Abstracts & Excerpts

MODERN PLYWOOD

By THOMAS D. PERRY

Pittman Publishing Corporation, New York
Copyright, 1942, *pp.* 338

ABSTRACT

Plywood consists of fabricated veneer and glue, just as shoes are made of leather and thread, books of paper and the like.

Plywood is relatively a recent product. In its simplest form, it consists of thin layers of wood firmly glued together with the grain direction at right angles with each other. Veneer, one of the constituents of modern plywood, is an old product. It dates back to the last hundred years, was produced by hands and with primitive tools. As a result, its use was limited and its product could only be enjoyed by those whose wealth permitted them to buy these luxuries. This kind of veneer was then used mostly for decorative purposes. As the years passed, the term veneer meant two things: First, it indicated a beautiful display of wood, one of nature's gifts to mankind everywhere. Secondly, it was merely an attractive surface that was likely to conceal poor workmanship and inferior materials.

It was not until the end of World War I that plywood was adapted instead of veneer. There was then the handicap to overcome which was the unpleasant public conception of anything that was "Veneer." The mechanical production of veneer does not go back more than 100 years, although thin sheet of wood had been laboriously shaved or sawed for decorative purposes 1,000 years ago.

There are four principal methods of veneer cutting:

1. Rotary veneer: lathe-cut representing upwards of 90% of all veneer production. This is just like unwinding roll of paper and adapted to all grades of veneer from the cheapest box to attractive bird's eye.
2. Sliced veneer: a flat cutting, shearing process for face veneer of value. This is adapted for appearance.
3. Half-round veneer: intermediate between rotary and sliced.
4. Sawn veneer: a rip-saw process. The strength is the predominant requirement, but now also in decreasing value.

At about that time potential plywood users were expanding rapidly. The makers of automobiles and motor vehicles, designers of airplanes, architects and contractors, all were then eager in evaluating the advantages of plywood, some of which are:

1. Distributed wood strength-normal solid wood has the predominant strength in one direction—along the grain; and conversely weak across the grain and splits easily. If two or more layers of equal thickness are glued together with alternate grain direction, the lengthwise strength will be distributed in both directions and will reinforce the crosswise weakness in two directions.
2. Non-splitting qualities—normal, solid wood splits easily along the grain. This can be easily seen when driving nails thru it. When layers are laid crosswise, it would be practically unsplitable.
3. Dimension stability—normal, solid wood has a tendency to swell or shrink and is therefore troublesome. It destroys the strength of joints and ruins the appearance by opening gaps and checks. Since plywood has the grain at right angles, the tendency to swell and shrink is neutralized.
4. Availability of relatively large areas—boards may be long but relatively narrow being limited in sawing to the diameter of the log. Wide, solid boards of maximum log width warp badly, since the rate of circumferential shrinkage is about double the radial shrinkage. There are rotary veneer that handles as long as 16 feet but this is not common as they are clumsy.
5. Favorable strength—plywood exhibits unusual strength that can be compared with steel, aluminum and other alloys.
6. Conservation of timber—timber resources of the world are limited and are not being produced as fast as they are used. It is highly important to develop and maintain the most economical utilization of timber.

Plywood qualities depend on particular construction employed. It may be designed for beauty, durability, stiffness, strength, lightness, cheapness, or for many other qualities. With an infinite variety of construction to choose from, there is a wide range of differing characteristics. Among them are those for appearance, strength and for capacity for bending and moulding.

A complete list of industrial products that are now possible or will be made from plywood is impossible, but it can be foreseen that even the near goals that may be reached by any individual product in this age of rapid industrial progress, when each one, old and new is being re-evaluated for its useful characteristics.

Wood as a raw material, has many valuable qualities but like other materials, it has also its individual limitations. Some of them are their fire resistance and increase in durability by wood preservation. The plywood adds a new range of valuable characteristics, beyond those inherent in the wood itself and broadens its application to human comfort and pleasure.

Plywood will continue to find its major uses in building, including houses and home equipment, in aircraft design, in boat construction, as well as in other fields. It is venturesome enough to predict that within the next few years the application of plywood to industry will out-distance them all.

—D. de Leon

MODERN WOOD ADHESIVES

By THOMAS DOANE PERY

(Pittman Publishing Corporation, New York)
Author's Copy Right—1944, *pp.* 1-208

ABSTRACT

Origin of Glues and their uses.—Authentic records of the use of glue dates back to the early Egyptians during the reign of the Pharaohs. A casket was unearthed in 1922 where glue was used extensively in its construction and the glue bonds are as firm as when they were made, some 3,300 years ago.

Beginning with about 200 B.C. occasional references have been found in literature, describing either glue itself or commenting on the art of gluing. It was not until 1690, in Holland, that the first commercial glue plant was founded. In the United States, the first record of a glue factory dates as far back as 1808.

(a) *Animal glues*:

1. Hide glues—This raw material comes from the hide trimmings of cattle, sheep, goats, etc., as well as fleshings, tails, ears, pates sinews, etc.

The first step in the manufacturing process ot hide glue is the washing of the raw stock with pure water to remove the dirt and other loose foreign material. Then treat the cleaned hide with lime water and other chemicals to swell it. The lime loosens the hair and dissolves the albuminous matter always present in the skin.

The next step is the removal of the excess acid and water-soluble salts by means of repeated treatments with fresh water. When the hide is cleaned, soak it in hot water for an indefinite period of time. This hot water treatments is repeated five or six days. The dilute glue liquors are next put thru vacuum evaporators to remove a part of the water. This flow into an endless rubber belt 30 inches wide, which travels thru a chill box. At this point they are cut into lengths of approximately six feet, broken into smaller pieces, ground and finally packed in suitable containers.

2. Bone glues—The bones consists of head, jaws, knuckles, feet, etc. The glue made from this type of material is in most cases clean and free from odor. Consequently, the glue produced is of a high grade.

A much shorter time is required for the various steps of manufacture of the bone glues. They are washed, cleansed, and boiled for the extraction of the glue. Higher temperatures and longer heating periods generally are necessary.

(b) Vegetables clues. This consists of two or more blended grades of cassava flour, together with certain chemicals, which are combined and prepared according to predetermined laboratory standards, for the convenience of the customer who requires a uniform quality adapted to simple factory procedures.

A properly mixed vegetable glue is translucent, colorless or of an amber shade, viscous and rather tacky. Caustic soda is usually added to make them stringy and less viscous. The amount of water required in mixing the glue varies from 1½ to 4¼ parts of water to 1 of dry cassava flour. The temperature of the mixture should not be allowed to go above 160 degrees F, as higher temperatures are likely to caramelize the mixture and greatly reduce its adhesiveness. Mixtures that have stood for several hours should be stirred for a few minutes before transfer to the spreaders. Then they are piped and pumped to storage tanks to release the mixing equipment.

A few minor sources of wood glues are the following:

1. Casein glues—made from milk from which the cream has been separated.
2. Soy bean glues—made from soy beans.
3. Synthetic resin adhesives—made from phenol-formaldehyde resin, urea—formaldehyde resin, urea resin, Melamine—formaldehyde.
4. Silicate of soda glues—made from sodium silicate and casein.
5. Albumin glues—made from animal blood.

—F. Mabanag

WOOD PULP

By

United States Pulp Producers' Association
Published by William E. Rudge's Sons, U.S.
January, 1944, *pp.* 35

ABSTRACT

Wood Pulp by the United States Pulp Producer's Association published by William E. Rudge's Sons, U. S., January 1944 is an interesting booklet. It portrays the valuable role that wood pulp renders to humanity as "a weapon of war and an instrument of peace." The booklet depicts how we depended on paper, a product of wood pulp. In times of peace, educational advancement and improved living standards were made possible through the use of printed words in textbooks, magazines and newspapers. In times of war, printed words help the armed forces with the aid of manuals and books. Selling of war bonds, promoting conservation and transmission of military orders were made possible through the medium of printed words.

Paper was also used to wrap and pack efficiently, economically and of less bulk the army rations, medical supplies, blood plasma, munitions and weapons; multi-walled paper sacks and paperboard cartons were used. Final victory was hastened and lives were saved because goods were shipped and received in usable conditions when and where they were needed.

Sanitary products in the forms of tissues—towels, facial tissues, toilet and napkins were made from soft, absorbent wood pulp. Being so economical and in adequate supply, it greatly helped in preventing the spread of infection and disease. New fiberbase products have also been derived. Rayon production was increased to serve as powder bags for guns, military tanks and tires. Cellophane was used for wrapping. Plastics and film, too, were made from wood pulp.

The importance of wood pulp in America is seen by the fact that it is the sixth largest industry. There were eight mills in 1820 and produced 1,077 tons. The latest figure (1942) reported an output of 10,227,720 tons.

Wood pulp is a mass of separate fibers obtained from wood by mechanical and chemical means. Mechanically, it is produced by grinding the wood into a fibrous state through large revolving grindstones. Large quantities of power and water are required to produce one ton of pulp out of one cord of wood. By chemical process, sulphite, soda and sulphate are used. Wood is boiled by high pressure and cooked in chemical combinations. Various types of soft and hard woods are used.

The industry has found varied responsibilities such as reforestation, forest fire prevention and conservation of water supply. Pulp and paper depend upon an adequate and continuing supply of pulpwood.

—J. L. Avellano

TREE RING HISTORIAN

Meet Arizona's Dr. Douglas Founder of Dendrochronology and apostle of good cheer

It takes brains to be a scientist. Perhaps it takes more brains to originate a science. And that's just what a veteran member of the Tucson, Arizona, Rotary Club—Andrew Ellicott Douglas—did 50 years ago when he gave birth to a brain baby now known as "Dendrochronology." This word is now only polysyllabic mouthful, but to many is undoubtedly meaningless, as it was to four women of the Tucson Busy Bee Bridge Club, who recently were gossiping about their distinguished fellow townsman.

"Let's see! Ellicott must be well over 70, but they say he's still playing with wooden blocks."

"Yes, my dear, and he's been doing it for more than 40 years. They say the habit is incurable!"

Then each picked up her hand and conversation languished.

Had these good women followed through, they would have discovered that this "playing with wooden blocks" represents the outward and visible sign of profound and scholarly research in the field of tree-ring chronology. It is the study and interpretation of tree rings as a guide to the relationship of climate to the sun, fixing the history of the sun through the history of climate, identifying the alternating periods of drought and rainfall through the centuries, establishing the linkage of astronomy with tree rings, and, finally, the application of cycles to these long climatic records.

The "blocks," which have been Dr. Douglas' lifelong playthings, are bits and pieces, sewed or bored from living fir, pine, and juniper trees, mostly dating from the pre-Christian, or early Christian Era. One beautiful specimen at the Laboratory of Tree-Ring Research at the University of Arizona is an Arizona veteran whose birthday was A. D. 11. Other tree-ring exhibits include samples sawed from ancient beams which supported adobe huts centuries ago. In their immutable concentric rings the scientist has read accurately, and recorded with authority, the story of drought and rainfall for each and every year for the past several centuries.

While the larger part of the Laboratory's vast collection of dated rings has been gleaned from semi-arid Arizona and New Mexico, there is also a comprehensive and imposing array of huge slabs some of them 6 to 8 feet in diameter cut from the giant sequoias in California. There are also sample cuttings from old sequoias dating back to centuries before Christ.

How did this new science begin? Well, in 1901, young astronomer Douglas, of the Flagstaff Observatory, 12 years out of Trinity College, leaped into a buckboard with Fred Preen, forest supervisor, and bumped over miles of rough terrain on a month's inspection of the wooded areas of northern Arizona. Already intrigued by previous study of the effect of sunspots on the earth' climate, it occurred to the young scientist that in those semi arid regions the extensive stands of pine and fir might yield in their tree-rings the full story of the past in the matter of rainfall and drought. From this "hunch" it was easy to secure the assistance of a kindly lumber company, which sent him hundreds of cuttings from carefully selected areas, emphasis being on "carefully selected" because samples from trees receiving moisture from any other source than rainfall would be valueless. The Doctor's definition of growths watered by nearby springs or streams is "complacent" trees. The chief contributors to tree-ring research were, and always have been, Douglas fir, ponderosa pine, pinon pine, and scopulorum juniper.

Practical application of dendrochronology came first to the archaelogist. These prowlers amidst ancient ruins formerly had as medium with which accurately to date their discoveries. Now, thanks to tree-ring science, they can send a piece of an old beam or rafter to the University Laboratory. There Dr. Douglass' staff compares the sample with like sections cut from a series of living trees which have been definitely calibrated and dated. Thus they can tell the archaelogist just how old is his precious ruin. Several datings thus arrived at go back to the 3rd Century A. D. In time it may be possible to go back 10,000 years in labelling the birth dates of men's primitive dwellings and artifacts.

One of the most dramatic stories of this work took place in 1929. At that time, Dr. Douglas and his associates had established dates for only part of their tree-ring calendar. To fill one important gap they needed a link—a sort of tree-ring Rosetta Stone to bridge the time. When such a tree was found near Showlow, Arizona, the scientists in one night were able to establish definite dates for 30 other ruins.

Tree rings also contribute to hydrology—the history of the run-off of rivers in particular. Such a contribution was made in 1941 when the engineers of the Hoover Dam called upon Dr. Douglas to report the history of run-off in the mighty Colorado River. After two months' hard work, the staff had a neat historical package all tied up and delivered to the operators of this monumental hydro-electric project.

A third significant contribution of tree-ring study is the formulation of a climatological hypothesis, from which eventually, it is hoped, valid forecasts can be made of what the weather will be for the next century or so.

The studies already show that in each century there has been one notable drought. Every 300 years there were great droughts. The last such dry period was from 1880 to 1904. But others came in the 16th and 13th Centuries.

"Ellicott," as his friends affectionately call him, has been a Tucson Rotarian since 1929. Seldom has our Rotary Club welcomed a man of such distinguished scientific luster. Nor can any of its 170 members surpass his cheery disposition, sparkling conversation, and withal his commendable modesty. At 83 he still seems possessed of abundant vitality, which is more than equal to discharge the duties of his professional career. He even has a lot left over to liven the table repartee at our weekly Tucson Rotary luncheons.

—CHARLES WAYLAND TOWNE
From "THE ROTARIAN" May, 1951: page 19-20.

ALABAMA REPLANTS ITS FOREST

Tall Pines will tower tomorrow—mostly because of a Rotary Club

It's easy to take trees for granted. They shade so many billion acres of this old earth that it's natural to think they always will. But, in the words of the old Southern melody, "it ain't necessarily so." Logged off, burned off, eaten off by insects, forests need to be renewed—and a man who has been saying so in his community for a long time is Euel A. Screws, of Opelika, Alabama.

As the leader of a movement that is turning wasteland into woodland, Rotarian Euel A. Screws was the man your Scribe wanted to see. So... booted for hiking and bursting with questions, I headed for the lumber and cotton town of Opelika (population, 12,264) in eastern Alabama. And there I saw a reforestation project that might well serve as a model for any town or county that wants its children to know the beauty and value of a tree. A project, I might add, that is backed by the State, schools, landowners, city dwellers, civic organizations—and the Opelika Rotary Club.

Standing amid rows of newly planted pine seedlings in Alabama's Lee County, Rotarian Screws traced for me some of the steps that led to the planting of the first seedling. Things looked pretty bad, he said, when they made him Lee County chairman of the "More Trees for Alabama" campaign some years ago. Fire was destroying much valuable timber every year, and sawmill cutting was exceeding the rate of new growth.

Rotarian Screws soon set out to show the people of Lee County what needed to be done. From the State Forestry Department he acquired films of burned forest areas, soil erosion, and wasteland. And he armed himself with hard-hitting facts about good forest management. Now he was ready to put his forest-education program in high gear. He began showing the films and giving talks to schools, garden clubs, and service organizations—Rotary, Lions, Kiwanis, and others. Within a year he had reached more than 8,000 people, and had won helpers in all parts of the county.

His next move was one he counted on heavily. It was a bid for the all-out backing of the Rotary Club of Opelika. At a Club meeting he described his plea, told his fellow Rotarians that Lee County needed thousands of seedlings put in its soil. And the work had to be done by machine, he explained. Hand planting would be too slow. Before the meeting was over, Euel Screws had the promise of two machine planters. His Rotary Club had voted $850 to buy them.

Recently the Club bought its third planter, and landowners who want to reforest their acres rent the machines at 50 cents per 1,000 trees. Thus the program is self-supporting.

While we chatted there in the field, Rotarian Screws pointed to the machines making their furrows for the seedlings and then packing the soil around them. "We average about 18,000 seedlings a day with both planters going," he said. "The first Winter we planted 375,000 seedlings, and the next year more than 570,000. The 1950-51 planting totalled 842,225, and for the 1951-52 season we have ordered over one million seedlings."

But tree planting isn't the only concern of Euel Screws and his team of foresters. They're doing things about fire control that have reduced costly blazes by about 70 percent. Mobile fire trucks and radio-equipped fire towers help to do the trick. And increased timber yield is being achieved by instructing woodland owners in a forestry practice called selective cutting.

In this big job to renew forest lands, Opelika Rotarians see something besides tree planting and fire control. As Euel Screws put it, "We are growing more trees, but we're also creating closer ties among Opelika businessmen and woodland owners."

As I departed, I thought of those thousands of seedlings not only as a State's valuable economic resource, but also as sort of living monument to some Rotary enthusiasm, goodwill, and foresight.

Yours,

THE SCRATCHED PAD MAN

From "THE ROTARIAN", May, 1951; page 10

COLLEGE NOTES

(*Continued from page* 30)

NASIPIT LUMBER COMPANY DONATES SUM TO U.P. FORESTRY SCHOLARSHIP

Sept. 10—Confirming its offer of a ₱6,000.00 donation to the University of the Philippines for a 4-year scholarship in the College of Forestry, the Nasipit Lumber Company sent today, through Dean Florencio Tamesis, a ₱1,500.00 check to the President of said University to cover the first year's expenses of the student who will be granted the scholarship. This scholarship is entirely different from the other scholarships in the College in that the applicant must be a mechanical engineering graduate. With such a background, the beneficiary after finishing the forestry course will be proficient to handle a key job in the sawmilling and logging work of lumber companies. The forestry course, being primarily intended for training men in the scientific management of forests, does not give specialization in engines and machineries used in lumbering operations, but proficiency in engines and machines alone is not enough to efficiently handle those operations. Private companies need trained men in both lines, according to Mr. Juan S. Versoza, General Manager of the Nasipit Lumber Company, and this prompted his company to offer the donation for this kind of scholarship. (Mr. Versoza is an alumnus of the College of Forestry).

PENSIONADO CLUB INITIATES SOCIALS IN COLLEGE

In spite of the rainy day, the Pensionado Club managed to push through successfully an afternoon refreshment and dance on September 2, 1951 in the park pavilion. It was the first dance in 2 years sponsored by a group of forestry students, hence it was most welcome and well-attended. Main attraction was the presentation of the Muse candidates (see pictorial section) of the club for the forthcoming Forestry Day, they are: Misses Luz Carangal of Calamba, Laguna; Natividad Malacoco (daughter of Sup. Ranger Evangelino Malacoco) of Sta. Cruz, Laguna; Josephine Calma of the College of Agriculture; Felicitas Palis of San Antonio, Los Baños, Laguna; and Ramona Gille of Manila (now studying in the College of Forestry). Tranquilino Orden, Jr., President of the Club, took occasion to expound the purposes of the club among which are to work for improvements of the College and the forestry profession. Dean Tamesis and family, Professor and Mrs. E. de la Cruz, Prof. G. Zamuco and C. Mabesa were the distinguished guests. Teamwork and industry of the members, particularly the President, PRO Segundo Fernandez, Ambrosio Juinio and Mario Eusebio, made the affair a success.

STUDENT BODY ACTS

The Forestry Student Body Organization ratified an amended Constitution and By-Laws on August 2; among the important amendments were: abolishing of a fixed date and time of regular meetings, creation of an election body and the position of Athletic Manager, specification of grounds and procedure of impeachment, changing the date of installation of second semester officers, etc. In the Sept. 2 meeting, the date of Forestry Day celebration was set for December 2, and contribution for a sickness fund was approved.