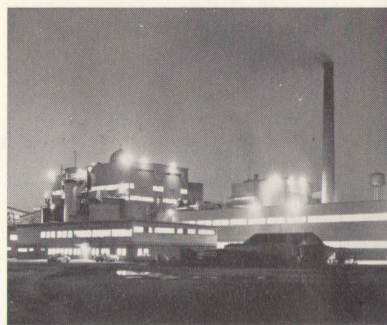
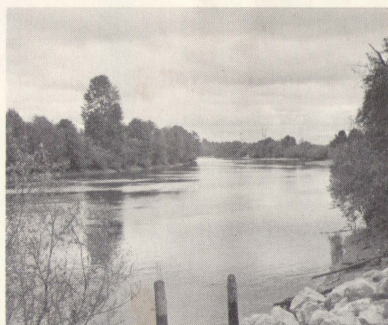
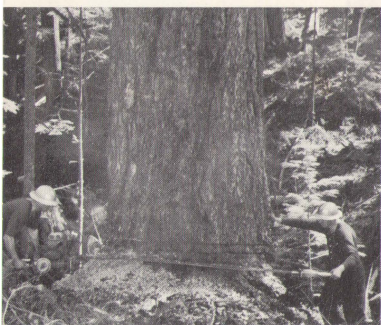


Wood, water, power and people

The story of
Weyerhaeuser Timber Company's
Everett Kraft Pulp Mill





Wood, water, power and people . . .

Where the Snohomish River empties into Puget Sound, the four essentials of pulp-making have been brought together in a complex, yet exceedingly compact, bleached kraft mill: Wood from the fir-bearing Cascades to the south and the east; cool water coursing down the mountains after being dumped from ocean-born clouds; steam and electricity generated from sawmill leftovers and oil; people who are descended from pioneers who came to harvest and to process Nature's most versatile gift to man.

Washington's Puget Sound is rimmed with evergreen trees and with mills and people who work the products sawed and processed from the tree farm harvest. Weyerhaeuser and others have invested in the capacity of this land to provide forest products for America forever. This

part of the Pacific Northwest is a temperate land, a vigorous land, a prosperous land.

Wood is man's oldest, most familiar, most useful industrial raw material. Today, through chemistry and engineering, wood can be transformed into a myriad of paper and paper products. This is due to the cellulose fiber which grows in all woods. These microscopic fibers—more than a million of them in an inch-square wood chip—are as strong as a comparably sized strand of steel.

Here is the story of how Weyerhaeuser releases those fibers—250 tons of them a day—from the Douglas fir for use in some of the more than 20,000 varieties of paper and other cellulose products now manufactured in the United States.

wood is grown on tree farms

With the faller's cry of "TIMBER—DOWN THE HILL!" another Douglas fir thunders to the forest floor. The faller's powersaw quickly bucks the tree into acceptable log lengths. A chokerman works a steel cable around the log end, and a roaring tractor slowly pulls it to a landing. There the log is loaded onto a diesel truck which runs on private, company-owned roads because its ten-foot bunks are too wide for public highways.

At a reload station, the entire truckload is transferred to one of a string of waiting railcars. Log trains, powered by diesel-electric engines snake their way down through the hills to a company log dump. Then the logs are rafted and towed to Weyerhaeuser's integrated Everett forest products plants.

The log harvest is carefully planned. Selected blocks of timber are cut, and the areas surrounding them provide the seed source for the cutover block. This system also provides the clean, open and sunlit ground needed to establish the new generation. This forest-area selection system has proved to be most effective in the fir region. Clear-cut and clean-logged areas also mean better utilization of forest raw material and less fire hazard.

Before the major log harvest, areas scheduled for cutting have their under-story of smaller trees removed. This is termed prelogging. These trees which might have been smashed during the major harvest, are ideal for kraft pulping.

Loading a truck at the landing



Log train heads for the dump



Another raft of logs being towed to Everett



Stripped bark is used for fuel

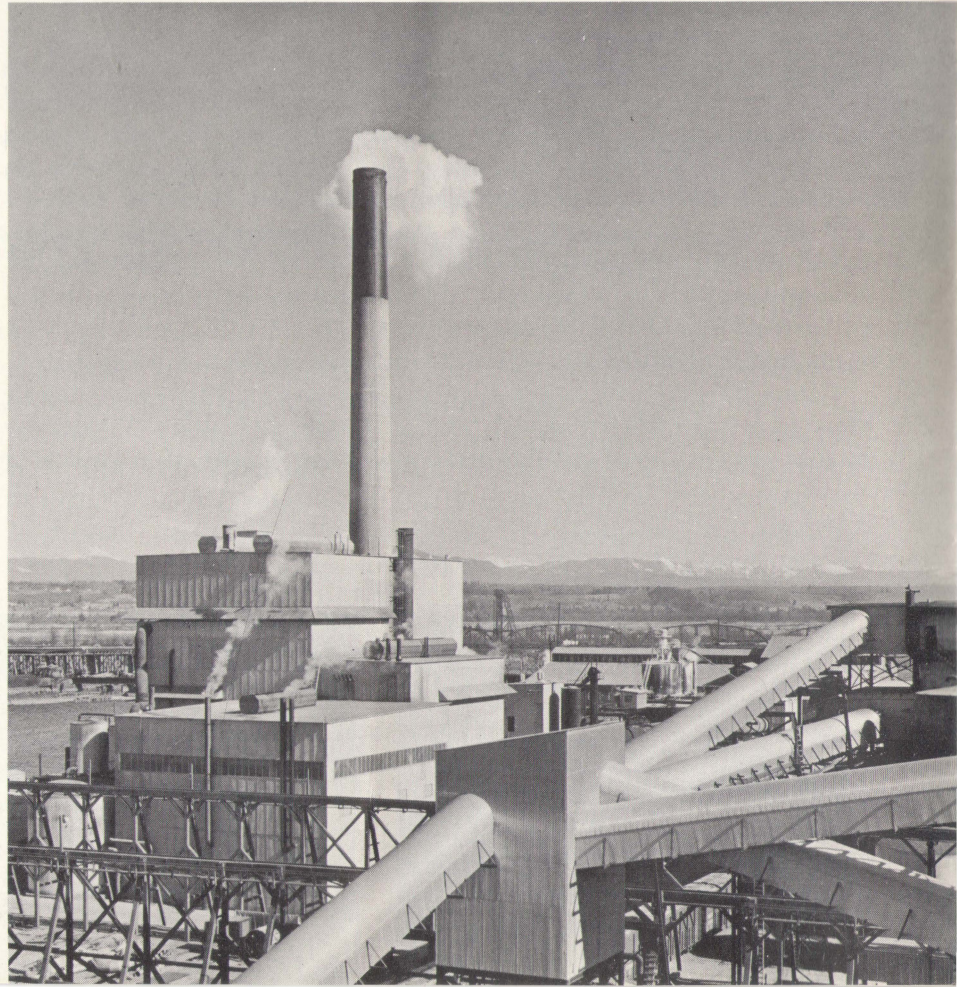


Edgings, trimmings go into the chipper

Chip conveyors converge near storage silos



Producing the most



from every log

By using Douglas fir chips from the company's two Everett sawmills and from Weyerhaeuser mills in Enumclaw and Snoqualmie Falls, the kraft mill produces 250 tons of pulp a day without a single extra tree being cut on company tree farms. The chips are made from edgings and trimmings leftover from sawmilling, in which square lumber has to be cut from round logs. Much of this material was formerly burned for fuel, but with the kraft mill it finds a much higher and more productive use.

Logs entering the sawmills are hydraulically stripped of their bark. Barking benefits lumber production, because the sawyer can better "read" his log for defects and cut it for higher-quality lumber. Also, chips destined for pulping cannot have any bark as the bark will not cook properly in the pulping digesters. Hydraulic barkers have been exceedingly important keys in opening each harvested log to its highest and best use.

This kraft mill is one of the few in the Pacific Northwest not to have its own wood-preparation department. Chips from the two Everett sawmills are conveyed to the silos by endless belts from Mills B and C. Those chips made at Snoqualmie Falls and Enumclaw are loaded into specially constructed railcars and hauled to Everett.



Kraft mill has 1¼ miles of chip conveyors



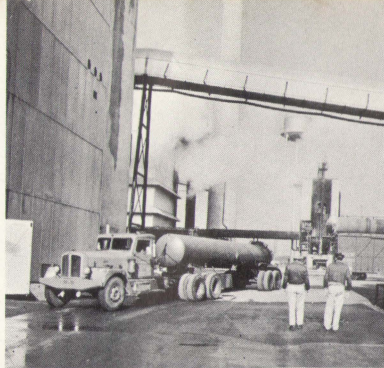
Unloading special chip car



Screening the chips for size



Water is filtered, treated



Chemicals arrive by truck



Chlorine arrives by train



And, chemicals arrive in bags

Pulping is a chemical process

While the prime requisites of any pulp operation are wood, water, power and people, the cooking, bleaching and water-treatment chemicals are vitally important.

Here is the formula for one ton of finished kraft pulp: 2.6 air-dried tons of wood chips, 75 pounds of salt cake (sodium sulphate), 60 pounds of limestone, 60 pounds of burnt lime, 76 gallons of fuel oil, 200 pounds of chlorine, 75 pounds of caustic soda, 14 million BTUs of steam, 535,000 kilowatt hours of electricity and 65,000 gallons of filtered water.

Each 24 hours the kraft mill sucks in 25 million gallons of water from the Snohomish. The intake is six miles upstream from the mill at a salt-free spot. All this water is purified with alum, chlorine and several other chemicals.

Chlorine, used for bleaching the pulp as well as for water treatment, is extracted from salt evaporated in

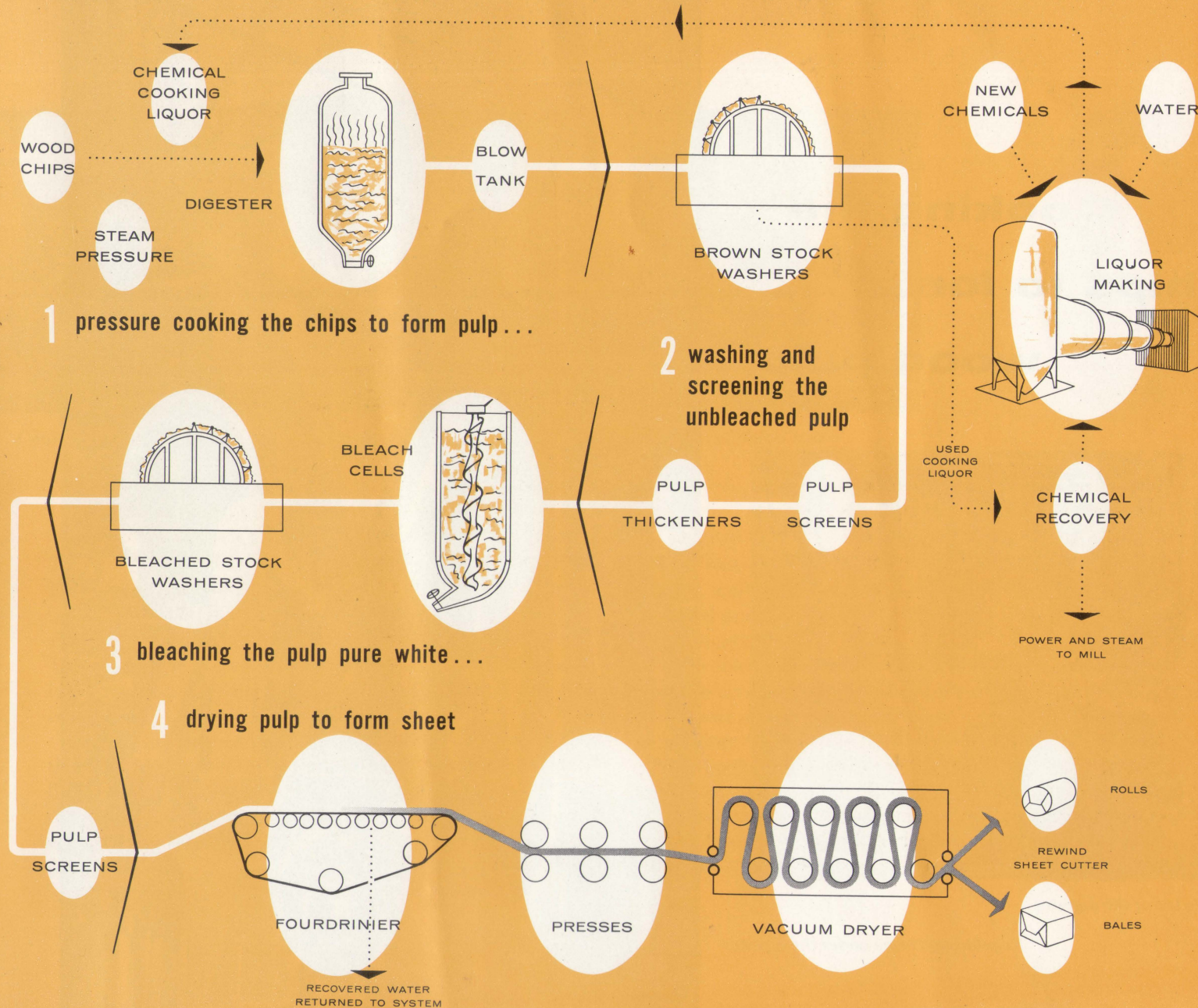
basins on the shore of San Francisco Bay. The chlorine becomes a gas in the electrolytic process, and from the residual solution comes caustic soda, used in pulp bleaching operations.

Salt cake, another cooking chemical, is mined from another prehistoric lake deposit near Death Valley California. These deposits are sodium and potassium salts. Lime, also used in kraft cooking liquors, is dug from a British Columbia quarry.

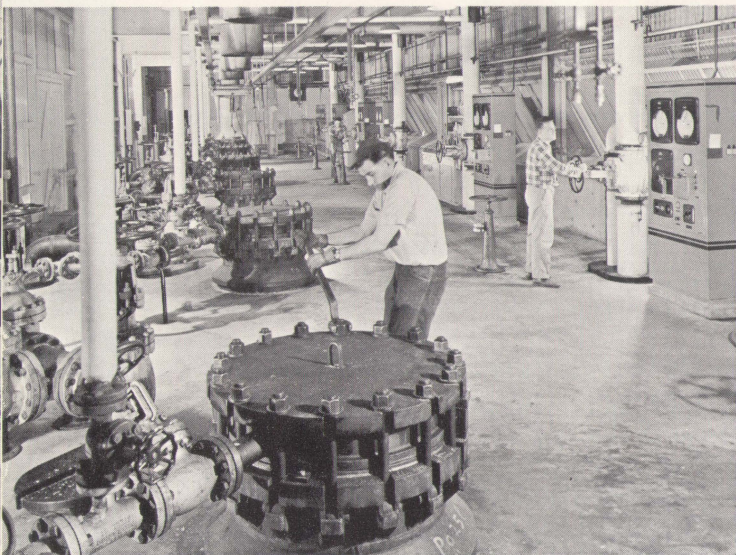
Fuel oil for power is shipped from Texas. Wire for baling the pulp packages comes from Sparrows Point, Maryland and from Duluth, Minnesota.

The raw materials needed at this mill literally come from all over the nation. And, the pulp produced here is shipped to paper-mill customers as widely scattered geographically.

step-by-step chart of kraft pulp process

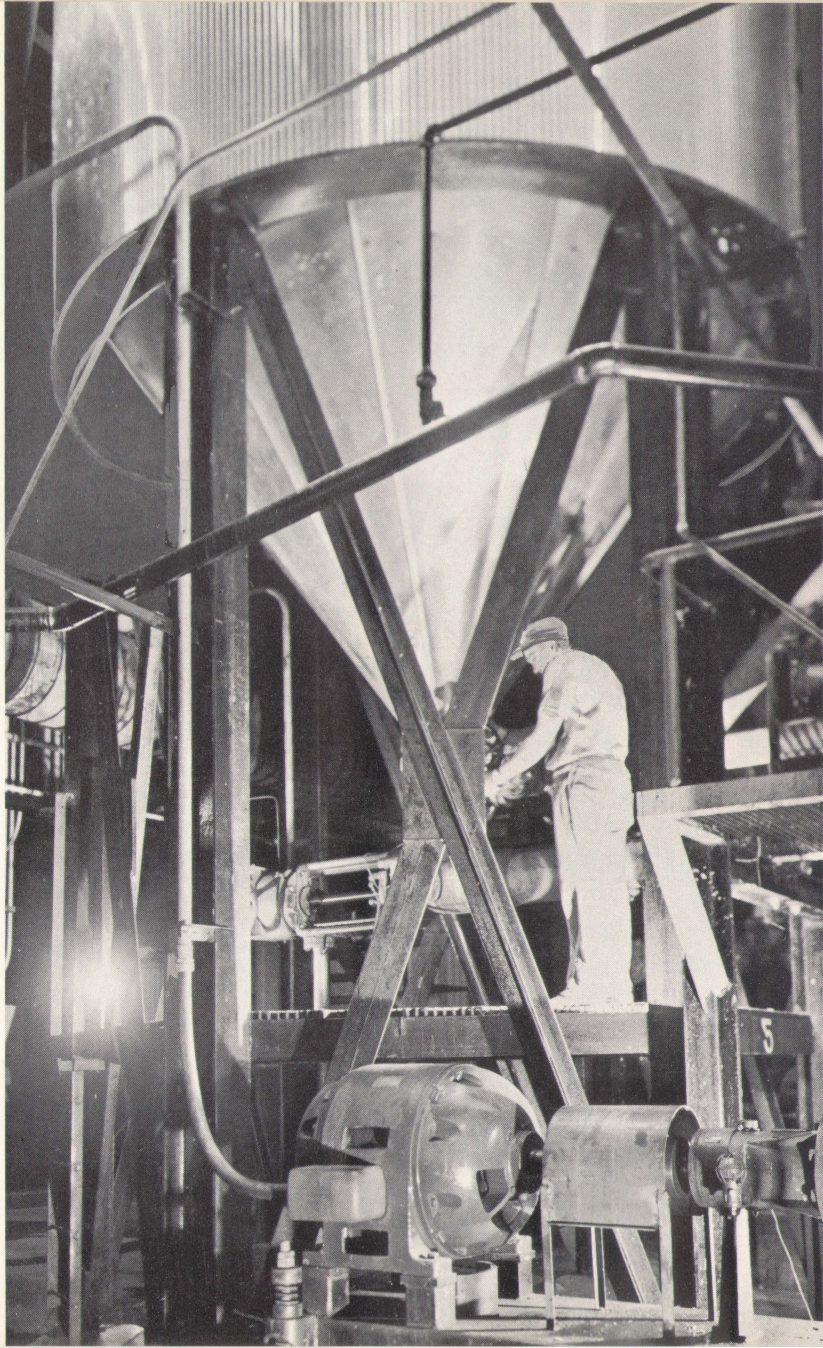


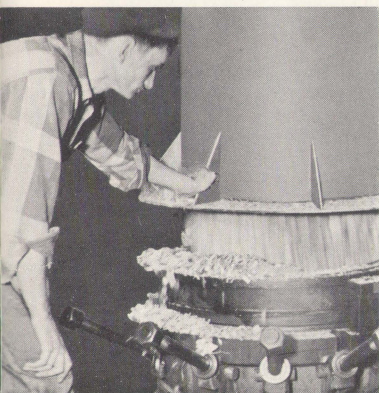
**Cooking the
chips to form
wood pulp**



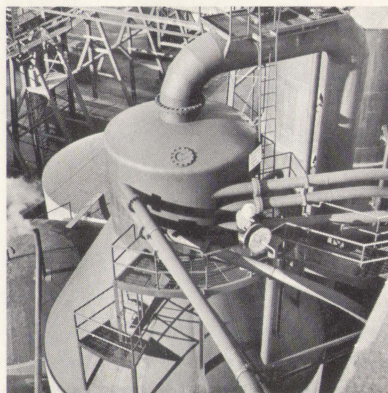
Securing the top of the digester

Regulating a valve under the digester

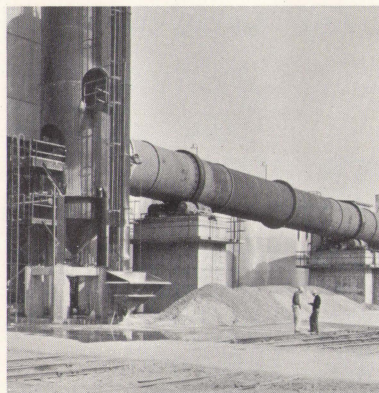




Chips going into digester



Top of the blow tank



Lime kiln is 275 feet long



The first step in kraft pulp-making is cooking the chips. Forty tons of screened, uniform-size chips are dumped into one of the six digesters. Cooking chemicals—lye (sodium hydroxide) and sodium sulphide—are added. The top of the digester is sealed with heavy bolts. Steam is introduced. The digester, in effect, is a gigantic pressure cooker.

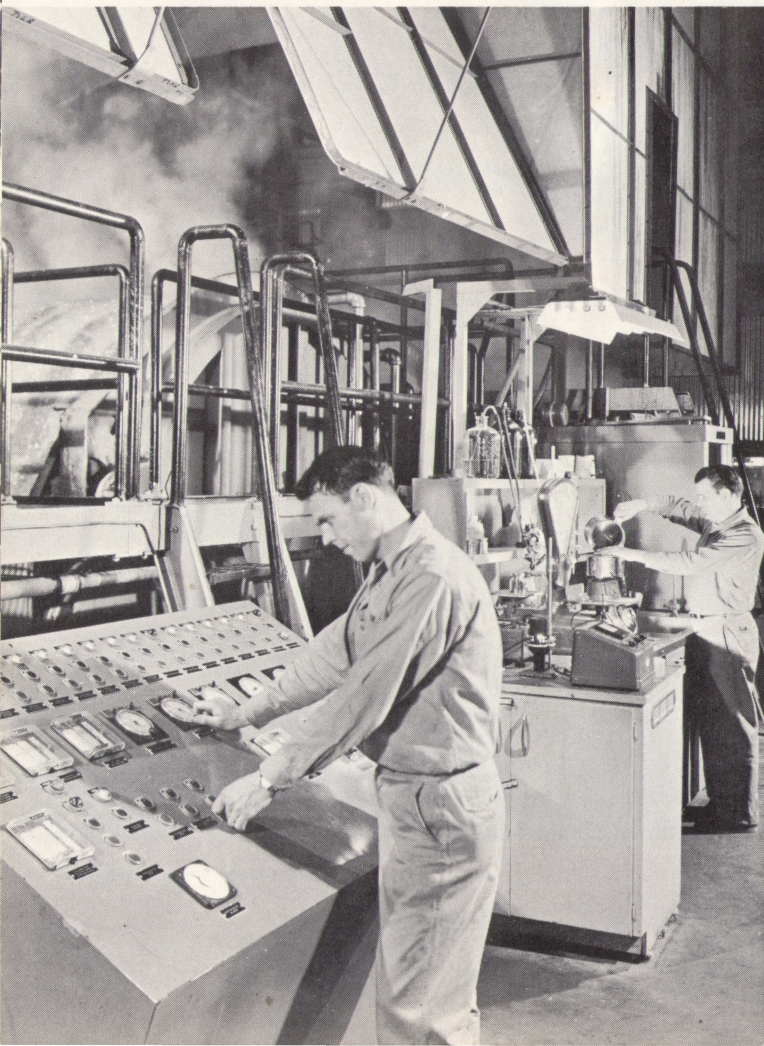
A pump at the bottom of the 54-foot digester circulates the cooking liquor through the chips. The “cook” carefully watches his recording instruments to check the changes taking place in the digester. Heat and pressure activate the cooking liquor and it begins to penetrate the fibers of the chips.

The non-fibrous materials in the wood—lignin, wood sugars, and other chemicals—dissolve. The fibers are loosened and freed from the cementing bonds which held them together.

The cooking pressure is lowered after about 3½ hours, and the contents of the digester are blown into a tank. The kraft fibers are dark brown at this stage of the processing.

The cooking liquor is not wasted; the chemicals are recovered and re-used to cook a new batch of chips and the non-fibrous wood materials are evaporated into a thick oil-like substance and burned in a furnace. This recovery furnace creates both steam and power.

Pulp is washed, screened, bleached



From the blow tank, the kraft fibers go to a de-knotter, where pieces of wood knots are removed. Then the stock is washed and all traces of the cooking chemicals removed.

In the screening process, the pulp stock is flooded over fine screens which only pass completely separated fibers. Finally, the pulp is thickened preparatory to bleaching.

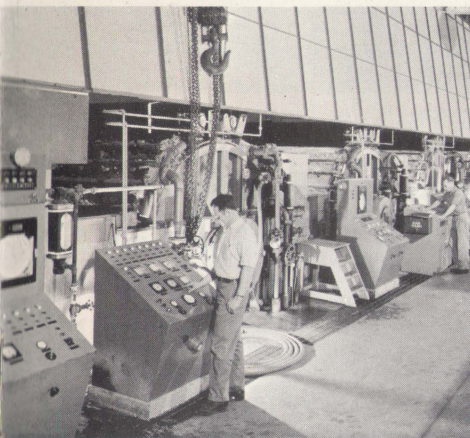
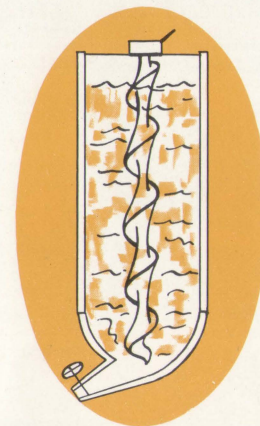
The bleaching takes place in six stages. At the climax of each stage the ever-whitening pulp passes over an open washer where the chemical changes effected on each stage can be observed. Here, as elsewhere through the entire pulping process, trained men make extensive tests to ensure the continuous quality of the pulp at every stage.

The dark brown fibers are first treated in a chlorine solution, the fibers changing from brown to a brilliant orange color, then by caustic soda, which turns the fibers brown again. The brown color changes into a semi-white color during the third step: hypochlorite. The fourth bleaching step is again caustic; and the fifth is once more hypochlorite. After bleaching, the pulp is neutralized with acid. The now-white fibers are rewashed and readied for the final processing step—drying and sheeting.

Careful controlling is necessary during brown stock washing



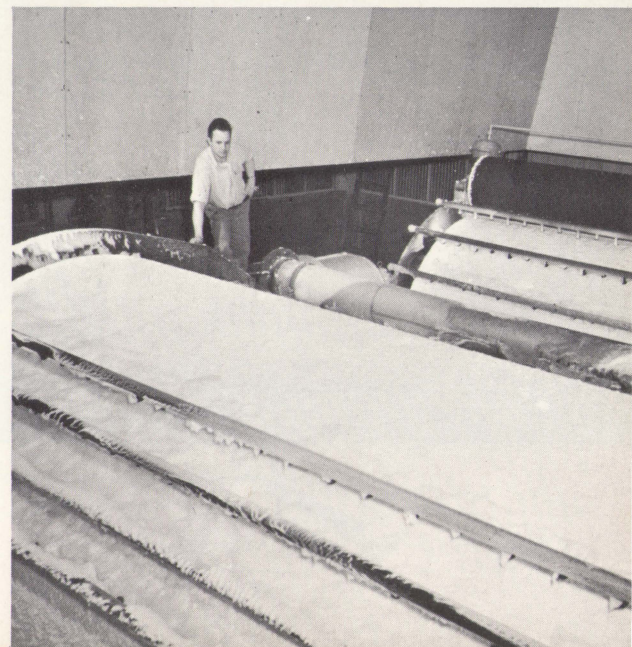
Unbleached pulp going over flat screens



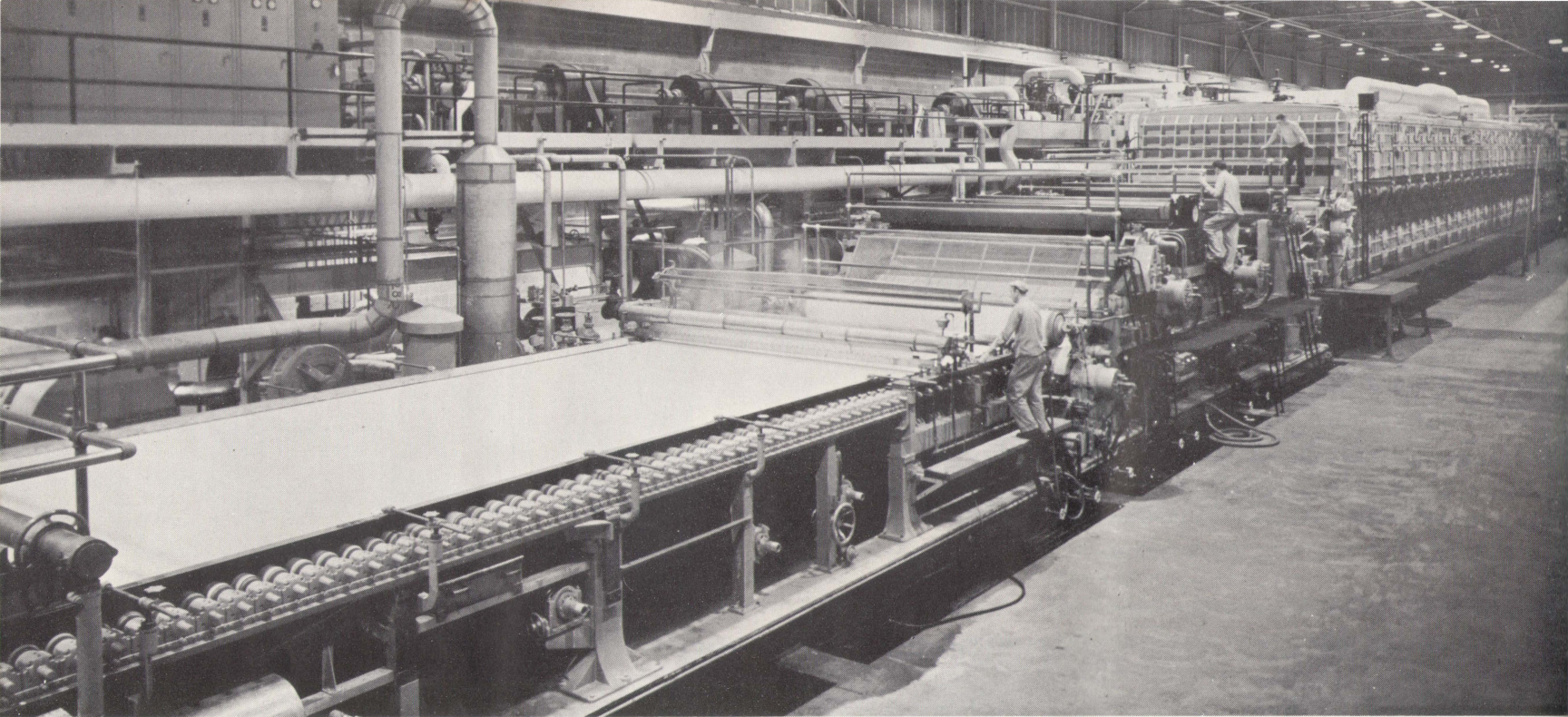
Bleaching is controlled at these panels



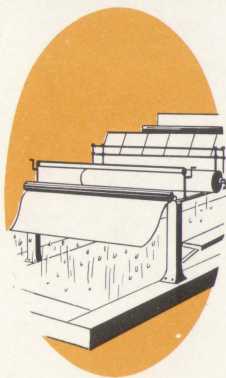
Inside a pulp bleaching cell



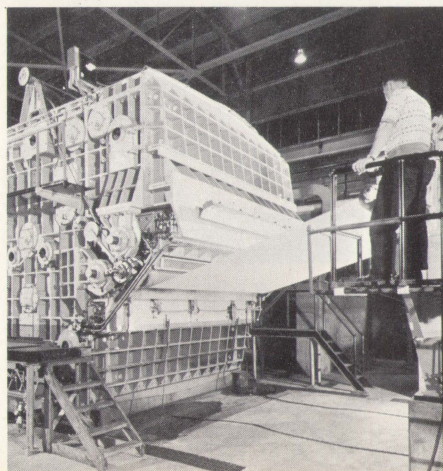
White pulp enters final bleach stage



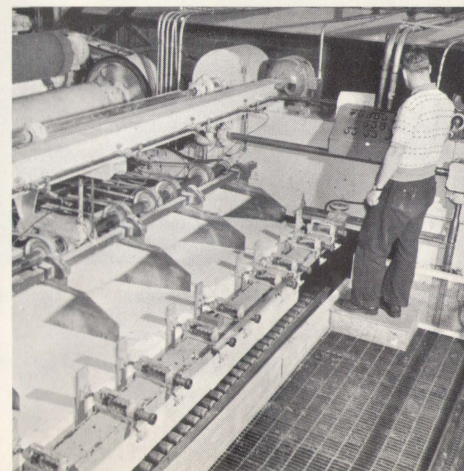
Fibers form into a sheet on the Fourdrinier



Pulp emerging from drying machine



Some pulp runs are cut into sheets

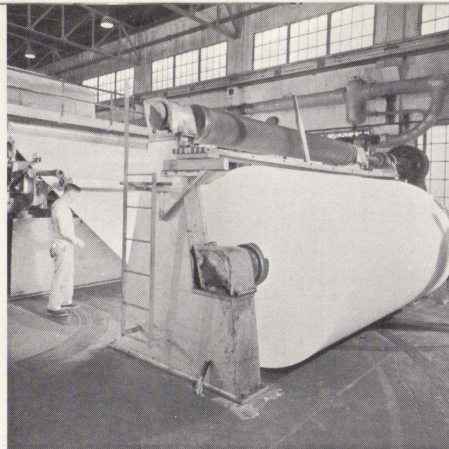


The fibers become a continuous pulp sheet

The final major pulp-making step is forming the bleached fibers into sheets for shipping. In the kraft mill's 380-foot-long machine room the fibers are aligned on a Fourdrinier. This machine has a wire screen 95 feet long carried on 52 rubber rollers, over which the wet pulp passes. The pulp then goes through several press sections which press still more water from the fibers. The fibers, pressed into a moist sheet, are fed automatically into a huge drying machine with 48 drying drums. This machine is a vacuum type and the moderate temperature efficiently dries the continuous pulp sheet to the desired moisture content.

As the pulp comes from the machine's "dry end," technicians take periodic samples for running quality-control tests.

The kraft pulp is either cut into sheets for packaging in 400-pound bales or wound into rolls—whichever the customer prefers. Two 1000-ton automatic hydraulic presses are used in the baling process.



Some customers specify kraft pulp in rolls



Fork truck loads a ton of kraft into a boxcar

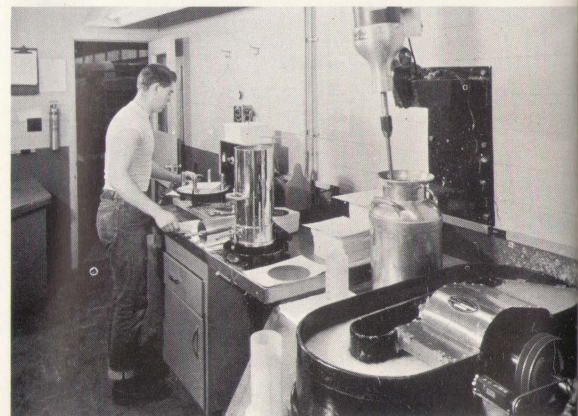
Ensuring pulp quality



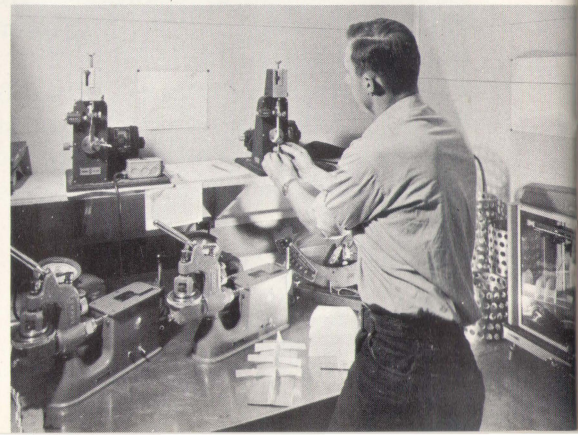
Constant quality control tests are run during all stages of production



Records are kept and filed



Making test samples of paper



Fold test on paper samples

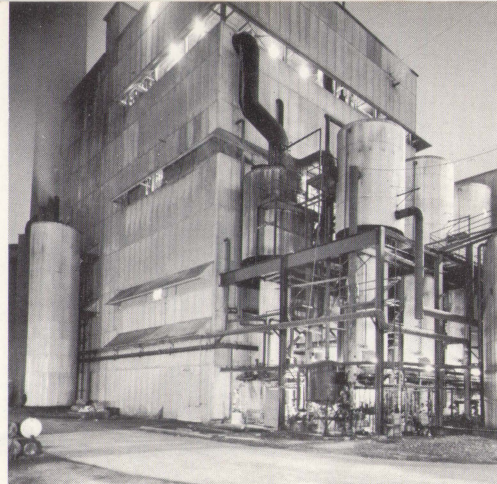
During the pulping process unbelievably strict quality controls are necessary. Pulp mill customers require a consistent, high quality product so that their own paper-making processes can operate smoothly. If a pulp mill's cooking process varies slightly, or if the bleaching is off a bit, or if the water treatment is inconsistent, the final product will be unsatisfactory.

The water filtering plant undergoes nine hourly tests. Every hour there are 35 different tests made in the bleaching group. The digester section makes 25 control reports an hour. In the powerhouse, a maze of dials and controls, 62 hourly readings and reports are made.

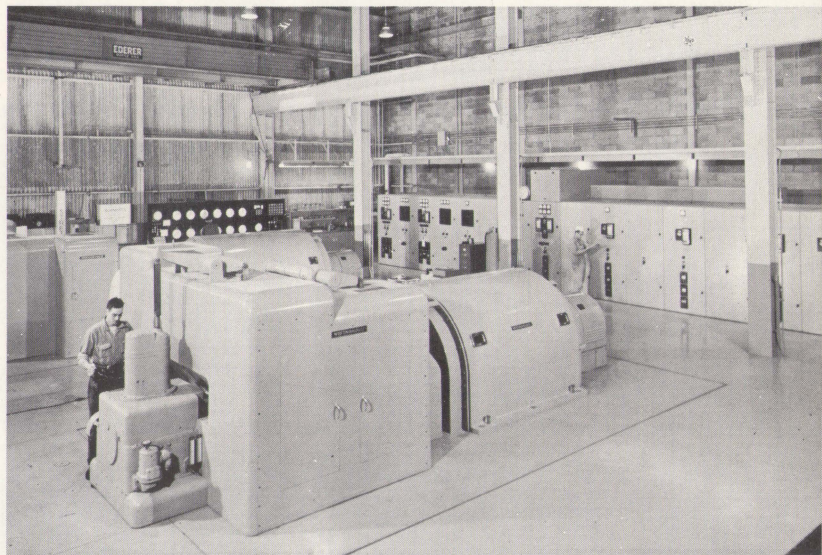
And, the finished pulp undergoes 10 major control studies before it is baled and shipped. Records are kept of all the various tests, so if a question of quality does arise, the reports can be checked.

Pulp research, too, is important in ensuring quality of the present product and leading the way to new and better products and processes. Weyerhaeuser pulp scientists pioneered the production of the bleached kraft process with Douglas fir as the basic raw material.

Utilization and disposal of pulp waste materials have been and continue to be major pulp research activities. Atmospheric and stream pollution problems are closely related to all pulping operations. Continuing studies have produced results in these fields.



Portion of black liquor evaporators



Section of the powerhouse and turbo-generators

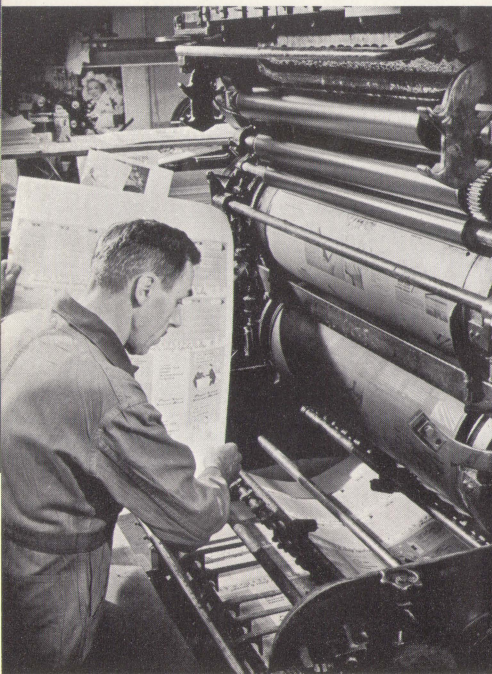
Bleached kraft **pulp in your daily life**

Some of the rolls and bales of bleached kraft pulp which leave Everett every day for converter customers all over the nation soon return to Everett in a thousand or so different forms. In fact nearly everyone in Everett uses some product every day made from Weyerhaeuser kraft pulp.

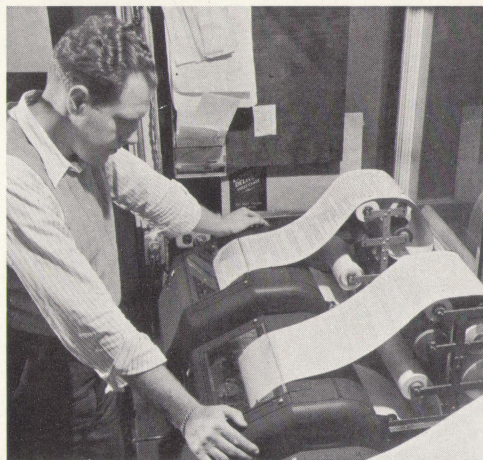
Your neighborhood drugstore carries a number of magazines printed on paper made from Weyerhaeuser bleached kraft: *Look*, *National Geographic Magazine*, *Readers' Digest*, *Boys' Life*, and many others.

Drugstore items packaged in attractive kraft-basis paper: toothpaste, shaving cream, soap, and other toiletries made by Colgate-Palmolive-Peet Company; and

Kraft goes into many printing papers



Kraft and the news of the world



Food packaging is major kraft use



various kinds of paper diapers, sanitary paper products, tissue papers, paper bandages.

Grocery and "super market" shelves are laden with a wide variety of items sanitarily packaged in kraft-basis papers: Jell-O cartons, Chiclet chewing gum boxes, Beechnut and Dentyne chewing gum wrappers, Camay soap wrappers, Lipton, Salada and Tenderleaf tea bags, Chase & Sanborn coffee bags, Chesterfield cigarette cartons, the many cookie and cracker packages of National Biscuit Company, Pabst and Ballantine beer and ale six-can carriers, Brillo cartons, Proctor & Gamble boxes of soaps and detergents—Tide and Duz, and a host of other products.

Stationery shops carry full lines of writing, printing, blotter, cover and other paper types, many of which are made with Weyerhaeuser bleached kraft. Several nationally distributed lines of greeting cards and those published by New York's Metropolitan Museum of Art are printed on paper made from kraft manufactured in Everett.

Books, pamphlets and hundreds of other printed media of communication, as well as industrial filter papers, ice cream cartons and other paper products without number are also manufactured from kraft stock.

Currently every person in the United States consumes, on a per capita basis, nearly 400 pounds of paper and paper products a year. Weyerhaeuser's Everett kraft mill plays a vital role in helping in the education, communication and sanitary packaging requirements of the American people. Weyerhaeuser pulp and the pulp produced by others in the industry are key factors in maintaining the nation's high standard of living.



Books and cards also are kraft uses



Kraft pulp products are everywhere and used by everyone

**The people
who make the kraft**



Most Weyerhaeuser pulp employees own their homes

Fishing is an important sport in Puget Sound



The more than 200 men and women employed in the kraft mill have varied skills. Some have rather unusual job titles—bleach operators, liquor makers, digester cooks, balers, lancers. Many of the jobs are self explanatory—electricians, chemists, millwrights. Each has an exacting job in production, maintenance and administration.

Kraft mill employees enjoy a number of important benefits. They participate in a 24-hour, medical-hospital-surgical insurance plan. And, their families are also eligible for that insurance. The company pays for six holidays each year, provides paid vacations of up to three weeks per year, and pays most of the cost of a health and welfare plan, which provides life insurance coverage and health and accident insurance.

Employees can take outside education courses for personal development through a company tuition-refund program. Employee sons and daughters can be eligible for college scholarships through a program instituted by Weyerhaeuser Timber Foundation.

An employee-operated credit union provides these people with a regular savings plan and a source for borrowing funds if the need exists. Safety programs—equally participated in by employees and management—continually seek the means and methods for the prevention of industrial accidents. Training programs often aid the employee in self-advancement.

The kraft mill has an annual \$1 million payroll, which circulates throughout the community and adds to its stability. Many of the employees are active in civic clubs, service organizations, churches. A high spot in recreational opportunities is the annual Everett pulp division salmon-fishing derby. Everett, as a community, is ideally situated for offering many opportunities for growth in education, recreation and in The Good Life.

Winners of a pulp division salmon derby

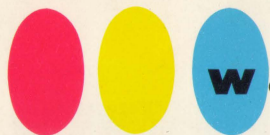


Everett has fine parks, buildings



Company golf tourney is serious affair





We manage

timber as a crop and the

harvest can last forever

The lands that grow the trees for Weyerhaeuser forest products are pledged to provide continuing harvests. These lands are certified tree farms.

Tree farms are protected from fire, insects and disease. And, these lands are reforested after each harvest. Tree farming is conservation—wise use—and is the key to today's integrated forest-products industries.

Below: Cutover areas are reseeded from trees left standing

Top right: Towers, radio help fire fighting

Bottom right: New Douglas fir crop is growing

