.

TABLE 1. Sources and description of the test logs.

Phase of study	Log origin	No. of logs	Ave. specific gravity[a]	General appearance of the specimens
Veneer cutting	Tagkawayan, Quezon	3	0.56	peeler grade
	Butuan, Agusan	2	0.39	peeler grade
Veneer drying	Claveria, Cagayan	1	0.49	contained numerous pin knots and scars
Veneer gluing	Tagkawayan, Quezon	1	0.56	peeler grade
Lumber laminating	Butuan, Agusan		0.40	straight-grain lumber

[a] Based on oven-dry weight divided by green volume.

Veneer Cutting

Rotary-cutting tests were conducted on 3.15 mm. (1/8-in.), 2.54 mm. (1/10-in.), 1.57 mm. (1/16-in.) and 1/27 mm. (1/20-in.) thick veneers. Two series of cutting tests were made on bolts from Quezon province. One series was on unheated bolts and the other on bolts that were preheated in water to 71°C. (160°F.) for about 24 hours. The cutting series on Agusan logs were confined to unheated bolts.

The tests were conducted on a 54 by 56-inch veneer lathe. The sharpness angle of the 5/8-inch knife was 21 degrees, ground to a concavity of 0.002-inch, and the 5/8-inch nosebar was set at 75 degrees.

Veneer quality was evaluated in terms of:

a. Thickness uniformity as influenced by the knife angle,
b. Surface smoothness, actual thickness, and depth of lathe checks as influenced by the horizontal-nosebar opening,
c. Depth of lathe checks as influenced by the vertical-nosebar opening, and
d. Tensile strength across the grain of veneer as influenced by heating the bolts before peeling.

The ranges of lathe settings found suitable for producing acceptable equality veneers from unheated bolts of red lauan from both sources, are presented in Table2. Generally, a wider range of lathe settings was found suitable in cuitting acceptable veneers from the Agusan logs.

Comparatively, the quality of veneers from both the unheated and heated bolts did not show any significant difference, except that tensile strength across the grain of veneers from heated bolts was significantly improved.

TABLE 2. Acceptable ranges of lathe settings for rotary-cut veneers from unheated red lauan bolts.

Veneer thickness	Knife angle	Vertical-nose-bar opening	Horizontal-nosebar opening
mm. (in.)	degree	mm. (in.)	mm. (in.)
3.15 mm. (1/8 in.)	89°30' to 90°00'	0.762 (0.030)	2.20 to 2.47 (0.0868 to 0.0974)
2.54 mm. (1/10 in.)	90°15'	0.508 (0.020)	1.981 (0.0780)
1.57 mm. (1/16 in.)	90°00' to 90°15'	0.381 (0.015)	1.102 to 1.20 (0.0434 to 0.0474)
1.27 mm. (1/20 in.)	90°30'	0.254 (0.010)	0.965 (0.0380)

Veneer Drying

The drying times for red lauan heartwood veneers, 1.27-mm. (1/20-in.) and 2.54-mm. (1/10-in.) thick, were determined at the drying temperatures of 121, 140 and 160 degrees C. (250, 285 and 320 degrees F.). Green moisture content of the test veneers ranged from 74 to 92 percent with an average of 81 percent.

The veneer-drying test was performed in a steam-heated, single-deck, roller-type mechanical dryer. Internal air velocity was maintained at about 365 meters per inch (1200 feet per minute) with closed venting stack.

Dry-veneer quality was evaluated in terms of the extent of splitting, checking, end-waviness, and buckling. Tangential and radial shrinkages were also determined.

The drying schedules used are tabulated in Table 3. Within these test conditions, the extent of drying defects on dried veneers was within acceptable limtis. There was no serious drying degrade in the veneers at any of the temprature and thickness combinations tested.

The compression of the panels and the resulting compression-set were measured.

The bond quality was evaluated by the 15-cycle delamination test, dry shear test, 48-hour cold-soak shear test, and the hot-and-cold-soak shear test.

Results showed that the bond quality of red lauan panels, produced at any of the level combination of variables tested, passed the requirements for Type II bond. On the other hand, statistical analysis revealed the following:

(a) The extent of compression-set was controlled by the amount of pressure applied and by the levels of temperature at which the pressure was applied. This was also influenced, to some degree, by the time-temperature interaction.

(b) The bond quality was affected by the action of individual variables and their interactions

TABLE 3. Veneer-drying schedule for red lauan.

Veneer thickness	Drying temperature	Drying time	Average dry moisture content	Drying shrinkage[b]	
				Tangential	Radial
mm. (in.)	°C. (°F.)	min.	percent	percent	percent
1.27 (1/20)	121 (250)	4.6	9		
	140 (285)	3.4	8	5	4
	160 (320)	2.7	8		
2.54 (1/10)	121 (250)	12.6	7		
	140 (285)	9.2	7	5	4
	160 (320)	7.1	6		

[b] Average of 6 specimens computed from green dimensions.

Plywood Gluing

Panels of 6.2 mm. (1/4 in.) 3-ply plywood were pressed at three levels each of pressing variables, namely, pressure, temperature, and pressing time.[2] Panel construction consisted of 1.67-mm. (1/16 in.) for faces and backs, and 3.15 mm. (1/8 in.) for cores with moisture content of about 8 percent. A hot-press urea-formaldehyde resin, extended 50 percent with wheat flour, was used as the adhesive. Glue spread was about 195 gr./m² (40 lbs./Msq. ft.) and the assembly time was 10 minutes.

From these results, the best combination of levels of the variables tested on the basis of bond quality and compression-set is:

Specific pressure — 7.03 kg./cm.² (100 lbs./sq. in.);
Pressing temperature — 121 degrees C. (250 degrees F.);
and
Pressing time — 2 to 4 minutes.

Solid-Wood Lamination

Red lauan lumber was investigated for ease in laminating and durability of the resulting bonds un-

[2] The levels of variables were:
pressure — 7.03, 10.54, 14.06 Kg./cm.²(100, 150, 200 psi);
temperature — 104, 121, 138 deg. C. (220, 250, 280 deg. F.); and
pressing time — 2, 4, 6 minutes.

der exposure conditions. Urea-formaldehyde and resorcinol-phenol formaldehyde resin were used. Thirty glue-block assemblies of 3.8 by 5 by 29.85 cm. (12 by 2 by 11-3/4 in.) were laminated with each adhesive. The moisture content of the wood was about 15 percent at the time of gluing. A glue spread of about 268 and 292 gr./m^2 (50 and 60 lb. MSGL) was applied with the urea and resorcinol-phenol, respectively, and an assembly time of 20 to 25 minutes each was alloted. A retaining pressure of 12.65 Kg./cm.^{2} (180 psi) was maintained for 24 hours at room temperature.

The bond quality produced was tested in accordance with:

(a) Glued-block shear test, as described in Sections 65 to 67 of ASTM D 805-53 specifications;

(b) Vacuum-pressure delamination test described in Procedure A, USDA Tech. Bull. No. 1068, p. 85; and

(c) Exposure test.

The block shear test showed that the initial bond strengths produced by both adhesives, were slightly lower than those of solid red lauan at 15 percent moisture content. Comparison in bond quality produced by the two resins, revealed the relatively higher shear values but lower wood failures developed by resorcinol-phenol glue. The resorcinol-phenol-glued specimens withstood the vacuum-pressure delamination test.

In test (c), the urea-glued specimens were placed indoors while those glued with the resorcinol-phenol adhesive were exposed to exterior conditions. The exposure test showed durable glue joints with resorcinol-phenol glues. The shear strength retained was about 88 percent after 30 months of outdoor exposure. The extent of delamination after this period was less than 10 percent. However, wood failure followed an upward trend.

Urea-glued specimens exposed indoors, showed a fast decline in shear strength and wood failure. After 30 months of exposure, only about 20 percent of the original strength was retained. Wood failures dropped to zero after 12-month exposure. The extent of delamination was about 17 percent of the total end-grain glue line.

* * *

I BELIEVE

I believe in the supreme worth of the individual and in his right to life, liberty, and the pursuit of happiness.

I believe that every right implies a responsibility; every opportunity, an obligation; every possession, a duty.

I believe that the law was made for man and not man for the law; that government is the servant of the people and not their master.

I believe in the dignity of labor, whether with head or hand; that the world owes no man a living but that it owes every man an opportunity to make a living.

I believe that thrift is essential to well ordered living and that economy is prime requisite of a sound financial structure, whether in government, business or personal affairs.

I believe that truth and justice are fundamental to an enduring social order.

I believe in the sacredness of promises that a man's word should be as good as his bond; that character — not wealth or power or position — is of supreme worth.

I believe that the rendering of useful services is the common duty of mankind and that only in the purifying fire of sacrifice is the dross of selfishness consumed and the greatness of human soul set free.

I believe in an all-wise and all-loving God named by whatever name, and that the individual's highest fulfillment, greatest happiness, and widest usefulness are found in living in harmony with his will.

I believe that all love is the greatest thing in the world; that it alone can overcome hate; that right can and will triumph over might.

— JOHN D. ROCKEFELLER JR.

(*Continued from page* 60)

ever, even if the approximation is off by 2 weeks, it will still be alright since the planting season is quite long. For example, if the target date for planting is July 15 at a desired seedling height of 60 centimeters, and something goes wrong such that it takes two additional weeks to grow the seedlings to 60 centimeters, planting can be done on July 29 which is still well within the proper planting season. If the seedlings reached a height of 60 centimeters at two weeks ahead of schedule (July 15), then planting can be done on July 1 which is also well within the planting season. In other words, there is enough latitude for possible errors in the approximations.

The danger arises, though, when the target date for planting is set at the beginning or at the end of the planting season. In the former, if the actual period of growing the seedlings to a particular size is shorter than the approximated period, then the seedlings will be too large at the target date for planting. This can not be remedied because the planting date can not be advanced. On the other hand, if target date for planting is set at the end of the planting season and the actual period of growing the seedlings is longer than the approximated period, the seedlings will still be too small at planting time. This also can not be remedied because the planting date can not be postponed. If possible, therefore, target dates for planting should be set at about the middle of the planting season so that Table 2 in this paper can be used without so much risk.

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MANAGEMENT PLAN . . .

(*Continued from page* 32)

2. Responsibility for maintenance of range improvements.
3. Protection of watershed areas and conservation of wildlife.
4. Permit or lease agreement.

Graphic: This will consist of a map of the area where condition and trend are colored. The map will show:

1. Area and management unit boundaries.
2. Plan of use for the area.
3. Inspection points (key areas, trend and study plots, etc.
4. Range improvements.

This proposed management plan should not be regarded as an end-all of plans. It should rather be used only as a model for the preparation of a management plan for a particular area. It is to be recognized that different areas of grazing in the country varies in their conditions and needs. And these variations of the contributing factors must be considered in the preparation of a management plan.

Should the government come to realize how important is our grassland (range & pasture) to our economy and policies will be laid down to put this resource into full operation, the writer is more than willing to render service. The result of the appraisal on world's population, food and economic problems conducted by the FAO under the United Nations should serve as a writing on the wall to our administrators and policy-makers. The result indicates that population growth is outpacing food output at a rate that could mean wide-spread starvation in the next five to ten years. The outlook is serious in the developing region of Africa, Latin America, and the Far East, which includes the Philippines. The only solution to this problem, is to increase food production ten-fold the present rate. And our grazing lands have very much to offer if only given proper attention and efficient management to put them into production.

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V E R D I C T

A New York attorney made such a bombastic closing argument that the jury seemed overwhelmed by his sheer volume. As the reverberations died away, his opponent rose.

"Listening to the thunderous appeals of my learned friend," he began, "I recalled an old fable. A lion and an ass agreed to slay the beasts of the field and divide the spoils. The ass was to go into the thicket and bray to frighten the animals out, while the lion to lie in wait and kill the fugitive as they emerged. In the darkest part of the jungle, the ass lifted his awful voice and brayed and brayed.

"The ass was intoxicated with his own uproar, and wanted to see what the lion thought of it. With a light heart, he went back and found the lion looking about doubtfully.

" 'What do you think of that?' said the exultant ass. 'Do you think scared 'em?'

" 'Scared 'em?' repeated the lion in an agitated tone. 'Why, you'd 'a scared me if didn't know you were a jackass!' "

The jury's verdict went to the quiet lawyer.

Forestry in the News

₱4-M FORESTRY RACKET

6 Mindanao officials logging firms linked

Ranking forestry officials in six Mindanao provinces were yesterday linked to the loss of ₱4.5 million in surcharges in timber revenues and to illegal exploitation of the country's forest reserves.

ASAC report

The charge was made by the Anti-Smuggling Action Center, in a report turned in by retired Brig. Gen. Ramon Z. Aguirre, ASAC regional director for eastern Mindanao.

Aguirre's report, contained in seven folders, also implicated several logging firms in Davao, Bukidnon, Cotabato, Zamboanga del Sur, Surigao and Agusan to rampant exploitation of forest reserves.

Illegal cutting

The report, to be submitted to President Marcos, alleged that the forestry officials tolerated:

1. Illegal cutting of timber from forest reserves for certain consideration.

2. Overcutting in excess of the allowable quota for which no surcharge was made.

3. Exportation of illegally-cut timber.

4. Loading when these logs did not undergo proper inspection.

5. Log substitution.

Submitted with the report were intelligence reports, affidavits of witnesses and other documents proving the negligence of the forestry officials.

—The Manila Times, January 28, 1967

* * *

FORESTRY REQUESTS MORE AID

Director of Forestry Antonio A. Quejado yesterday bewailed the meager financial support the government was giving for forest protection and conservation even as he vowed he would work for the increase of the agency's budget for the coming fiscal year.

Quejado said the bureau could not hire the necessary number of technical and non-technical personnel needed to carry out programs of the agency due to lack of funds.

Under the law the Bureau of Forestry is charged with the protection, conservation and supervision of the country's forest resources.

Deficiency

Quejado said laxity and deficiency in the implementation of the bureau's duty could result in the destruction of forests.

Considering the fact that the Philippines is predominantly an agricultural country, the efficiency or deficiency of forestry programs could spell the future of this country, he added.

The director said he was aware of the clamor for accelerating forest protection and conservation. However, he said, the number of forest officers scattered all over the country was so little compared to the vast forest lands they were bound to administer, protect and conserve.

"This points out the need for increasing the appropriation of the bureau so that the agency can function efficiently and be able to live up to the expectation of the people," he said.

According to Quejado he had recommended for inclusion in the 1967 national budget items for 1,000 scalers, 1,000 forest guards, 500 forest land appraisers and foresters and 200 lumber graders.

Meanwhile, Quejado said the bureau would hold the first regional seminar for forest guards in Baguio City starting January. He said the seminar was designed to keep forest wardens and forest guards with modern forest protection techniques.

—Manila Chronicle, December 21, 1966

* * *

FOREST CONSERVATION TOPS BUREAU PROJECT

Forest activities during the fiscal year ending June 30, 1966 were geared mainly toward the accomplishment of government programs and objectives on forest conservation, protection, proper utilization and watershed management it was learned from Forestry Director Antonio A. Quejado.

The forestry director said along the conservation and forest utilization aspects of the bureau's activities, efforts were accelerated for the adoption by forest concessionaires of the sustained yield management program based on selective logging. He said 94 licenses with a total area of 751,527 hectares were placed under the system.

Quejado also said the grouping of small timber licenses, particularly those less than 20,000 hectares and with 25,000 cubic meters of allowable cut, pursuant to Presidential directives have been started.

The director said the drive of the bureau and the Philippine Constabulary against illegal loggers have also been successful. Seized illegal logs were turned over to the Philippine Army for use in the construction of pre-fabricated school houses.

A total of 787 kaingin cases were detected. Of these 442 cases were filed in court and 443 were pending submission to the court. There were 64 convictions while 23 cases were dismisesd due to insufficiency of evidence. A total of 651 hectares of public forest were cleared and 450 persons have been accused for destruction of public forest.

Quejado said all permits of log and lumber dealers without timber concessions were cancelled. This is expected, he said, to stop timber smuggling and illegal logging.

—Sunday Times, January 1, 1967

* * *

MARCOTING METHODS EXPLAINED

COLLEGE, Laguna, Dec. 31 — (PNS) — Kauayan-Tinik, (*bambusa blumeana*) can be reproduced asexually by marcoting or layering with a high result of percentage survival.

This was discovered through a study of the various methods of propagation conducted by Artemio C. Cabanday at the Bambusetum of the college of forestry, College, Laguna.

Results of the study show that marcoting yields the highest percentage survival among the four methods applied.

Marcoting gives 69.9 per cent survival followed by unsplit cutting with 60.8 per cent, split cutting with 59.7 per cent and the ground layerage with 27.8 per cent survivals.

Furthermore, results show that the best portion of the bamboo to be marcotted is taken at the basal section because of the presence of primodial roots.

In the marcoting of bamboo, according to Cabanday, more time and money are needed in the planting operations and in the preparation of planting stocks.

However, these factors can be reduced to minimum by the improvement of propagating techniques, he said.

—Sunday Times, January 1, 1967

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FOREST CONSERVATION STILL NO. 1 PROBLEM

Nicolas Capistrano, Jr., president of Philippine Lumber Producers Association, said yesterday the main problem of the timber industry "still is forest conservation."

In a report to the PLPA board after his arrival from abroad where he attended the annual meeting of the U.S. National Hardwood Association in Toronto, Canada, Capistrano said:

"The Philippine timber industry, however, was doing its share to solve this problem and lately, the government had intensified its campaign against squatters and shifting cultivators who contribute to a large measure in the depletion of the forest resources of the country."

Other Problems

Capistrano enumerated the other problems of the industry as (*a*) higher freight rates in the Philippines; (*b*) absence of a lucrative local market to absorb the fall off grades; (*c*) low utilization of timber because of lack of integration of our operations; and (*d*) lack of incentives on the part of our government.

"There is a growing concern in the Philippines about the volume of logs being exported and what has been decried for many years is that those exported to Japan, Korea and Taiwan are competing against the Philippines in the United States wood market."

According to Capistrano, he reported in the Toronto meeting that the trend in lumber exports in the Philippines has been on the downgrade and even "our exports of plywood are also being displaced" by Taiwanese and Korean plywood because of numerous problems facing the local wood industries.

Reappraisal

"The timber industry in the Philippines is going through an agonizing reappraisal of its problems

and came to the conclusion that on the matter of freight rates, there is nothing much we can do about it."

"The high cost of loading in the Philippines precludes a lowering of freight rates. The solution therefore is for lumber shipped to the U.S. to be shipped as finished products or semi-finished (as blanks) so as to reduce the volume of the cargo."

—Manila Chronicle, December 31, 1966

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UP EXTENSION OFFICE OPENED

BAGUIO CITY — The University of the Philippines College of Forestry, through its department of forestry extension, opened its regional forestry extension office in Baguio City recently. This was learned from Forester Carlos V. Glori, officer-in-charge of the regional office.

The regional office will engage in forestry extension work in the Mountain provinces, Ilocos region, and the Cagayan valley. Its primary purpose is to create awareness on the importance of the national forests.

To achieve the goal of forest conservation, the regional forestry extension office cooperates and coordinates with the bureau of forestry, reforestation administration, parks and wildlife office, and other government entities.

Located at 127 Abanao street, just a stone's throw from the city hall, the regional forestry extension office is now ready to serve the people of the Mountain provinces, Ilocos region, and Cagayan valley, Glori said.

—The Manila Times, January 23, 1967

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REFORESTATION PROGRAM IN ABRA BARED BY FIRM

Araneta Pulp and Paper Co. proposed a gigantic reforestation plan in the barren mountainside of Abra province involving the planting of Kaatoan Bangkal, a "miracle tree" that grows 20 times faster than other Philippine woods.

Hilarion M. Henares Jr., president of the company, said that in the period from June to December this year, the company plans to plant 2,565,000 seedlings, 3,485,000 seedlings in 1968 and 4,025,000 seedlings in 1969 and 1970. The seedlings will be planted in an area of some 12,000 hectares which it requested from the government on a "woodland lease."

Kaatoan Bangkal, when used for pulp, has the same characteristics as white lauan (Philippine mahogany), but grows amazingly fast, achieving in eight years a breast height diameter of 23 centimeters, a clear height of eight meters and a volume of 0.20 cubic meters.

In comparison, Benguet pine in the same eight years grows to a breast height diameter of eight centimeters, a clear height of six meters and a volume of only 0.01 cubic meter — one-twentieth of the volume of Kaatoan Bangkal.

—Manila Bulletin, January 22, 1967

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FORESTRY CHIEF CLARIFIES MT. APO LOGGING REPORTS

Director of Forestry Antonio A. Quejado said yesterday his office had no jurisdiction over the Mt. Apo and Mt. Matutum national parks in Davao and Cotabato.

The administration, management and protection of the forests thereon were legally under another (Parks and Wildlife Office), he said.

Quejado made the clarification in the wake of reports that illegal loggers had been rushing "their operations day in and day out in the Mt. Apo national park and at the Mt. Matutum reservation" in defiance of a presidential directive cancelling all timber licenses and stopping logging operations in the areas.

If it was true that illegal logging was going on in the Mt. Apo and at the Mt. Matutum national parks, Quejado said, the people should look for the proper government office to blame.

Extend Cooperation

As far as the forestry bureau is concerned, Quejado said, the forests at the Mt. Apo national park and the Mt. Matutum reservation were off-limits for timber utilization and should be protected and conserved for their aesthetic values.

Quejado, ordered forestry regional director Higinio Rebosura and district forester Jose Calip of Davao City and District Foresters Samuel Fortich and Emiliano Sonico of Cotabato to look in the reported illegal logging activities and "extend full cooperation in the drive to stop the destruction of the forests."

According to Quejado, his office will always cooperate with other agencies in implementing all forestry directives of President Marcos even as his

agency was itself tied up carrying out its own programs and objectives on forest conservation.

* * *

ISSUE NEW RULES ON TIMBER PERMITS

Malacañang laid down new rules for the issuance of new or renewed timber licenses, the granting of additional timberland for logging, the adjustments in area, and the size of timberland allowable annually for logging.

The new rules were embodied in a letter of Executive Secretary Rafael M. Salas to Vice President Fernando Lopez in his capacity as secretary of agriculture and natural resources.

The executive secretary said the power to decide requests for renewal of timber licenses lies with the department of agriculture and natural resources. Only those which by law must be coursed through the Executive Office will be entertained by that office.

Small timber licensees, according to the new rules, with concessions of less than 20,000 hectares and an annual allowable cut of less than 25,000 cubic meters may not have their licenses renewed unless they have a total holding area of not less than 20,000 hectares. Annual allowable cut for this area should be not less than 20,000 cubic meters, which is the new minimum set for a forest working unit.

However, in order that a licensee may be allowed to form a working unit with others, he should have an area of not less than 2,000 hectares. All licenses for an area less than 2,000 hectares shall no longer be renewed irrespective of whether the licensees are in good standing or not.

Salas also said all those concessions of over 2,000 hectares but no more than 20,000 hectares shall be automatically renewed, provided the licensees are in good standing.

However, the automatic renewals of these areas will only be for the purpose of allowing them to consolidate with other areas, in order to attain the ultimate minimum working unit of 20,000 hectares with an annual allowable cut of 25,000 cubic meters.

On the renewal of big timber licenses, Salas said timber licenses for areas of 20,000 hectares or more, but not exceeding 100,000 hectares, and with allowable annual cut of not less than 25,000 cubic meters may be renewed subject to certain terms and conditions.

On the timber licenses, Salas said no new timber license shall be issued for commercial utilization covering an area less than 20,000 hectares, but not more than 100,000 hectares.

However, applications for timber licenses covering areas less than 20,000 hectares which have already been favorably recommended for approval by the bureau of forestry and are pending action in the department of agriculture and natural resources should, if in order, be approved with the condition that the licensee shall comply with all the requirements provided in the renewal of big timber licenses.

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PUYAT JR. ELECTED PRESIDENT OF PCWI

Jose G. Puyat, Jr. of the Gonzalo Puyat & Sons timber division has been unanimously elected president of the Philippine Chamber of Wood Industries for the year 1967.

The annual election took place at the chamber office on the Escolta.

Puyat was previously vice president for northern Mindanao.

Outgoing president Gaudencio S. Mañalac, who had served twice as president, was unanimously acclaimed as PCWI honorary president for life.

Other newly elected officers are Teodoro C. Araneta, executive vice president; Jose E. de la Rosa, vice president for western Mindanao; Constancio Maglana, vice president for southern Mindanao; Policarpio del Rosario, vice president for northern Mindanao; David M. Puzon, vice president for northern Luzon; Romulo Petines, vice president for Visayas; Apolonio V. Dionisio, treasurer; Conrado C. Alcantara, Nicolas Lansigan, Democrito O. Plaza, Rosauro Dongallo, Raoul Beloso, Salustiano R. Oca and Graciano Borja, directors.

Dean Florencio Tamesis was reelected chairman of the advisory committee.

Ex-officio members of the board are Arturo Say, president of the northern Luzon PCWI chapter; Louis Johnston, president of the Zamboanga Small Concessionaires and Sawmills Association: Uldarico Mosquito, president of the PCWI chapter in Agusan; and Dee Cho of Dee Cho Lumber Co.

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'FORESTS WILL BE GUARDED'

BAGUIO CITY, Jan. 19 — Acting Forestry Director Antonio Quejado said here Monday that the bureau can still protect and conserve the remaining public forest in the country.

Quejado made this statement in a speech delivered during the opening day of the 1st Regional forest guard seminar and training on forest protection at the Patria Hall of this city.

He said that with everyone in the bureau working as a team and with public cooperation our remaining public forest can still be protected and conserved.

Quejado said that forest protection constitutes the principal backbone of the forestry bureau's activities. This is in accordance with presidential directives, he added.

He said that this mission of the bureau can only be achieved through seminars and forest protection trainings all over the country.

He pointed out the need of updating our forest laws and regulations in order to achieve the goal of conserving and protecting our remaining public forest in the country.

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U.S. FORESTER ARRIVES

American forester Thomas Sears arrived in Manila recently under the United Nations Development Program to bolster the 5-man F.A.O. pilot project in demonstration and training in forest, forest range and watershed management of the bureau of forestry.

Under his terms of reference, Sears will demonstrate and implement proper forest grazing and range management practices within a pilot area, carry out surveys and collect the necessary data on the conditions of forest grazing and range land and the socio-economic problems involved.

He will also advise on the technical, scoial and economic feasibilities for the improvement and rehabilitation of grazing land, develop an extension program for farmers and train his Filipino counterpart on all aspects of forest management with special reference to watershed conservation.

Previous to his Philippine assignment, Sears was a team member of similar F.A.O. pilot projects in forest and watershed management in Lebanon and in Greece. For 25 years, he was also a forest officer in charge of forest recreation, land uses and watershed management in various park and forest reservations of the United States Forest Service. Sears holds a B.S. in forestry and range management from the Washington State University and is a member of the American Society for Range Management.

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QUEJADO RENEWS APPEAL TO LOGGERS

Forestry Director Antonio A. Quejado reiterated the other day his appeal to the timber concessionaires and other forest-users to abide by the terms and conditions in their licenses.

He warned he would not hesitate to recommend the cancellation of the licenses of those found guilty of violating forest laws. Quejado asked loggers of good standing that while they are engaged in the pursuit of profit from logging they should at the same time consider the greater interests of the nation by helping actively the bureau of forestry in its forest protection and conservation program.

Quejado hoped that Congress will approve his request for additional appropriation for forest guards, foresters, scalers, lumber graders and other items.

The director also bared that the bureau forces mobilized against forest destruction against forest destruction throughout the country would be strengthened with the training of hundreds of forest guards in Baguio City starting Jan. 16. After the training seminar, the forest guards would be strategically deployed in the different critical forest areas of the country, Quejado said.

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SMALL TIMBER LICENSEES HIT

Small timber concessionaires will soon be out of business.

The department of agriculture and natural resources will no longer renew their licenses in compliance with the new rule set by Malacañang stopping timber-cutting by loggers with timber concessions of less than 2,000 hectares.

Concessionaires may renew their licenses if they merge their concessions to a total of 20,000 hectares with an annual cutting capacity of 25,000 cubic meters.

According to the new rule, no new timber license shall be issued for commercial utilization covering an area less than 20,000 hectares but not more than 100,000 hectares.

The new rule also set a government policy not to grant additional cut to loggers.

An exception is the clearing of timberland transferred to the bureau of lands to be used for agriculture. The licensee of the area will be granted additional cut to clear the land.

* * *

Proper Safeguards

COLLEGE, Laguna, Jan. 10 (PNS). — Acting Forestry Director Antonio Quejado has pledged to intensify all activities of his office this year with a view to drawing the greatest benefits from forests in terms of national income and employment income and employment but with the least volume of timber drain.

He said the bureau would promote a more favorable business atmosphere and encourage the maximum utilization of the country's timber wealth under proper safeguards prescribed by the bureau.

Quejado said the bureau had started grouping small licensed timber areas into working circles of at least 20,000 hectares each with minimum annual allowable cut of 25,000 cubic meters.

He explained that the policy was designed to give licensees a chance to establish wood processing plants and enable forest officers to do effective supervision over logging operations.

These areas, according to Quejado, will be placed strictly under selective logging.

* * *

FILIPINOS WELCOMED TO BORNEO TIMBER

The Malaysian state of Sabah in North Borneo is inviting Philippine timber industry leaders to invest in the development of its natural resources.

At a luncheon conference at the Philippine Columbian clubhouse, Inche Harris bin Mohamed Salleh, minister of finance for the state of Sabah, officially invited members of the Philippine Lumber Producers Association headed by Nicolas Capistrano Jr., to invest in agricultural and timber joint ventures.

Salleh assured Filipino businessmen of fair treatment of their capital. He said his government was "more than interested in offering this opportunity to its next-door neighbors — the Filipinos — not only because of geographical location but because of the fact that they both come from the same stock, the Malayan race."

He said that among others, the Philippines possessed "more than any other nation" the know-how and the capital that would help in the full development of the agricultural and timber resources of Sabah.

The Sabah official pointed out that the two states are "almost adjacent" and belong to the same zone in the tropics. The Philippines in fact has a pending territorial claim on Sabah.

Salleh was accompanied by Inche Wee Chun Kee, permanent secretary of the Sabar ministry industry of natural resources, and Robert Clifford, United Nations economic adviser in Sabah, Harry Case, representative of the Ford Foundation, Dr. Warren Cornwell, resident representative of the United Nations Development Program in the Philippines, and Dr. J. Forspusher, representative of the UNDP stationed in Manila.

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FORESTRY CHIEF MAY RENEW LOG LICENSES

Timber licenses for areas covering 2,000 hectares and not more than 20,000 hectares will still be recommended by the Bureau of Forestry for renewal until May 13, 1967, provided that the concessionaries are of good standing and had complied with regulations.

All other licensees with the same areas or less and who have failed to form or join the required working units will not have their licenses renewed but will be given until May 13, 1967 within which to liquidate their businesses.

Forestry Director Antonio A. Quejado said yesterday he was certain of the soundness of the presidential directive on the matter and vowed to enforce them to the letter no matter who gets hurt.

Quejado said that to be considered a license of good standing, the concessionaire must satisfy the requirements of Forestry Circular No. 25, series of 1964:

1. Attestation by the licensee of the certification of the bank as to his cash deposit;

2. A statement by the licensee, attested by the district forester concerned, that the former is the one actually and directly operating the licensed area;

3. A list of logging equipment and machinery owned or leased by the licensee, together with the corresponding evidence or proof of ownership or leasehold right; and

4. A list of personnel employed by the licensee and their registration with the Social Security System.

Quejado also said the following licenses will not be required to form or join working units as required by the President:

1. Miner's timber license of corporations or individuals engaged in the development of their registered mining claims;

2. Isolated forest areas, such as forested islands or islets; areas surrounded by alienable or disposable lands already placed under cultivation were intended for permanent forest production, with no adjoining areas available for consolidation but with a processing plant dependent upon them;

3. Special timber licenses, such as those granted to individuals or corporations the purpose of which are for the manufacture of "bakya," wood carving, pencil, match and similar industrial purposes; and those granted to pasture leases for the purpose of cutting trees within the pasture areas for the construction of fenses and sheds of animals or for the improvement of their pasture areas granted under existing laws.

4. Public and private gratuitous licenses granted for non-commercial purposes.

According to Quejado licenses covering less than 2,000 hectares will not be renewed definitely. However, he said, a person holding two or more licenses may be allowed to consolidate his areas under O. T. license to satisfy the minimum requirement of 2,000 hectares provided that the areas are adjacent and contiguous.

* * *

SMALL TIMBER OPERATORS FACE OUSTER

Small timber concessionaires will soon be out of business.

The department of agriculture and natural resources will no longer renew their licenses, in compliance with the new rule set by Malacañang stopping timber-cutting by loggers with timber concessions less than 2,000 hectares.

Only concessionaires with over 2,000 hectares may renew their licenses if they merge their concessions to a total of 20,000 hectares with an annual cutting capacity of 25,000 cubic meters.

According to the new rule, no new timber license shall be issued for commercial utilization covering an area less than 20,000 hectares but not more than 100,000 hectares.

The new rule also set a government policy not to grant additional cut to loggers.

An exception is the clearing of timberland transferred to the bureau of lands to be used for agriculture. The licensee of the area will be granted additional cut to clear the land.

However, Vice President and Secretary of Agriculture Fernando Lopez allayed fears of small loggers "going out of business."

Lopez explained that with regard to renewals of licenses with areas of less than 2,000 hectares the general rule is to withdraw renewals unless (1) they have formed or are actually forming themselves into working units (corporation, partnership or cooperatives) with a total holding area of not less than 20,000 hectares of contigous or adjacent territory with an annual allowable cut of 25,000 cubic meters, and (2) had their license already duly approved by the secretary of agriculture and natural resources and delivered to the licensee who is in actual operation of the area.

According to the vice president, the presidential directives require that licenses for areas covering 2,000 hectares and not more than 20,000 hectares will be automatically renewed if they are in good standing.

It was explained that the exceptions will be allowed only until May 13, 1967 when they are required to consolidate into working units of not less than 20,000 hectares but not exceeding 100,000 hectares.

Lopez said a person holding two or more licenses may be allowed to consolidate these areas under ordinary timber license to satisfy the minimum requirement of 2,000 hectares provided the areas are adjacent or contiguous.

Meanwhile, a forestry expert said the country's forest industries employ 160,000 workers and bring in annually 170 million dollars in foreign exchange.

The expert, Hardy L. Shirley, dean of the college of forestry, New York State University said, "without any increase in number of trees cut, these industries can provide jobs for more than twice this number of people and increase their contribution to the national economy."

According to Shirley, the key to realizing such a desirable goal by the wood industries generally is an adequate supply of highly specialized foresters, wood technologists and industrial managers.

These observations were included in a 100-page report Shirley had submitted to Dr. Warren Cornwell, resident representative of the United Nations development program in the Philippines.

Shirley is the head of a three-man food and agriculture organization team.

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AIRBORNE FOREST RANGERS FORMED
An hour's flight over pine forest bares bald hills

By GUILLERMO E. MAMOYAC

BAGUIO CITY, Feb. 1 — It took a one-hour plane flight over the Mt. Province to realize the urgent necessity of protecting and conserving the famous pine forest, which is fast dwindling on account of indiscriminate cutting of trees.

The idea of an aerial reconnaissance of the pine forest in the Mt. Province was conceived for the first time by acting Director of Forestry Antonio A. Quejado in connection with the current first regional forest protection training seminar at Patria Hall, this city.

View from air

Aboard a Philippine Air Force plane, which was specially arranged with President Marcos, forestry officials and the 60 seminar participants took to the air in three flights to see for themselves the actual remaining pine forest in the Mt. Province, going farthest north up to Mount Data national park.

Visibility being clear at the time, one could see below the huge mountain lakes impounded by the Binga and the Ambuklao hydroelectric projects of the National Power Corporation. They also flew over the 100,000-hectare watershed from which forest vegetation is gradually disappearing.

Watershed area

The situation is more alarming on the Bontoc side, where the mountains are brown-bare, including the headwater areas of the Agno and Chico rivers.

Skirting the eastern bank of the Agno river, the PAF plane piloted by 1st Lt. Ciriaco Reconquista with 2nd Lt. Isauro Custodio, as co-pilot, headed for the north at an elevation of 9,200 feet.

In its flight back to the Loakan airport, Baguio City, the plane followed the Halsema Mountain Road from Bauko, Bontoc, exposing to full view under a clear weather the devastation of the forest caused by the multi-million-peso vegetable gardening industry up to Km. 52, Atok, Benguet.

No less than six large patches of clearings right on top of Mount Data were visible from above, surrounded by brownish-green vegetation of mixed growth of trees.

Several communities built by the vegetable industry along the Halsema Mountain Road were equally discernible from the air, with the bare, terraced mountains surrounding them.

Devastation

Portions of the Ambuklao watershed, which were practically laid bare by timber concessionaires, were also visible. The licenses covering these areas have been cancelled.

Among those who joined the first flight were Director Quejado, Regional Forestry Director Gabina Montillo, Macid Y. Gulcur of the United Nations, manager of the Ambuklao pilot forest project; Loloy Caneda of the press for Mindanao and Sulu; Jose Jison, president of the Davao Press and Radio Club; Ed. Madrazo of Davao City; Ram Morada, former vice mayor of Davao City; and participants in the seminar.

Forest club

Another step taken by the participants in the seminar was the organization recently of the Forest Conservation Club, which will form the nucleus of a national movement to protect and conserve the remaining public forest of the country.

The move taken by the 60 participants and 15 observers had quickly drawn keen interest of forestry officials, headed by acting Forestry Director Antonio A. Quejado.

New movement

At the induction of the FCC officers, Forester Ceferino Abella, chief of the forest protection and watershed management division encouraged the forest guards to keep their club active and make it a nucleus of a national movement, which will spark forest protection-consciousness among the citizens.

Quejado also promised both technical and financial assistance of his office to keep the club active and eventually involve more than 2,000 forest guards as members of the FCC.

Assignments

At the end of their training on Feb. 9, the seminar participants will be assigned to their respective areas in the 90,000-hectare watershed area of the Ambuklao and Binga hydroelectric dams of the National Power Corporation in Bokod and Itogon, Benguet.

After rendering field duties for a few weeks at their assigned sectors, they will be replaced gradually by casual employes, who will be drawn from the localities, where the forests under protection are located.

Forest guards

Meanwhile, the bureau of forestry, announced that the country will soon have a commando of crack air-borne-forest guards that can be quickly mobilized any time to stop forest destruction anywhere in the Philippines.

The forest guards will be ferried by Philippine Air Force helicopters to any point in the country and unloaded at any precise place for the purpose of apprehending illegal loggers, kaingineros, squatters and timber smugglers.

Forestry Director Antonio A. Quejado said his bureau was seriously considering the plan to train forest officers as airborne forest guards. This might yet be the key to the final solution of the problem of rampant illegal logging, timber smuggling and kaingin making, he added.

With PAF help

According to Quejado he had already made preliminary talks with PAF officials regarding the matter and was glad the Air Force officials saw the practicability and effectiveness of carrying out the plan as a means of combating all factors responsible for the destruction of our forest resources.

The director said in order that this plan can be successful, cooperation of other agencies is needed. Among those expected to participate actively in the program besides the PAF are airline companies and the local PC and civil officials, he added.

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SMALL LOGGERS GET NEW WARNING

After May 12 holders of timber licenses with areas below 20,000 hectares and annual allowable cut of 25,000 cubic meters will find themselves without concessions unless they have consolidated their leased areas with other licenses whose areas are adjacent to theirs or within a radius of 20 kilometers.

This was the warning issued the other day by Director Antonio A. Quejado as he reiterated the deadline for the compliance of the Presidential directive on consolidation of logging areas.

The director urged those who have already renewed their licenses and submitted to the bureau formal agreements to submit on or before May 12 the following:

1. O.T. application for the consolidated area duly accomplished, in the name of the holding company, partnership or association;
2. Capitalization, duly documented;
3. Equipment with supporting papers and ownership;
4. Incorporation/partnership papers, duly certified by the Securities and Exchange Commission; and
5. Remittance of required O. T. application fees and license fees.

Quejado said the bureau would issue four-year timber licenses covering the consolidated working units to the holding companies or partnerships upon submission of all requirements so that after May 12 operations under the new management (successor to the small O. T. licensees) can be conducted, thus causing no delay and inconvenience to the private sector.

Meanwhile, Quejado instructed information and public relations staff of the bureau headed by Amador J. Evangelista to conduct information and extension campaign throughout the country especially during the coming summer season when forest fire is prevalent. Acting PRO Melanio M. Gacoscosim has been coordinating with the rural broadcasters council on forestry radio programs. Assisting the bureau information men is assistant district forester Modesto T. Tobias.

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LOPEZ CANCELS LOGGING CONTRACT

Cancellation of the lease contract between the National Development Corporation and a logging firm has been directed by Vice President and Secretary of Agriculture Fernando Lopez.

The directive was prompted by a complaint of Gen. Ruben Maglaya, Fort Magsaysay commander, that a firm, a leasee of the NDC over logging rights in the 11,000 hectare Sabani Estate owned by the NDC in Laur, Nueva Ecija, has poached timber inside the fort reservation.

At the meeting in Diliman between Vice President Lopez, Secretary Constancio Castañeda of the office of economic coordination, Fort Magsaysay brass, NDC officials, Vice President Lopez directed total cancellation of lease contract if reports are confirmed.

During the meeting, Jose H. Panganiban, NDC general manager admitted that the reported logging firm, a certain Maglake logging Co. has acquired leasehold rights over the Sabani Estate. Secretary Castañeda and Panganiban agreed to immediately enforce the Lopez directive.

It was agreed during the meeting that the NDC with the cooperation of the reforestation nursery to reforest denuded areas within the Sabani Estate.

Present during the meeting were Vice President Lopez, OEC Secretary Constancio Castañeda, Gen. Ruben Maglaya, Fort Magsaysay commander: Undersecretray Isosceles Pascual for natural resources, Jose H. Panganiban, NDC general manager; Demetrio Brillantes, NDC assistant general manager and Jose Viado, chief reforestation administration.

Meanwhile, Forestry Director Antonio A. Quejado directed the other day forestry regional directors to conduct simultaneous training seminars for scalers and forest guards as well as other vital technical men in the field service to maximize their effectiveness in the implementation of the Presidential directives on forest management, utilization, protection and conservation.

In a meeting held recently at Davao City, the director also ordered the regional directors to strengthen the structural organization and manpower of their offices throughout the country especially in provinces where there are still forests.

Quejado said the first regional training seminar for Mindanao scalers is now going on in Maco, Davao. Handling the training program in Davao are forestry project coordinator Severino U. Nablo, division chief Jose R. Claveria and regional director Higinio Rebosura. They are assisted by district foresters Fernando Roy, Jose Calip and Amando Diasanta. The training site is in the Adecor compound in Maco, Davao.

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FORESTRY DEADLINE MAY 12

Forestry Director Antonio A. Quejado yesterday said small timber licenses which have not yet been consolidated into working units with minimum area of 20,000 hectares and allowable cut of at least 25,000 cubic meters have up to May 12 to comply with the order.

Quejado said any small timber license who fails to comply with this policy embodied in the Presidential directives of May 13, 1966 and January 7, 1967, will no longer be allowed to operate after the May 12 deadline.

Forest policy

According to Quejado the order for the consolidation of small timber licenses was the administration's answer to the clamor of the public for a forest policy designed to protect and conserve the forest through wise utilization as well as accelerate processing of improved wood products.

He said as of last week a total of 93 working units involving 555 small timber licenses covering 2,802,450 hectares have already been organized with an aggregate allowable annual cut of 3,484,908 cubic meters.

He said 48 working units consisting of 157 small timber licenses were in Mindanao; 38 consisting of 367 small licenses were in Luzon; and 7 in the Visayas consisting of 31 timber licenses.

Measures set

The director said his office has mapped out measures for the immediate issuance of timber licenses to qualified working units.

Quejado said the applications should be accompanied by the following:

1. Application and license fees
2. Registration papers with the Securities and Exchange Commission.
3. Commission bond
4. Proof of cash capitalization
5. Logging equipment certified by the local district forester
6. Development plan of the processing plant intended to be established.

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KAINGIN DRIVE ON

The bureau of forestry has launched a campaign against unlawful occupation and destruction of the public forests by squatters and kaingineros.

Forestry Director Antonio A. Quejado late last week ordered fieldmen to seek the cooperation of local police agencies and the Philippine Constabulary in the campaign.

According to Quejado forest destruction due to kaingin making and squatting is rampant during the summer season. He said kaingineros usually start clearing the forest at the start of the hot season and burn the cleared area after the debris has dried. More often the fire burns the adjoining timber stand, he added.

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Seniors 1966 - '67

ALBERTO ABORKA y DE LA PEÑA
Kalibo, Aklan
Bachelor of Science in Forestry
FRM-Silviculture
Ranger Certificate 1956
RA Pensionado (4 semesters)
In-charge, RA Pensionados (1966-67)
Sgt.-at-Arms, Senior Class (1966-67)
Member, UPSCA

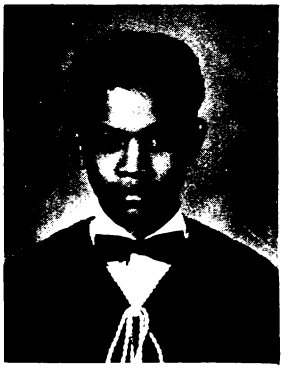
PEDRO AGANAD y RABARA
Proj. 3, Quezon City
Bachelor of Science in Forestry
FRM-Timber Management
Senior Forester, Bureau of Forestry
BF Pensionado (1965-67)

ORLINO ANCHETA y PADRE
Banban, Bangui, Ilocos Norte
Bachelor of Science in Forestry
FRM-Logging Engineering
Member, Beta Sigma Fraternity

BONIFACIO APURA y AGUINALDO
Tagum, Davao
Bachelor of Science in Forestry
FRM-Logging Engineering
Brother Historian, Alpha Phi Omega (1967)
Member: Senior Basketball Team
Davaweños Club, Los Baños

ANACLETO BERNARDO y BAUTISTA
Gen. Tinio, Nueva Ecija
Bachelor of Science in Forestry
Senior Forester, Bureau of Forestry
BF Pensionado
Ranger, CS Eligible, 1955
Forester, CS Eligible, 1959
PRO, Pensionado Club (1965-67)
Athletic Manager, FSBO (1966-67)

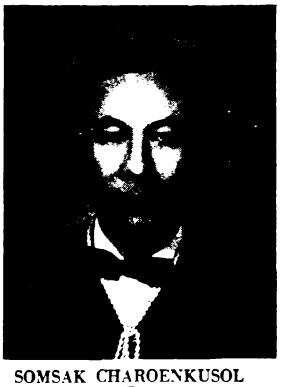
JULIO BINCAY y ROJAS
Lambajon, Baganga, Davao
Bachelor of Science in Forestry
FRM-Timber Management
***PRO*, Junior Class (1966)**
***Member*: Alpha Phi Omega Fraternity**
Junior Basketball Team (1965-66)



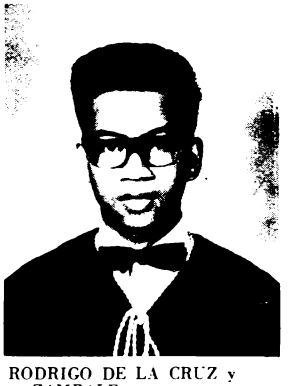
MANUEL BONITA y LIBRES
Guindulman, Bohol
Bachelor of Science in Forestry
FRM-Logging Engineering
Entrance Scholar 1963
University Scholar (1 semester)
College Scholar (6 semesters)
RA Scholar (8 semesters)
Secretary, FSBO (1966-67)
Auditor: Junior Class (1965-66)

VICTOR BUENAFLOR y DEOCAMPO
Surigao, Surigao del Sur
Bachelor of Science in Forestry
FRM — Logging Engineering
Bureau of Forestry Pensionado (8 semesters)
Vice-Chairman, Forestry "Y" Club
Business Manager, FSBO (1965-67)
Business Manager, FORESTRY NOTES

VADANA DAMASIDHI
Royal Forest Department
Bangkok, Thailand
Bachelor of Science in Forestry
Thai Government Pensionado (4 semesters)
Member: Pensionado Club
UPCF Soccer Team
International Club



SOMSAK CHAROENKUSOL
Royal Forest Department
Bangkok, Thailand
Bachelor of Science in Forestry
Member: Pensionado Club
UPCF Soccer Team
International Club

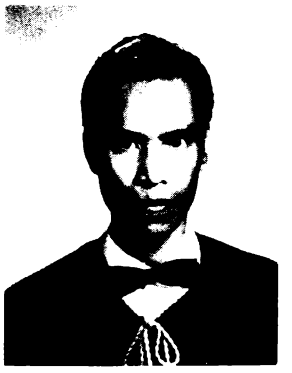


RODRIGO DE LA CRUZ y ZAMBALE
Baloling, Mapandan, Pangasinan
Bachelor of Science in Forestry
(Forest Utilization Engineering)
BF Scholar (5 semesters)
Treasurer, Junior Class (1965-66)
Business Manager, Senior Class (1966-67)
PRO, UPSCA (1966-67)
Managing Editor, FORESTRY LEAVES (1966-67)
News Editor, FORESTRY LEAVES (1965-66)

PEDRO GALAPIA y SACLAYAN
Namuac, Sanchez Mira, Cagayan
Bachelor of Science in Forestry
FRM-Range Management
BF Pensionado (4 semesters)
Sgt.-at-Arms, Senior Class (1966-67)
Junior Class (1965-66)
Guardian of the Coffers, Beta Sigma Fraternity
Member: Pensionado Club

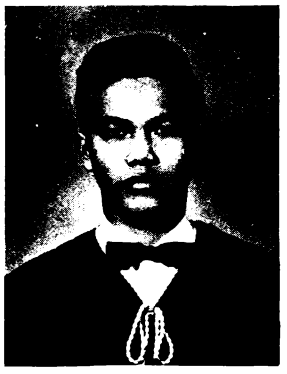
VICTOR GUYOT y TECSON
Cebu City
Bachelor of Science in Forestry
FRM-Silviculture
College Scholar (1 semester)
RA Scholar (8 semesters)
Vice-President, Sophomore Class (1964-65)
Rep. to SBO, Junior Class (1965-66)
PRO, UP Varrons Ltd.
Member: UPSCA
Pensionado Club
Softball Team (UPCF)
Senior Class Debating Team

MARIANO JURADO y PASCUA
Amlang, Rosario, La Union
Bachelor of Science in Forestry



MARIANO LACAP y CADIZ
Labrador, Pangasinan
Bachelor of Science in Forestry
FRM-Watershed Management
BF Pensionado
Auditor, Junior Class (1965)
Member, Pensionado Club

BALDOMERO LACCAY y DINU
Dupax, Nueva Vizcaya
Bachelor of Science in Forestry
FRM-Logging Engineering
College Scholar (1 semester)
BF Scholar (7 semesters)
Supreme Fellow, Zeta Beta Rho Honor Fraternity (1966-67)
Fellow Scribe, Zeta Beta Rho Honor Fraternity (1965-66)
PRO, Freshman Class (1963-64)
Secretary, Sophomore Class (1964-65)
Member: UPCF Basketball Team and Track and Field Team (1966-67)
Pensionado Club (1963-67)



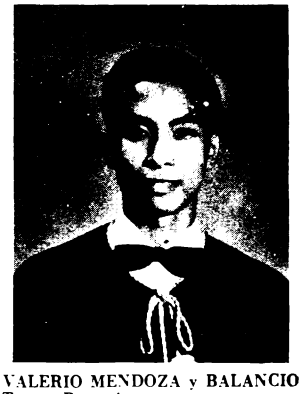
JOSE LORENZO y AGUSTIN
San Agustin, Isabela
Bachelor of Science in Forestry
FRM-Silviculture
Most Outstanding UPSCA applicant, 1965
Member: UP Varrons Ltd.
Forestry Y Club

RICARDO LUMBANG y MIRANDA
Arayat, Pampanga
Bachelor of Science in Forestry
FRM-Watershed Management
Entrance Scholar 1963
Member, UP Varrons Ltd.

ESMERALDO LUNA y CALINA
Pasuquin, Ilocos Norte
Bachelor of Science in Forestry
FRM-Timber Management

Ranger Certificate 1959
Bureau of Forestry Pensionado (4 semesters)

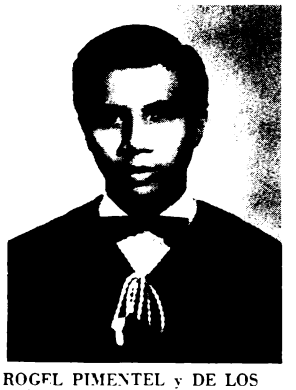
ISABELO MANGAYA-AY y CLAVITE
Bilar, Bohol
Bachelor of Science in Forestry
FRM-Silviculture
Treasurer, UP Varrons Ltd.
Member: UPSCA
UP Barangay



VALERIO MENDOZA y BALANCIO
Tayug, Pangasinan
Bachelor of Science in Forestry
(General Curriculum)
Ranger Certificate 1957

RA Pensionado (1966-67)
PRO, Senior Class (1966-67)
Vice-President, Freshmen Class (1957-58)
Member: Makiling Literary Club

NARCISO MINDAJAO y MULDEZ
Macrohon, Southern Leyte
Bachelor of Science in Forestry
FRM-Forestry Economics
Entrance Scholar, 1963
College Scholar (3 semesters)
BF Scholar (8 semesters)
Editor, FORESTRY NOTES (1965-66)
Delegate to the 1964 YMCA Conference (Baguio)
Best Speaker, FSBO Debate Series (1965-66)

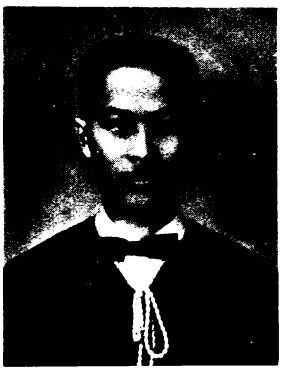


ROGEL PIMENTEL y DE LOS REYES
Tayug, Pangasinan
Bachelor of Science in Forestry
FRM-Timber Management
Rep. to SBO, Sophomore Class (1964-65)
Brother Historian, Alpha Phi Omega (1964-65)
Prime Chancellor, Alpha Phi Omega (1966-67)
Member, Forestry Y Club

DOMINGO PINAROC y DE PALMA
Bambang, Nueva Vizcaya
Bachelor of Science in Forestry
FRM-Forest Economics
Ranger Certificate 1957
B.F. Pensionado
Sgt.-at-Arms, FSBO (1966-67)
Member: Alpha Phi Omega Fraternity
Pensionado Club

EDUARDO PRESTOZA y FLORES
Casibong, San Jacinto, Pangasinan
Bachelor of Science in Forestry
(General Curriculum)
Sgt.-at-Arms, Senior Class
Member: UPSCA

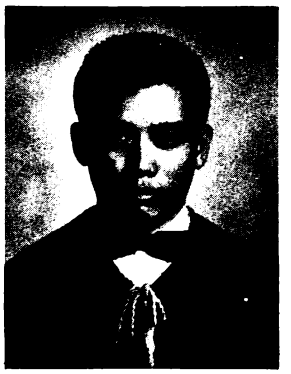
RUBEN RAYALA y BONGALA
Sta. Ana, Manila
Bachelor of Science in Forestry
FRM-Timber Management
Ranger Certificate 1958
BF Pensionado (4 semesters)
Secretary, Pensionado Club
Member: Editorial Board, SENIORS' BEAM
Zeta Beta Rho Fraternity



LEONARDO ROBERTO y ROBERTO
B. Menor, Bustos, Bulacan
Bachelor of Science in Forestry
FUE-Forest Utilization Engineering
College Scholar (1 semester)
B.F. Scholar (5 semesters)
Member: Makiling Literary Club
Zeta Beta Rho Honor Fraternity
Junior Debating Team
Senior Debating Team

LUTH SAAVEDRA y QUIÑONES
Basud, Camarines Norte
Bachelor of Science in Forestry
FRM-Logging Engineering
College Scholar (1 semester)
BF Scholar (7 semesters)
Athletic Manager, Senior Class (1966-67)
Vice-President, Junior Class (1965-66)
Staff Member: FORESTRY NOTES
SENIORS' BEAM
Member: Forestry Basketball Team (1965-66)
UPSILON SIGMA PHI

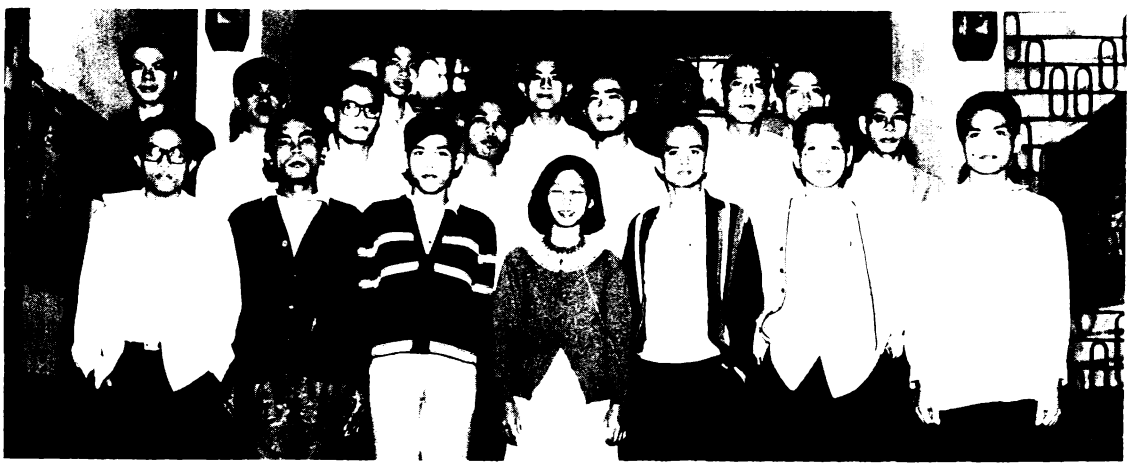
SALVADOR SAMBO y SUPNET
Claveria, Cagayan
Bachelor of Science in Forestry
FRM-Logging Engineering
Member, Gamma Kappa Rho Fraternity, Los Baños Chapter



TERENCIO SARIGUMBA y INTING
Cancatac, Corella, Bohol
Bachelor of Science in Forestry
FRM-Silviculture
College Scholar (4 semesters)
RA Scholar (8 semesters)

JOSE SERNA y SOCIAS
Cabugao, Ilocos Sur
Bachelor of Science in Forestry
Guardian of the Treasury, Alpha Phi Omega Fraternity
Councilor, FOREHA (1963-64)
Member: UPSCA

JOVENAL SERNA y SOLLA
Gonzaga, Cagayan
Bachelor of Science in Forestry
FRM — Timber Management
1st Vice-Grand Princep, Beta Sigma Fraternity
Member: UPSCA



FSBO COUNCIL

The officers and members of the Forestry Student Body Organization. Front row (l-r) Arturo Madlaing, Carmelito Sagrado, Rheophi Medina, Juliet Ulibas, Anacleto Bernardo, Edilberto Cajucom (adviser), Mateo Saagunto, Allen Torrenueva, Domingo Pinaroc, Florencio Macaranas, Mariano Machacon, Theodore Tabayoyong, (president), Victor Buenaflor, Esmeraldo Luna, Manuel Bonita, Baldomero Laccay and Terencio Sarigumba.

ELPIDIO TABACO y RUBIANES
San Vicente, Ilocos Sur
Bachelor of Science in Forestry
FRM-Timber Management
Ranger Certificate 1959
BF Pensionado (4 semesters)
Vice-Supreme Fellow, Zeta Beta Rho Honor Fraternity (1965-67)
Business Manager, Junior Class (1966)
Member: Pensionado Club
Senior Bowling Team

THEODORE TABAYOYONG y ROMERO
Laoac, Manaoag, Pangasinan
Bachelor of Science in Forestry
Wood Science and Technology
President, FSBO (1966-67)
Vice-President, FSBO (1965-66)
Member: Alpha Phi Omega International Collegiate Service Fraternity
UPCF Football Team (1966-67)
UPCF Track & Field Team (1965-67)

GREGORIO TEXON y ISRAEL
Lagonoy, Camarines Sur
Bachelor of Science in Forestry
FRM-Logging Engineering
Entrance Scholar 1963
BF Scholar (8 semesters)
Treasurer, UPSCA Forestry Chapter (1965-66)
Auditor, UPSCA Forestry Chapter (1966-67)
Treasurer, Senior Class (1966-67)
Member: Zeta Beta Rho Honor Fraternity
Pensionado Club

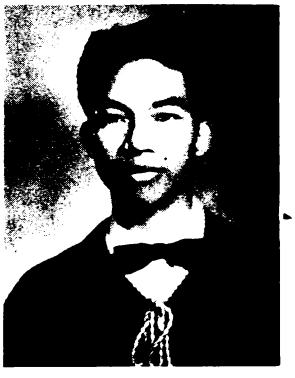
ISABELO TOBIAS y CARMONA
Baggao, Cagayan
Bachelor of Science in Forestry
FRM-Watershed Management
Ranger Certificate 1955
BF Pensionado (4 semesters)
Secretary, FSBO (1965-66)
President, Pensionado Club (1966-67)
Grand Princep, Beta Sigma Fraternity (1966-67)
Laurel Gold Medal, Oratorical Contest 1954
Gold Medalist, Oratorical Contest 1965
Team Captain, Senior Debating Team (1967)

CELESTINO TOLENTINO y OLIVAS
Magsingal, Ilocos Sur
Bachelor of Science in Forestry
FRM-Timber Management
Ranger Certificate 1959
BF Pensionado (4 semesters)
Asst. Guardian of the Coffers, Beta Sigma Fraternity (1966-67)

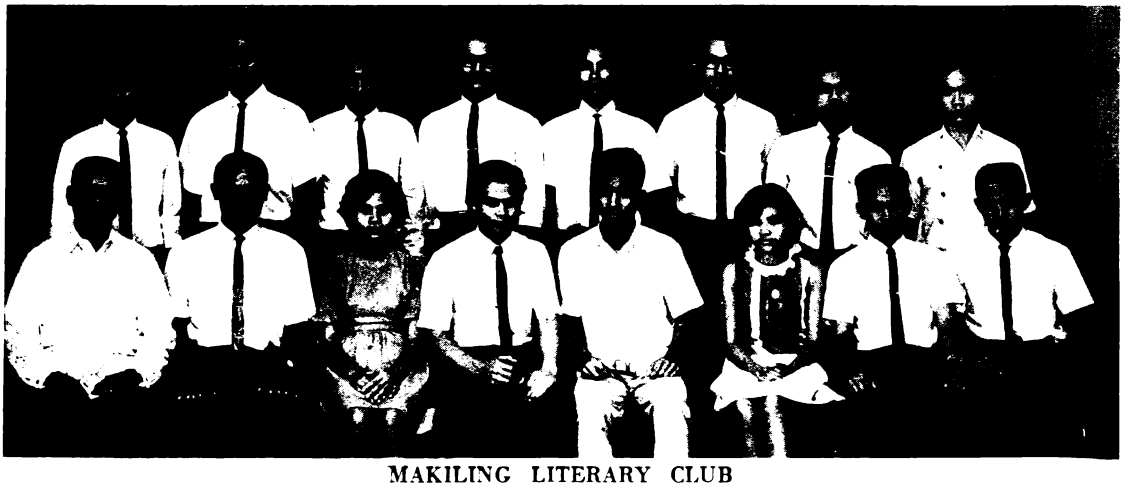
ALLEN TORRENUEVA y LIZASO
San Miguel, Catanduanes
Bachelor of Science in Forestry
FBS-Forest Ecology
Entrance Scholar 1962
BF Scholar (8 semesters)
President, Senior Class (1966-67)
Rep. to Student Council, FSBO (1965-66)

ANGELITO VALENCIA y RAMIENTO
Mabasa, Dupax, Nueva Vizcaya
Bachelor of Science in Forestry
FRM-Timber Management

Ranger Certificate 1965
Chattel's Governor, Beta Sigma Fraternity



ABRAHAM VELASCO y BAUTISTA
Tayug, Pangasinan
Bachelor of Science in Forestry
FRM-Silviculture
Entrance Scholar 1963
College Scholar (3 semesters)
BF Scholar (7 semesters)
President, Sophomore Class (1964-65)



MAKILING LITERARY CLUB

The Makiling Literary Club members. Front row(l-r) Prof. Jose B. Blando (MLC adviser), Carmelito Sagrado, Eufresina de Leon, Florencio Macaranas, Rodrigo de la Cruz, Victoria Tamolang, Catalino Blanche, Christopher Kuizon. Back row (l-r) Alejandro Salinas, Roberto Romero, Rodolfo Leal, Eduardo Principe, Valerio Mendoza, Jeremias Canonizado, Mariano Machacon and Lorenzo Agaloos.

The Ranger Class 1966–'67

PROTACIO A. AGUSTIN
Cacamilingan, Norte, Camiling, Tarlac
Ranger Certificate 1967
Member, UPSCA Forestry Chapter

ROGELIO O. ANDRADA
Aritao, Nueva Vizcaya
Ranger Certificate 1967
Member: UP Los Baños Varsity Basketball Team (1966-67)
UPCF Basketball Team (1963-64)
Co-Captain, UPCF Basketball Team (1966-67)
Sgt.-at-Arms, Ranger Class (1966-67)

LEON C. APSE
Itogon, Benguet, Mt. Province
Ranger Certificate 1967

ROBERTO R. ARAÑO
Siocon, Zamboanga del Norte
Ranger Certificate 1967
Business Manager, UP Varrons Ltd.
Member: UPSCA Forestry Chapter
Forestry Y Club
UPCF Softball Team

RODOLFO O. BAYUDAN
Dupax, Nueva Vizcaya
Ranger Certificate 1967
Auditor, Ranger Class (1966-67)

CECILIO V. BIDAL
Cagayan, Abra
Ranger Certificate 1967
Member, Beta Sigma Fraternity
Officer, Ranger Class

RIZAL D. CURUTAN
Jones, Isabela
Ranger Certificate 1967
Member, RCO Bowling Team

ROMEO R. DELMENDO
Bacnotan, La Union
Ranger Certificate 1967
Sgt.-at-Arms, Ranger Class (1966-67)

FILAMOR M. DORONIO
Sanchez Mira, Cagayan
Ranger Certificate 1967
Member, Alpha Phi Omega Fraternity

SANTOS A. GARDUQUE
Pasuquin, Ilocos Norte
Ranger Certificate 1967
Entrance Scholar 1964
President, Ranger Class (1966-67)
Treasurer, Freshman Class (1965)
Member, UPSCA Forestry Chapter

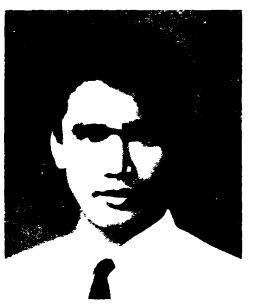
AURELIO P. GAVARRA
Dahat, Lagonoy, Camarines Sur
Ranger Certificate 1967
Member, Beta Sigma Fraternity

TEODORO L. GRAJO
Burgos, Carranglan, Nueva Ecija
Ranger Certificate 1967
Sgt.-at-Arms, Ranger Class (1966-67)
Member: UPSCA
UPCF Softball Team (1966-67)

HENRY T. LORENZO
Baggao, Cagayan
Ranger Certificate 1967

ARTURO G. MADLAING
Binalonan, Pangasinan
Ranger Certificate 1967
Entrance Scholar 1964
College Scholar (1 semester)
BF Scholar (6 semester)
Auditor, FSBO (1966-67)
Staff member, FORESTRY NOTES (1966-67)
News Editor, ZETAN NEWSLETTER (1966-67)

ARSENIO NICOLAS
Jones, Isabela
Ranger Certificate 1967



CESAR C. PANTALEON
Sta. Fe, San Marcelino, Zambales
Member: UP Vanguard Fraternity
UP Varsity Track & Field Team (1965-66)
UPCF Basketball Team (1965-67)
RCO Basketball Team

PELUSIO R. CELZO
Bahi, Gaechitoresa, Camarines Sur
Ranger Certificate 1967
Vice-President, Ranger Class (1966-67)
Secretary, Ranger Class (1965-66)
Wielder of the Sword, Beta Sigma Fraternity
Member, Forestry Volleyball Team (1965-67)

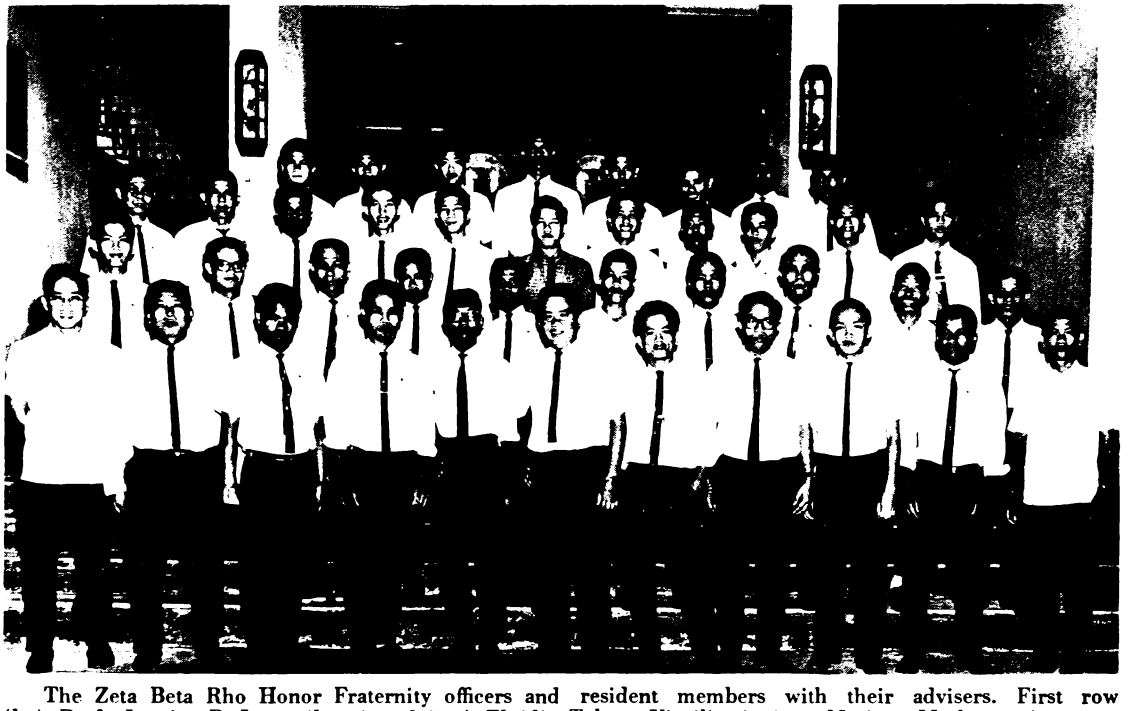
DIONISIO B. REFUERZO
15 Naranbira, Proj. 2, Quezon City
Ranger Certificate 1967
Member, UPSCA

ROBERTO A. ROMERO
Aparri, Cagayan
Ranger Certificate 1967
Bureau of Forestry Scholar (6 semesters)
Circulation Manager, Forestry Leaves (1965-67)
Fellow Fiveolizer, Zeta Beta Rho Honor Fraternity (1966-67)
Captain Ball, Forestry Varsity Basketball Team (1966-67)
Rep. to FSBO, Freshman Class Organization (1964-65)
Rep. to FSBO, UPSCA Forestry Chapter (1966-67)
Staff Member: FORESTRY NOTES (1966-67)
ZETAN NEWSLETTER (1965-67)
Member: Makiling Literary Club (1964-66)
UPSCA Basketball Team (1967)

CARMELITO J. SAGRADO
Bato, Leyte
Ranger Certificate 1967
Geodetic Engineer
President, Freshman Class (1964-65)
Auditor, FSBO (1965-66)
Rep. to Student Council, FSBO (1966-67)
Chairman, UPSCA Forestry Chapter
President, St. Therese Men's Choir
Captain, Ranger Debating Team

MARCELINO F. TORRE
Sto. Domingo, Ilocos Sur
Ranger Certificate 1967
Member: Beta Sigma Fraternity
UPSCA
Gamma Kappa Rho

MARCELINO L. VIERNES
Salvacion, Bayombong, N. Vizcaya
Ranger Certificate 1967
Member: Softball Team, Track and Field Team



The Zeta Beta Rho Honor Fraternity officers and resident members with their advisers. First row (l-r) Prof. Juanito D. Lamanilao (Sr. adviser), Elpidio Tabaco, Virgilio Agriam, Mariano Machacon (supreme Fellow), Eliezer Lorenzo, Ruben Rayala, Rolando Burgos, Arturo Madlaing, Gregorio Texon, Esperidion Catan, Romulo Casilla (Jr. Adviser). Second row (l-r) Eduardo Luna, Eliseo Bacena, Benjamin Parucha, Policarpo Najera, Sixto Badua, Carmelito Sagrado, Dennis Navarro, Jaime Molina. Third row (l-r) Roberto Romero, Victor Buenaflor, Honorio Toribio, Jose Garduque, Manuel Sado, Arthur Garcia, Zosimo Jumao-as Jr., Alberto Manzano, John Bragas, Baldomero Laccay, Celedonio Suetos. Last row (l-r) Precillano Bongbonga, Alfredo Pascual, Rodolfo Leal, Jimmy Guiang, Bayani Nera, Jacob Zabala, Pacifico

Sunshine Corner

FUNNY TALKS

Tourist: "I was informed the food you served me this morning was a meow-meow."

Waiter: "No sir, it was a bow-wow-wow."

* * *

Young Hunter (upon meeting a group of mountain tribesmen): "We came here to look for my long lost father. Have you ever met him?

Tribesmen: "Yes and we found him to be friendly, courageous and delicious."

* * *

Sonia: "I didn't sleep a wink last night, thinking of my debts."

Noemi: "Oh, you should have gone straight to me."

Sonia: "Really? You'd have lent me the money?"

Noemi: "Well, not exactly. But I've got some sleeping pills."

* * *

Patient: "Doctor, what I need is something to stir me up — something to put me in fighting trim. Did you put anything like that in this prescription?"

Doctor: "No. You will find that in the bill."

* * *

In a church meeting, the president stood up and made this announcement: "In next week's meeting, Mrs. Atienza will be our speaker. Her speech is entitled "The Devil." She is full of her subject and will make an interesting speech."

* * *

IT'S A ROUGH LIFE

Tactfully, although he knew she was 22, he ordered 18 American Beauty roses to be sent to his beloved on her birthday and he enclosed this note: "A rose for every precious year of your life."

But the florist, appreciating that the young man was one of his best customers, sent an even two dozen . . .

* * *

"Looks like a smart dog you've got there," remarked a friend.

"Smart? All I gotta say is, 'Are you comin' or ain't ya?" An' he either comes or he doesn't."

* * *

SIR WALTER STEP-OVER

Lunch time!

Everyone was in a bit of a rush and the halls were jammed.

He was going one way; she, the other.

To allow her to pass, he stepped to one side — the same side she chose. Back and forth, several times, they tried to pass, but they remained facing one another.

"Tell you what," said he almost desperately, "I'll lie down and you just step over me."

* * *

A small boy, shopping with his mother in a supermarket brought her a box of something he had taken from a shelf. "Oh, not that, dear," exclaimed the mother. "That has to be cooked!"

* * *

The little girl awakened at 4 o'clock in the morning and went to her mother asking that she tell her a story. The mother replied, "Your daddy should be home soon and he'll tell us both a story."

* * *

John to wife: "Hey, did you see that girl smile at me?"

Wife: "That's nothing. The first time I saw you, I laughed out loud."

* * *

Sam, the private eye, was giving his curvesome client a report.

"I trailed your husband into four bars and a bachelor's apartment," he said.

"Aha!" exclaimed the wife. "Go on, go on! What was he doing there?"

"Well, lady," Sam responded in an embarrassed tone, "near as I could make out, he was trailing you."

* * *

"I don't like Bill," confided one coed to her roommate. "He knows too many naughty songs."

"Does he sing them to you?" asked her friend.

"Well, no — but he whistle them."

* * *

Interviewer: "We need a responsible man."

Applicant: "That's me. Wherever I've worked, whenever anything went wrong, they told me I was responsible."

* * *

Suzie had been on the telephone for half an hour. When she finally hung up, her father said sarcastically, "You usually talk for at least two hours. What stopped you this time?"

"Wrong number."

* * *

March 11, 1967

Mr. Dusit Banijbatana
Director-General of Forestry
Bangkok, Thailand

Dear Dusit:

First of all, let me congratulate you for having been appointed Director-General of Forestry of your country. This I learned only the other day when our mutual friend Nick Lansigan mentioned that he met you in Madrid, and also that you and your wife passed Manila and had a chance to meet some of our fellow alumni. Sorry I missed you then. However, I was expecting to see you in Tokyo as you were among those supposed to represent Thailand in the 11th Pacific Science Congress, but I was told by the Thailand representative who attended the Congress that you could not make that trip to Tokyo because you just returned from Madrid and was kept busy.

Last week we had a meeting of the U.P. College of Forestry Alumni Association, and in looking for a recipient of this year's Most Outstanding Forestry Alumnus award, your name came up in the deliberation. While I am not the party to officially advise you, I just wish to advance the information that you have been nominated for that award. Of course, your nomination is still to be passed upon by a committee. At any rate, I am very happy to note the progress that you have achieved in your career, and I wish to congratulate you and it also goes to your wife as well as your children who, I suppose, are all grown up now.

This morning we finally approved the trip of our Assistant Field Manager, Forester Jesus Natonton who, I am sure, you also know because he was in Los Baños when you were stil lthere. He is leaving for Bangkok to see the operation of the Rau-te veneer lathe, one of which I understand, has been installed there. I am interested in this particular machine and before we finally decide on procuring this particular unit, we would like first Mr. Natonton and our Plywood and Veneer Plant Superintendent, Mr. Alexander Climacio, who is accompanying him in this trip, to see its actual operation.

In this connection, may I asked your favor to help Mr. Natonton and Mr. Cimacio get in contact with the people whom they would like to meet while in Thailand to enable them to study and observe the different lumber manufacturing units in your country.

I presume many of our Thai alumni in Los Baños are with you in your organization — I really do not have an idea how many of them are with you. At any rate, I wish to extend my regards to each and every one of them. I hope that someday I may be able to make another trip to Bangkok and be able to see some of your operations. I am very much tied up these days in the production end of our operations with very little time for vacation.

Here's my congratulations again, and Nick Lansigan, too, wishes to convey his personal regards.

Sincerely yours,

(Sgd.) FLORENCIO TAMESIS
General Manager

* * *

ROYAL FOREST DEPARTMENT
Bangkok, Thailand

31 March 1967

Prof. Florencio Tamesis
General Manager
Nasipit Lumber Company, Inc.
5th Floor, Maritima Building
117 Dasmariñas, Manila,
Philippines.

Dear Dean Tamesis,

I have the pleasure to receive with thanks your letter of March 11, 1967. However, after such a long absence and loss of contact, this letter has indeed brought to me not only a great surprise, but also a heartfelt delight. I do humbly accept your compliments and kind words. I always do realize that the success in my career depends a great deal upon your effort and of the other beloved professors who had untiringly imparted their knowledges and experiences to their students like myself. I also feel very grateful for the kind support you have given me in nominating me to the U.P. College of Forestry Alumni Association, as the most outstanding forestry alumnus of this year. It does not really matter whether my name will be accepted by

the Association or not, but what touched me most is the kind thought and consideration that you and your colleague had for me, the alumnus, who is residing in a remote foreign land.

I have to apologize to you for not being able to entertain Mr. J Natonton and Mr. A. Cimacio when they were in Bangkok, because I was away on a field trip during that period. However, Mr. K. Aganidad, my secretary, also U.P. alumnus had arranged for the two gentlemen to visit the Thai Plywood Co. as you requested. I hope that by now they had returned to the P.I. and informed you about this matter.

I am delighted to inform you that my wife is well, as usual, and all the children are not only grown up but have already graduated from Chulalongkon University, and are in the Government Service. The eldest boy has already married and has two children. The rest are still single.

My wife is very much pleased to hear from you and joins me in wishing you and your family the healthiest and most prosperous life. Please do not hesitate to write me if there is anything that I could do for you or for U.P., and the Bureau of Forestry.

Sincerely yours,

(Sgd.) DUSIT BANIJBATANA
Director General

* * *

UNIVERSITY OF THE PHILIPPINES
College of Forestry
College, Laguna

May 9, 1967

Regent Florencio Tamesis
The General Manager
Nasipit Lumber Company, Inc.
5th Floor, Maritima Building
117 Dasmarinas, Manila

Dear Regent Tamesis:

I wish to thank you for the kind accommodation that your company has afforded to Director-General Dusit Banijbatana and Professor Lucio Quimbo. Although Mr. Banijbatana was in the Philippines as guest of the U.P. Forestry Alumni Association, still we feel that the College must share the responsibility of making his stay worthwhile. He mentioned to us that his visit to Mindanao has made his coming to the Philippines very fruitful and he was particularly impressed with the operations in Nasipit. He even wished that some of the Thai students will be allowed to visit the Nasipit plant before they leave the Philippines.

We in the College of Forestry are glad that we have such a "show-window" of the wood using industry which in many occasions have drawn praise from foreign visitors.

Thank you once again for this and the other many favors that you have done for the College of Forestry.

Very truly yours,

(Sgd.) DOMINGO M. LANTICAN
Dean

* * *

Oregon State University Library
Corvallis, Oregon 97331
U. S. A.

April 13, 1967

Professor Jose B. Blando
College of Forestry, University of the Philippines
College, Laguna
The Philippines

Dear Professor Blando:

We would like to bind volumes 12 through 17 of *Forestry Leaves*, but are not sure whether or not we have all the numbers in each volume. Volumes 12 and 14 have four numbers each, but we have only three numbers for the other volumes. Did you publish a fourth number for volumes 13, 15, 16 and 17? If so, we shall appreciate your mailing them to:

Library. Serials Department
Oregon State University
Corvallis, Oregon 97331
U. S. A.

Kindly notify us if these numbers were not published so we can go ahead with the binding.

Unfortunately, we have lost the following numbers:

v. 12, no. 3

v. 13, no. 3

If these are still in print, we shall appreciate your sending us replacements. If available only on purchase, we shall be glad to order them if you will quote price for them.

Thank you for helping to complete our file.
Sincerely yours,

(Sgd.) IRENE L. CRAFT
Serials Librarian

WHY NOT TRY NARRA SAYS THIS TREE LOVER

Dear Editor:

Probably few if any among Manila's sizzling dwellers mourn the recent felling of the agoho trees that lined the traffic island on Padre Burgos drive leading to Plaza Lacson. These scraggly trees looked so drab and that they gave the impression some pinchpenny bureaucrats were responsible for them. Even the lowly *mayas* shunned them for habitat or flight terminal. Successsive typhoons also gave their verdict — that these agoho were better as firewood than as Joyce Kilmer's object of poesy.

It is time to abandon planting agoho, and instead to increase propagating hardwoods like molave and narra, along Manila's thoroughfares and in its parks and plazas. The narra and the molave are just as beautiful as the agoho if not more so. The unfading green of their thickest leaves cools the sunglazed eyes. Unlike the agoho and the acacia, these trees do not grow to scrawny or unwieldy heights. Ample proof of their esthetic worth is the placid triangular spot across the street from the Manila post office or the department of education compound on Arroceros St.

Every hot season underlines the need for more tropical vegetation along Manila's streets. Thick-leafed trees like the molave or narra may yet serve a double purpose: to decorate the city and to bring the temperature down for us who cannot afford the artificial blessings of airconditioners. — B. B. PASCUAL, Philippine Normal College, Manila.

— Manila Times

* * *

UNIVERSIDAD DEL TOLIMA
Ibagué, Colombia
DEPARTAMENTO DE BIBLIOTECA
Y PUBLICACIONES
UNIVERSITY of the Philippines

Atentamente me permito solicitar a Uds., la publicación "Forestry Leaves" con destino a la Biblioteca de la Universidad. Es para nosotros un placer contar con la colaboración y ayuda que proporcionan sus artículos a la investigación científica ahora que iniciamos la reorganización de la Biblioteca.

Cordialmente,

NORA URIBE DIAZ
Bibliotecóloga

Ibagué, Enero 24 de 1967.

* * *

Roy Chapman Andrews, the noted naturalist and explorer, took his first step along the road to honor and fame when, fresh from college, he applied to Dr. Bumpus, at the American Museum of Natural History, for a job.

The Director heard the young man out with kindness and sympathy, but regretfully informed him that no position was available.

"I'll take anything, Doctor," Andrews pleaded. "I'll even clean the floors, if you have nothing else."

"A man with a college education cleaning floors?" Dr. Bumpus rejoined.

"Oh, not just any *floors," the eager applicant explained. "But museum floors — they're different!"*

"You win!" Dr. Bumpus announced. "We'll find you a job!"

Literary Attempts

When the Seeds become Trees

By Florencio Macaranas

Pilo carefully picked up a potted Araucaria seedling and deftly shook aside the strains of dirt that clung to the sides of the rustry milk can. Rows and rows of seedlings growing in the small cans have penetrated the tin bottoms and were beginning to take root firmly into the soft soil.

He pulled at the weeds that were slowly entangling the small plant, tenderly grasping it like a new father holding his first born baby. Wetting his lips with his tongue, he took a glance at me with his one good eye at the angle that gave him the best view. Pilo was pitifully blind in one eye. It was horribly opened, showing the red smooth meat with some streaks of blue and violet, that seemed to ooze out tear mists when its muscles moved. He had to tilt his head and bend it sideward a little to get a clear view of me. I flinched at the apparent effort he exerted with the glance for it opened his eye frighteningly and contorted his face painfully.

"Yes?" I asked, anticipating that he had something to say.

Flecking off some particle of soil on the fragile needles of the young Araucaria, he put it down and then stood up. He wiped his muddy hands on his equally muddy trousers, then reached into one of his pockets and brought out a shiny old watch. It glinted in the afternoon sun and it hurt my eyes.

"See," he slyly smiled, dangling the watch before my puzzled face. "I bet your watch could not last two hours underwater against mine. Wanna bet yours huh? Would you? Would you?

Pilo talked fast, and challengingly, his lips quivering as they spoke, hiding his decaying brown teeth in the process, but failing to hold down the thin spray of his saliva that rained down into my face. I just wiped off the wet drops on my cheeks pretending they were just sweat.

How I wished it was rain instead that wet my face so we didn't have to water the endless rows of seeds and seedlings that lay helplessly in the hot lazy afternoon summer sun. The sun beat down mercilessly while we tended the nursery, and our dirty shirts clung to our dirty backs, the sweat dissolving the brown earth on them and forming a thin paste on our bodies.

I laughed a little at what Pilo said, the sound hardly coming out from my dry throat. I needed a drink of water very badly and afterwards longed to lie down in the shade of the big majestic Araucaria nearby, its long cone-shaped crown cooling the brownish grass below it. That grass was green last December and Pilo and I had always lain there everyday after partaking of our lunch wrapped in fresh banana leaves.

We would look at the clouds together while the wind wafted them into various shapes and sizes. And Pilo kept talking about those balls of cotton that he had set on fire when he was a child. The old nurse who had regularly visited his home had never failed to prick his bottom behind with an ugly needle after a struggle with his pants which his mother had always tried to force down. And so one day, before the nurse could use her alcohol soaked cotton balls, Pilo had burned them.

Pilo would laugh uncontrollably everytime he told that story. And I would laugh too, even though I didn't feel like laughing, for the fun of it was reflected in Pilo's neck veins which expanded and contracted with each sound that his thin throat could muster. When Pilo laughed, the world did not laugh with him. It laughed at him.

When Pilo laughed, everybody thought him drunk. But Pilo was the lousiest drinker I ever saw. He could not finish half a bottle of beer. It would make him vomit and twist on the ground like an epileptic. The first time I saw him drunk, it was late at night. It was our turn to guard the nursery that cool night in December. And to keep warm and to keep awake, I brought along a bottle

of gin which I planned to sip once in a while during the watch.

The night was clear and no clouds were in the sky. Only the stars showed the stamp of intelligence printed deep in the very being of the universe of unintelligent things like the bottle I held in my hand. Pilo was sitting against the Araucaria, shivering like a malarial patient.

"Here," I laughingly thrust the bottle of gin in front of Pilo's purple face. The bonfire was not sufficient enough to warm him. "Why don't you try this?"

"No," he said, waving the bottle away.

"Aw, c'mon. Just a sip. It'll do you good."

"But . . ."

"No buts."

"Dammit" he uttered menacingly, and grabbed the bottle from my hand.

For a second or two, he raised it to his mouth and then thrust it back into my chest. He spat and then suddenly stood up, and ran, waving from side to side as he did so.

"Hey, where're you going?" I shouted at him, puzzled.

I ran after him, spilling a little of the gin on my jacket, and stepping on some seedlings. He was twisting prostrate near the creek when I found him, his mouth smelling of vomit, his forehead wet with perspiration.

I cursed myself and threw the bottle into the rocks where it was dashed off into minute pieces. The sound of the impact of breaking glass reverberated in my ears, as if Pilo's wife was screaming in the stillness of the night. After that there was only icy silence and nothing else.

". . . *we are not happy with too much of space. We enclose our hearts with the embracing arms of a few friends, our minds with the absorbing labor of a few interests, our lives with the comforting walls and roof of a home. We are steadily grateful that there is a sky to mark the limits of heights, ground to put an end to depth, and horizons to mark off the boundaries of length and width. . . .*"

Pilo slept the whole night, and I was left alone to guard the nursery. I still cursed myself for forcing Pilo to drink. I had to walk around alone trying to keep awake and to stop from dreaming dreams which nourish evil and emptiness, the lovable and the real, even goodness and fullness which are had from the obvious futility and desolation of the human heart.

All night long, the icy wind ripped into my angry face while Pilo snored the sleep of giants.

From then on, I never offered Pilo a drink again. Whenever the boys called us into the potting shed during breaks to partake of the gin and dried fish or dried squid that they had heated with burning cement paper, we would politely refuse the drink but grabbed at the delicious smell of the roasting squid. Farther down below, the watch would whistle whenever the boss was coming and the bottles would vanish into baskets of buho pots.

And oh yes, the boss. That sneaky old crow, as Pilo would describe him. He was that well-travelled sophisticated old man who prided in the experiments he had learned from abroad. He was always trying out ways of improving the seedling stock and when the plants died he would bawl the poor laborers out.

"In Australia, the leaves were this long at this stage, and in New Zealand they didn't have to water them, now here you are blaming the climate you idiot. Who do you think you are? Better than me?" The boss would argue with Pilo.

"No, sir," answered Pilo. "If it's not the environment, it's the climate, but you say it's not the climate, so the blame lies in. . . .

"You!" answered the boss.

"Me!" answered Pilo.

And Pilo stared at the drying needles of the exotic pine species the boss had brought in from Australia and New Zealand. Somewhere in those places, the growth would be this long and that vigorous, and . . .

"Damn you plants," Pilo muttered when the boss had left. "May you all die like your ugly father from New Zealand." And he kicked at the watering can, spilling the water into the small canal by the pathway. Then picking the can up, he hurled it down the slope and it clang loudly as it rolled, stopping among the plots where the boss's wife grew some lovely roses for some chattering ladies who never failed to come everytime the boss was out.

"Pilo", I said, taking him by the shoulder "What brought you to work in this place? I thought you were a *caminero* before? Wasn't that job easier?

And I remembered that he could hardly carry the big watering can full of water. Often times, I

had to help him finish watering all the seedbeds alotted to him. Pilo had a stout heart alright, but his body was not strong. When he was tired, he would walk with a limp and his blind eye would quiver. The heavy can of water would cause him to walk like a drunk and he would step on some seedbeds, crushing the tender plants. How he would shake his head and curse later on, while he replaced the crushed plants.

"Damned *capataz!* he cursed, in answer to my question.

"Why?"

"Day in and day out, he always asked for merienda money. Even during duty-hours, he would ask me to buy him a drink. Pity the others who could not give enough for his cigarettes. They were laid off in due time. Lack of funds the boss would say. Four pesos a day is not much. We were then lucky if we got two pesos left after a day."

"Were you laid off too?" I asked.

"No, I quit. Nay, I was discharged, dishonorably," and he smiled a little. Seeing my puzzled face, he continued, "I gave the no good *capataz* a good sized punch in the belly!"

I broke into amused laughter. But after that, I felt angry at the world. With all the no good people who took advantage of the not so good people. With all the good people who could not do any other good. With all the lousy people who bred lousier people. With myself who was one of them.

"Alright Pilo," I finally answered his challenge. "Fill the can with water and let's soak our watches. Anyway, I'll be going back to the College tomorrow and I'm raring to buy another brand new watch."

"Huh?" Pilo was surprised.

"Yeah, today's my last day here."

"But you'll come back, won't you? You'll come back and be the boss someday huh?"

I didn't answer him. I just turned my gaze towards the seedbeds, bare on the outside but brimming with seeds inside. Two, three months maybe and these would sprout and see the world.

"It's now exactly three o'clock" Pilo said, gazing at the watches with the characteristic angle of his head. "It would just be right after quitting time. Let's see how waterproof your watch is."

He placed the two watches in the kerosene can. Then, forgetting something, he took them out again and removed the leather straps.

"Maybe you'll go to Australia and New Zealand too, someday," Pilo remarked.

"Why do you say that," I asked.

"Don't you like Australia?" he replied, picking up a trowel.

"I haven't been there yet."

"You ought to. You're going to be boss someday. But you won't be a mean old crow I'm sure. And then those goddamned plants would not be frightened anymore," Pilo talked with a smile on his lips.

"Please don't say those things, Pilo. People could be hurt too you know. Besides, many things can happen in two, three, four years. And they do happen."

"I don't care." Pilo uttered.

"I'm going to rest there by the creek. Wake me up if the boss comes. I'm tired," I said.

"You'll come back and be boss someday, won't you?" Pilo shouted as I neared the creek.

I just glanced back, pretending not to have understood.

The grass was cool and refreshing. Listening to the flowing water of the creek gurgling a lullaby, I immediately fell asleep and dreamt of Pilo in his brand new white polo shirt, walking proudly with the others in the Labor Day parade. He was smiling happily and his teeth did not look dirty.

Feeling a shiver, I opened my eyes to see the day already dark. I quickly stood up, and as I did so, a can beside me fell on its side. It was the kerosene can where we put the watches. Picking it up, I nervously groped for its contents. It was dry inside.

In it were the two watches, their straps neatly chained together. I read off six-thirty on both watches. I looked around and at once shouted for Pilo. The nursery guards were surprised to see me.

"Where'd you come from? Everybody's gone home."

"Pilo left something. Could you give this watch to him tomorrow? I can't give it myself. You see I . . ."

"He isn't coming back," the guard interrupted. "All the casuals are to be laid off beginning tomorrow, remember?"

I didn't remember.

The Island and the Genesis of Contentment

By MARIANO T. MACHACON

At eleven o'clock the cold gentle wind blew and crept into the city bar. The souls in the place had been restless. I had been here with Pablo Poblete the past three hours. We heard alluring laughters of men and women in the dimly illuminated corners. Moaning sometimes. Pablo Poblete's laughter now was louder behind the multi-colored curtain.

"Damn this world," I said to myself but with joy paralyzing my emotion in that moment. "Damn this Empire of Satan," but for all desperates this was heaven on earth with an ancient thought: "drink and be merry for tomorrow you die."

I remembered the first time Pablo Poblete brought me to the Greenland Club. It was cold and raining hard. It was the time that the people were seeking the warmth of the summer sun. I was so scared before, I couldn't speak. I'd never been in a place like it before. And I kept thinking, "Oh, my Lord if my nanay should find out! I was then fourteen going on fifteen. And Poblete was my middle-aged forester friend. . . . I didn't know how I met him. But anyway we had been friends eversince the time he treated me to a bottle of beer. He told me that he was a forester. He told me the glamour and wonder of being a forester. He told me everything about forestry all night long. He added that had he not been a forester, he couldn't have met me and he could not have treated me with a drink. Don't you know how it is when you're a kid? However, I liked to hear him. I liked him like a father. My mother told me that three years after I came to this world, my father had gone. Gone when the war broke out. My father left me, my sister and my mother. And tonight, I was with him again, sitting in low stools by the table.

"Ah . . . fried chicken at last. . . ." I sighed mirthfully. But he ordered another. This time it was beer! I felt my whole being shiver.

"Don't you like this?" he said smilingly.

"Just a little."

He drank his beer. The next few minutes I did too. Boy, it tasted wonderful!

Then as the night wore on, we had already many toasts. It was intoxicating, but I guess we enjoyed the cold night. My mind was already hazy, and his facial appearance now was reddening like pale red petals. . . .

"Am dizzy," I complained.

"Nevermind, it will settle soon just after a few hours." I looked at his face, he was red too, his eyes were to me, ready to sleep but with pride, he kept them open.

I will never forget the hour in the Greenland Club. It was strange, yet it was not a dream.

"You have been to college, Pab." I used to call him that way. "I want you to tell me why you have known all these things."

"I know what you mean. I remember that people love them. And I think I used to come here."

Then he nodded and questioned me. "Why did you ask me?"

"I don't know. I've often wondered about it. I don't know what enjoyment it is." I said nothing more.

I felt that his words were strange and hollow, and he had not said what he wished to say. He stared at me a moment, knowing that I was so sleepy with the saturating spirit of the beer. That was how it was when we were together in the place of music, neonlight and dark corners with low voices, with shivering lips rubbing in the midst of darkness against the lost daughter of Eve. Lights were off, not even a peeping light from the outside and silence was predominant with the smell of the newly washed bedspread. And all these things would have a kind of life in genesis when God created Adam and Eve in the Paradise of Eden a thousand centuries ago. It was close to midnight. The night had been long and much had happened.

FORESTER POBLETE was smiling that day when I visited him in his office. It was just one month after my graduation from high school. He was behind his Narra table, sitting comfortably with his arms resting on the arms of the chair. After some efforts in trying to remember, his lips drew back again into a caricature of a smile. He said as he stood up.

"You said before you're interested in forestry. Aren't you?"

"Yes, but how long will the course be?"

"In four years, forestry in four years to five years," he said with a convincing voice.

I smiled back. "Forestry in four years to five years?" I frowned questioningly.

"That's it, shall we go?"

He led me to a nearby canteen. The leaves of the Molave stand were drifting all over the street. Sometimes they flew with the dust, when the wind blew hard. The leaves were falling from the twigs and branches. They scattered onto the ground in gray and yellow. They broke through the street forming concentric circles. The wind and the storms perhaps swept them down even in the shrill night. It was summer and thunderstorms had not come yet. And all day the Molave leaves drifted down until they covered the ground. I wished for the rain - - - but the rain would not come that day.

We sipped our softdrinks moderately. I felt coldness in my throat and my palms. Outside the oppressive summer sun continued blistering over and over again. Then our glasses were drained and we ceased sweating.

"Mang Pablo, I will leave soon to study." I don't know why I used *Mang*. It was the firs time I called him that way.

"When?"

"Next month maybe - - -"

"Go on, you have been a good boy. This I have kept on telling my wife and my daughter Clarita."

He did not look at me as he uttered all the words. He inclined his head a little, and continued to coil the straw around his finger. I was puzzled for a moment. But I did not bother to inquire, even as I felt a hugging vagueness. I thought, we human beings were slaves of loneliness and sorrow the moment our rational thinking went deep beyond our limit. Man have fibers of his mind, the thread of limitless emotion which can string our words — so complicated and full of complexities - - - How many great thoughts were there in the brain of a man, and how wise we are to avoid our sensitivity and hidden area. Impossible! How large the cerebrum of a genius, large it may be. So large that man is proud, now he has the nerve to question the theory of evolution that after all man is man and ape is an ape. And Pablo Poblete might be another man who was emancipated not long before I came to this world and together with my generation. This man told me that life is luxury for those who made the past life profitable. Man is right, he did not originate from an ape.

For a few minutes, I succumbed to the abstract power of the night. I uttered my last word for the night, my lips closed for one last word. There was a slow circulation of my blood, I snored with the wild screaming and scramble of the mob in my dream swirling in all directions, like an ocean in high waves and the stormy season of Mother Earth. For a while my frightened soul roamed in the night - - - until the sun began to break the eastern dawn of the vaguely crimson but still dark horizon.

I was awakened. The dawn was cold. For some long hours I lay on my bed, my mind going back to the past night. Something had not all healed during the night. The morning was getting ready to emerge, just for some moments. Five days before, I began to recollect our spree in the city and the night spot, the expensive wine. It had all acted upon me now like a ferment. It was long and dormant with an aching activity, and after the slumber of the night, there was a thing, palpitating about them that altogether was a wonder.

PABLO POBLETE'S HOUSE was one of the best in town. He had been competing with Don Protacio. By the way Don Protacio was the last of the heir of an *Encomendero* in our town. He owned vast tracts of ricefields and sugarcane plantations. The pepole used to call him *Don* but I preferred calling him *Apo Olandes,* because of his long nose, blond hair and white complexion.

Poblete's house was spacious and full of luxuries that only few families could afford. It was painted cream, pink and green. It was indeed bright and magnificent. Inside wallings were doubled reflecting geometric designs of the finest woods in our trees. Above the tin roof was a towering television antennae. Below its facade gleamed the magnificent lawn grown with trimmed Manila grass with patches of lovely rockeries extending from the main door of the house up to the iron fence. Behind the iron fence were blooming garden flowers and Red Palms in luxuriant growth. Nearby was the garage for their limousine.

There were many things to admire in Poblete's residence, so pleasant and with apparent dreamy things which are not illusions in their vividness. Whenever he invited me to his residence, I was biting my lips, thinking of home, my mother and my sister.

Our house was built of semi-wooden materials with nipa shingles as a roof. Once during the typhoon season, the roaring wind rushed into my room and the loose shingles were blown off by the wind. The next morning, we repaired everything. Again during the night there was a heavy rain. I was awakened by the dripping of the rain coming from the loose shingles. My sister was crying then for

she began to get wet from the rain which was dripping into the peeping holes of the shingles' wall. I got my blanket and covered the spaces of the wall in her room. Then I shivered all night long, until morning and I caught high fever dreaming that I was the owner of the beautiful mansion of Don Protacio and Forester Poblete's modern home.

"And you're leaving tomorrow, Ruding?" Mang Pablo said shrugging his shoulder as he leaned on the sofa.

"Yes, I am. I wish I will be like you soon." I really meant what I said. I longed for the time to have much comfort and wealth. He smiled and looked at me again with approval. That was my last meeting with Pablo Poblete for- - - -

THE TIME OF THE DAY had changed. It was late afternoon and at last the shadows were lengthening. The quiet desolation of the places I passed by flooded down upon me suddenly and freezingly. The chill of the evening was creeping inside my T-shirt and the trees left behind by the bus were becoming dim and forbidding. The bus continued to travel along the highway beneath the tiny glimmer ing light that caught the edges of my eyes. I had known that I was on the path of destiny with my dream — not drifting leaves but in search of the towering Red Palms of Poblete and the yellowing ricefields of Don Protacio. The setting of the sun had no impression on me. The first star was coming out from the boundless dark. I thought first that dizziness might be coming back, because the horizon at my right glimmered. Through the gaps in the trees there was the cold light, until the sun expired and hid its rays behind the mountains.

Once again, I remembered Poblete's luxury, the wrinkles in my mother's face and the night I shivered beneath the shingles of our nipa hut. I bit my lips. I felt the pain. It bled perhaps but I didn't care. Sadism! Plain enough but sadists feel no pain. And the long trip swept away into a golden distance parted to a liquid horizon and showing the gray rim of the sea. It was sheer, exuberant, instinctive and unreasoning with careless joy knowing that I was faraway from home. The thought's sweetness was born for immortality. And memories lay afar, left behind in the lingering night.

That morning of registration, there was a late summer storm. It was cold and raining very hard with the occasional gust of strong winds. There were droplets of crystals from the rain whizzing and pouring from the cloudy sky, huge ones falling and bouncing all over the campus. The raindrops pitter-pattered on the tin roof. They slid on the leaves. On every roof a million raindrops were rolling. Afterward, there was a rainbow hanging perfectly in the now brightened sky. The rays of the sun were breaking through, glimmering in marvelous silence. I was still shivering in my wet clothes.

"You must hurry, today is the last day of registration." She said gently. It was Amherstia, my first college acquaintance. She was the girl in the unforgotten twilight with pale rose cheeks and tantalizing dimples.

"Nevermind, much have been accomplished, I am sure I can make it today." I snapped back without looking at her while I hurriedly filled up my forms.

And for the first time, I wondered now why I had had to win this scrap of knowledge so painfully when there were people like Don Protacio apparently born with full possessions, I never possessed.

The tension of struggling and the tediousness of the brains and minds were the late frosts of the semester disappearing like a dream. And I found the forester's dream, a dream which I had never seen in Poblete's reflection. The last summer I went home, Poblete's home was still there proudly standing and unshackled between the heat of the summer and the coldness of the rain. It was his possession.

AND BEING NURTURED with the nostalgia of man's idealism, of man's love for the truth and the beautiful and of man's search beneath the fires of the sun, I sniffed more and more the cold wind of the rainy night, and the hot summer air of the crystalline sky.

For a long time, the shallow and rosy dimples of Amherstia have grown deeper. Her cheeks and lips were now as red as a rose that was coming into full bloom. This the clavier alone could not reveal. Amherstia might have known the distance of the season the first time I met her in college. That was when it was raining hard, when there was the last thunderstorm of the summer, and raindrops were rolling down every tin roof. . . .

"At last - - - we are on the headline." Rey my roommate said. "Who said that the profession is unknown?"

"What is it? You're making again your own news." I said while giving a long yawn that early morning.

"See this news, we have been lucky enough to have the headline of the day." In bold and black the morning daily carried in its banner: "SEVEN FORESTRY TOP BRASS DISMISSED" and nothing more- - - -

"You might have an uncle here Ruding." Rey uttered in a teasing manner that followed his first laugh of the day.

"None whatsoever but it's still bad news, you know." I was little touched. Not in a dream nor in realm of imagination. Poblete was linked to the scandal.

"Why bother yourself, oh - - - yes I have a seven o'clock class I might be late in prolonging our argument." He got his notebooks and hastily left the room, slamming the door.

Everybody was chatting about the news. It was the most talked about incident of the day. Somebody said that except the two foresters among the seven, all were millionaires- - - -

April, Amherstia the only "rose among the thorns." And I was among the thorns. Said Larsen's poem in silence:

"Seek not ease, nor wealth, nor wine . . .
But the friendliness of the hills and
the trails before thee. . . ."

IN ALL THE THINGS and complexities of life there are triumphs, there are desolations, fears and avarice, the fact that light and shadow cast human existence. And the darkness of man's existence had settled in my subtle thought like emotions that dissolved some unsubstantial frail fancies hindering the steady flame of desires not to harvest the barren regrets of deep melancholies. I thought hard. I thought with all my mind! They were now strange. They were now shattered dreams - - - And- - - -

"Going home? It was Amherstia's melodious voice.

"Congratulations." I evaded her question. "I read the article in the *Chronicle Magazine* about you. You are the first forestry woman engineer. Would you like that praise and would you mind that I'll write another article for you?" I replied jokingly.

"Enough for my writer who never helped me with my term paper," she countered laughing.

Then she repeated, "Are you going home?"

"When are you coming back?"

"By next month," I answered her again. This time I looked steadily into her dark blue eyes.

"You know I decided to join the faculty of the college," she said modestly.

"Me too." I said smilingly.

We began to stroll, stepping on every dried leaf of summer as we cast a meaningful glance in the far distance. The summer winds brushed against the pale rose cheeks of Amhestia. I envied the winds.

THE LUMINOUS SUMMER sun brightened the horizon and the Mahogany trees in the campus were now leafless. . . .

FORESTRY LEAVES

Organ of the Student Body and Alumni of the College of Forestry, College, Laguna

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SAVING NATURE

Conservation of a country's natural resources is a primordial duty of any government. Unwise use of these resources always lead to waste, damage that is often irreparable.

When the balance of nature is disturbed, so is the whole way of life in the community. A bird that eats fruits in the forest is nature's agent for reforestation. Other birds feed on insects that are destructive to farm crops. An animal in that forest helps to keep it healthy in the same way that the forest helps the animal population to survive and multiply. Some creatures are good and some are bad for man, but still they are necessary if life on earth is to continue.

The balance of nature in this country has already been disturbed in many areas. Our forest and marine life have been so abused that what has been left is becoming less and less productive. Numerous species of plant and animal life are facing extinction.

To return the balance of that life the Administration has embarked on a project with President Marcos himself taking a direct hand. He has started by revitalizing the Parks and Wildlife Office which heretofore, according to Director Marcelo A. Buncio, had no proper direction, charted course of action to follow, sincerity of purpose, or effective management.

With the revived interest in conservation there is fresh hope that the destruction of wild life will be arrested and eventually compensated by the protection of animal and plant life. (MANILA TIMES)

FOREST ENEMIES

Congress is now under the impression that the campaign against the kaingeros is not as effective as it is pictured to be. Lawmakers still receive information or complaints from governors and mayors concerning the senseless stripping of forest lands so that these could be hurriedly converted into productive patches for growing rice, bananas or camotes.

It is not unfair to presume that forest concessionaires themselves are to blame. The law compels them to plant five trees for every three cut to perpetuate the forest growth but how many of them do so. With the forest rangers having to patrol thousands of kilometers of wild country, it is no wonder that such violations escape their attention. With denuded areas practically abandoned, the kaingeros claim these as their own.

At one time the late Senator Primicias, who had gained quite a reputation as an aggressive advocate of conservation (not only of forests but also antiques), warned that the reckless method of logging might cause this country to suffer the fate of the Middle East which are mostly desert. Even the bountiful blessings of nature around us cannot be reassuring unless the forest concessionaires give up their quick-profit mentality and start thinking of the future. (MANILA TIMES)

THE PREFERENCE FOR THE FORESTRY COURSE

At each end of the schoolyear, only a thin crop of forestry graduates is put out by the U.P. College of Forestry.

This year, we have only some thirty of them. Hardly a good crop from the starry-eyed and hundred fifty freshmen four years ago. Hardly a good addition to the measly five-hundred or so foresters now managing and taking charge of Philippine forests which constitute forty percent of our total land area.

There is no doubt that we are in dire need of more and more thoroughly trained and intelligent foresters to cope up with the serious problems that beset forestry in particular and the nation in general.

Why is the forestry course neglected by the youth of the land? Why is it unglamorous to them? Because it is rugged? Because it needs much brawn and less brains? (Does it?) Because the life of a forester is a primitive life? A life in the wilderness? So what? Just what kind of life must be lived? What kind of responsibilities There is no doubt that most people prefer to work behind a desk where they would not soil their hands and dirty their delicate clothes. They are fond of the "soft" life, the glamorous life. They want to be the "well-respected men about town." As if they are the kind of men who demand respect.

There are those who think that forestry is a vocational course. No sir, it is one of the hardiest technical courses in the University of the Philippines. As a challenge to the snickers, try the course and see if you can whisk through it with yying colors and not just by the skin of your teeth.

It is sad to note that most of those who are attracted to the forestry course are those who do not have the sufficient background and aptitude to tackle such highly technical subjects as mathematics, surveying, mensuration, statistics, management, and research. Many of them are high school vocational graduates who are hardly interested in social sciences subjects. Subjects which are so vitally needed in the course of forestry work. No wonder, there is a high percentage of student drop-outs and failures in the U.P. College of Forestry. The state university can demand no less.

The leading problem in student recruitment is the attraction of top high school students. Most valedictorians, salutatorians and honor students prefer engineering, law, medicine and other glamorous fields such as physics, chemistry and electronics. True, such fields are not yet crowded, but upon graduation, where do our top graduates work? Abroad, that's where.

In forestry work, our graduates are always absorbed here right in our own backyard. And the pay is good. Although the glamour is not. But why bother with glamour! It is not the measure of a nation's greatness.

Forestry, anyone?

Republic of the Philippines
Department of Public Works and Communications
BUREAU OF POSTS
Manila

SWORN STATEMENT
(Required by Act 2580)

The undersigned, EDUARDO B. PRINCIPE, Business Manager of FORESTRY LEAVES (title of publication), published quarterly (frequency of issue) in English (language in which printed), at College, Laguna (office of publication), after having been duly sworn in accordance with law, hereby submits the following statement of ownership, management, circulation, etc. which is required by Act 2580, as amended by Commonwealth Act No. 201.

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ARTEMIO ELEPANO
(Officer Administering Oath)

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THE GREAT WERE ONCE AS YOU

Would you be great?
The great were once as you!
The men you magnify today
Once groped and stumbled on life's way;
Then fortune crowned with her caress
The self-same gifts that you possess.
The great were once as you,
Dreaming the self-same dreams you hold;
Fearing, yet longing to be bold;
Doubting that they themselves possessed
The strength and skill for every test.
Then one fine day, the first bold venture made
(Scorning a cry for aid),
They dared to stand and fight alone;
Took up the gauntlet life had thrown,
Moved full-front to the fray,
Mastered their fear of self; and then—
Found out the world's great men
Are, after all, but men.
Oh Man! Go forth today and DO!
You, too, to fame may rise,
You may be strong and wise;
Stand up to life and play the man!
You can, if you but think you can.
The great were once as you.

— EDGAR GUEST