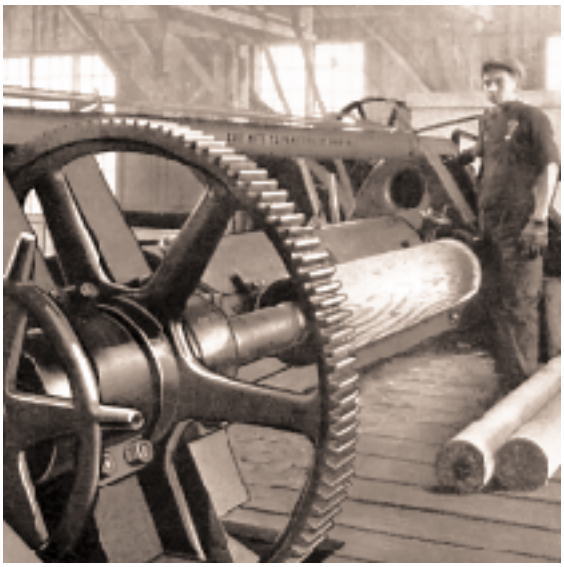

THE COE MANUFACTURING COMPANY

A Classic Story of Engineering Know-How and Marketing Genius

No. 21

in a series of monographs on the history of plywood manufacturing

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Plywood in Retrospect

This monograph, twenty-first in a series devoted to the history of plywood manufacturing, differs from the others in that it is the first devoted to an organization not principally concerned with producing plywood. The record of The Coe Manufacturing Company is so closely linked with the history of plywood, however, that it was a pleasure to accept PPA President Bill Robison's invitation to include Coe's story in this fine series.

No account of a company founded close to 150 years ago, during the tenure of Whig President Millard Fillmore, could begin to describe all of the events and personalities that have shaped its destiny through nearly 15 decades of wars, peace, recessions, recoveries, and unceasing technological advances. Such a history would require a book. This monograph, well prepared by Hugh Love, appropriately highlights Coe's partnership with plywood manufacturers past and present, and merely outlines other aspects of the company's history.

Collaboration with the great people of the plywood industry has been one of the most satisfying aspects of my own career. I would like to acknowledge my debt to those unforgettable pioneers, entrepreneurs and builders of their communities, who helped our business grow and at the same time became my lifelong friends. Working with plywood makers to "build a better mousetrap," or replace it with something new, has been a happy task with no end in sight.

I am deeply conscious of the priceless heritage handed down by the tireless innovators and champions of free enterprise who have served Coe in times past. It is a legacy founded on belief in the creativity and potential of every human being, a case history of achievement unsurpassed in American industry as a whole. Coe's Painesville, Ohio facilities, although expanded beyond recognition from humble beginnings, have been in continuous operation at one location for over 146 years. Maintaining that proud record and improving upon it in the years ahead will, I am confident, inspire the best efforts of all who will follow us.

I would like to thank Coe staff members and veterans for their contributions to this publication, particularly Gene Knokey, Arthur Holden, Norton Oehling, Art McGee, George Milbourn, and Ralph Gage. Acknowledgment is also due to the late Frank W. Milbourn, Jr., whose more detailed history of the company from 1852 to 1989 has provided much of the background for this monograph.

Fred W. Fields

It all began as a small manufacturing operation in a plant not much bigger than a blacksmith's shop. Fifty three years before the first Douglas-fir plywood mill came on line in 1905, Harold Hayes Coe and a fellow entrepreneur, Leonard Anderson, joined forces in 1852 to form The Anderson and Coe Company in Painesville, Ohio. Harold and his partner first manufactured steam engines and machinery for sawmills and grist mills. From these modest beginnings, the company they founded was to grow in 146 years to the highly diversified, internationally known enterprise which is The Coe Manufacturing Company today.

After only five years, Anderson and Coe took their share of recession in the nationwide banking crisis of 1857. Numerous banks failed when forced to back their drafts with gold. Everywhere, businesses and homes were foreclosed. But the little Ohio company survived through the succeeding years by introducing a rotary lathe. This coincided with a need for veneer by sawmills eager to tap a burgeoning market for baskets, boxes, spools, barrel staves, pails, tubs and furniture. The company's new lathe, a progenitor of what was to become a staple item in plywood mills more than half a century later, was able to convert timber blocks into many thicknesses and widths of veneer. *The Painesville Republican* declared that one of the company's "most wonderful inventions is a machine for the making of slack barrel staves which can cut 125,000 staves in 10 hours." Despite the adverse economy, Anderson and Coe began to prosper.

Then the Civil War burst upon the country, draining communities everywhere of men, money and resources. Harold Coe spent four hard years as a soldier. But he survived, and returned to find a reconstruction boom – and spiraling demand for lumber and sawmill machinery. Fredric Wilkes bought out Leonard Anderson, and the company became Coe-Wilkes.

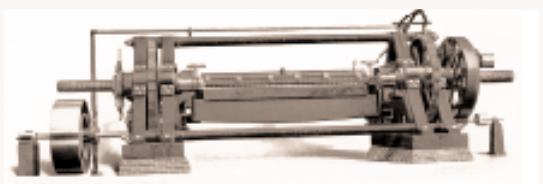
Aided by the boom, machinery orders flowed in from new sawmills in the South and the emerging West. Business was further helped by the opening of coast-to-coast railroads. Coe-Wilkes boosted its payroll from eight employees in 1867 to eighteen in 1869. During this period, it was reported that "the Mississippi River was jammed with logs headed for the treeless Plains States."

Wilkes retired in 1891, declaring that "the lumbering days are over, anyway." Harold Coe welcomed his 26-year-old son, Harry P. Coe, into the business, which then became The Coe Manufacturing Company.

The younger Coe – widely known as "Handsome Harry" – had a flair for selling. And for a while, the company continued to prosper. In 1901 – a peak

Early 1900s impression of The Coe Manufacturing Company's headquarters in Painesville, Ohio.

The machine shop at Painesville in 1904.



Front view of the A-frame Coe rotary veneer cutter, as shown in a 1905 advertising brochure. The machine is described as "the standard of the world." Prospective purchasers are advised that the general design "is easily understood by any person of a mechanical turn of mind." There is also the assurance that "only the best materials are used, all castings being made of the best quality of foundry iron."

Harold Hayes Coe, founder of The Coe Manufacturing Company.

Nine employees of The Coe Manufacturing Company in 1889, seen with founder H.H. Coe (sixth from left).

Coe's stature as a internationally recognised machinery manufacturer was reflected in a gold medal award for the rotary veneer lathe at the 1901 Pan-American Exposition in Buffalo. The company was also a major exhibitor at the St. Louis World's Fair, where it received the Grand Prize.

year in which the Coe rotary lathe won a gold medal at the Pan-American Exposition in Buffalo – ground was broken for a new five-acre plant location in Painesville. Everything in the new facility was state-of-the-art. Natural gas fired the boilers. Arc and electric lights in shops and offices were the very latest. And the payroll jumped to 32 employees.

But peaks often precede a fall. America entered a deep recession in 1902 that was to last over a decade. While "Handsome Harry" battled declining markets, the engineers kept working on a new machine that was to dramatically support the company's future prosperity – a veneer dryer.

Drying the thin sheets of veneer as they left the lathe had always been the most difficult part of the plywood manufacturing process, and no method then existing was even adequate. Loft, rack and hanging sheets invariably resulted in a warped and split product. Coe's first dryer, built and sold in 1902, was unique. Largely the brainchild of Harold H. Coe, it involved steel tubes or rollers to move the veneer through the dryer, holding it flat and firm as water was removed. Another great advantage was the reduced drying time – in a range of from minutes up to half an hour, compared to days or weeks when using older methods.

The Painesville Republican advertised the new dryer in 1902 as "a machine with no counterpart in the world!"

The Next 20 Years: Important to the company as were developments like the rotary lathe and the roller veneer dryer, aggressive selling was necessary to convince customers they should invest in capital equipment. Gradually through the first decade of the new century, Coe's customers came to recognize the advantages of more sophisticated equipment that would help them increase production volumes. Certain competitive machines entered the market, including conveyor-type dryers that were popular where thin-figured veneers were being cut. But a revolutionary new wood product was in the wings, one that would fully challenge the ingenuity of Coe and its competitors.

An event that was to positively influence the fortunes of The Coe Manufacturing Company for decades to come was the emergence of the first construction plywood in the Pacific Northwest. In 1905, the Portland Manufacturing Company was asked to produce "something unusual" from wood for the Lewis and Clark Exposition being held that year in Portland, Ore. The "new baby," Douglas fir plywood, created growing demand for veneer lathes and other equipment.

This was a challenging period for the company, however. Coe's official history records that founder Harold Hayes Coe died in 1908, "and the company nearly followed him." The history frankly acknowledges that between 1908 and 1919, the caliber of management represented by H.H. Coe was not maintained.

During World War I, the Coe plant and others in the woodworking machinery industry were requisitioned for military production. Painesville's assignment was making shell-turning lathes. This diversion left the company depleted. A strong leader was needed to pick it up, dust it off, and set it on the road again.

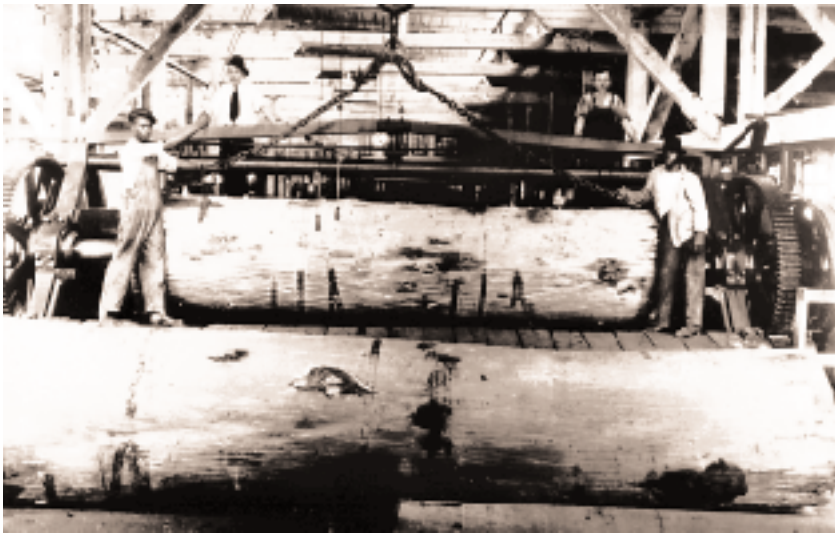
30 Years of Progress: The man of destiny for Coe in the heady three decades after World War I was a farseeing mechanical engineer, Frank W. Milbourn, Sr., President of the company through this period of great expansion, Milbourn was little impressed by his first look at Painesville. A walk through the plant in 1920 revealed buildings that had not been painted in 16 years. Machinery and tools were in poor condition – and the state of the books was even more depressing.

But Milbourn sensed potential, and the ability to capitalize on a long-established company name. A University of Kentucky graduate who had spent his working life up to then with Southern Engine and Boiler Works, Frank had the gift of recruiting and retaining good people.

Initially he tried to be a "one man band" at Coe, serving first as engineer, salesman and general manager. But his intuition in bringing in an old college

Frank W. Milbourn, Sr., President of Coe from 1920 until his death in 1957.

This 1920 era picture shows a 60 ft.-by-16 ft.-8 in. veneer sheet from "the world's largest lathe" – Coe's installation at Flora American Plywood Company in Macon, Georgia.



A closeup of the 200-inch-long lathe at Flora American Plywood Co.

friend, Arthur Vance, was to serve the company well. Vance joined Coe from the B.F. Sturtevant Company, leading fan and heater manufacturers.

Vance was just what the revitalized company needed. Complementing Milbourn perfectly, he had all the skills necessary to build a sound engineering and sales organization. The results soon showed in Coe's balance sheet. All old debts were paid one hundred cents on the dollar. The company received an AA rating from Dun & Bradstreet that has been maintained ever since.

Through the 1920s, which were prosperous except for the very early years, Coe's product line consisted of veneer lathes, veneer clippers, knife grinders, veneer dryers, and increasingly, board dryers. During the decade the company made approximately 100 "double letter" veneer lathes and 50 veneer dryers.

The line of sturdy double-letter ("DD", "EE" and "FF") lathes and their predecessors, the single letter ("D," "E" and "F") lathes, represented the state-of-the-art in their time. Slow by today's standards and requiring considerable maintenance and set-up time, they nevertheless produced high-quality veneer as fast as it could be handled in conjunction with the processing equipment then available. Many lathes were steam engine driven, for in numerous remote plant locations there was no electricity. By 1933, the "double-letter" lathe line was still the best available, but by this time the market for capital equipment had collapsed due to the Depression. Operation of the lathe, combined with the offbearing group and the clipper complex, was highly labor-intensive. Sixty log turns per minute was considered "highballing." Production of veneer and plywood was becoming expensive from a labor standpoint. However, timber was "plentiful and cheap!"

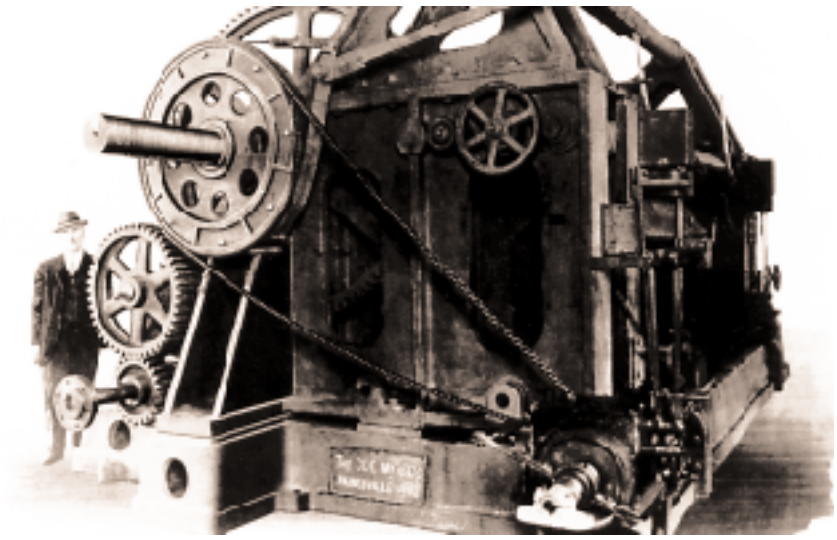
Another highlight of the late Twenties and early Thirties was the company's leadership in veneer dryer engineering. Following up its success with the Model 23 dryer, Coe introduced a vastly improved machine in 1928, incorporating a much higher velocity air stream and many other refinements. Approximately 100 of these machines were to be sold across the U.S. and overseas, further helping to consolidate Coe's position as the standard setter in the field.

Surviving The Depression: During the Depression, Coe showed innovation in switching from $30,000 machines that had no market to a $30 machine capable of being mass produced for general industry. The Coe Drainator was a steam trap with no moving parts. Eventually it was to prove its worth in World War II, with orders worth several million dollars for use aboard ships.

Plywood Bonanza: The last half of the Thirties, however, was notable for the resumption of confidence in American business – and for a boom in West Coast plywood plant construction that was accomplished with major input from the machinery industry. Coe historians record that during this period, brand new Douglas-fir plywood plants were installed by M & M Woodworking of Portland, Ore.; West Coast Plywood Corporation, of Hoquiam, Wash.; Smith Wood Products, of Coquille, Ore.; Northwest Door Company, of Tacoma, Wash.; and Pacific Plywood Company, of Willamina, Ore. All of these plants were completely equipped with Coe lathes, clippers and dryers. Expanded production also benefited existing West Coast plywood plants, so that total Douglas-fir plywood production in the Thirties tripled from 300 million square feet, 3/8-inch basis, to approximately a billion square feet. The foundation had been laid for the huge future expansion of the softwood plywood industry.

This period in Coe's history was also notable for the increasing sophistication of the company's engineering, sales and customer support activities. The leadership demonstrated by Arthur Vance in melding engineering and sales was carried on by his successor, E.P. Morris. Assisting Morris were R.C. Moore, Arthur S. Holden and Frank W. Milbourn, Jr., who joined the company in 1934 and was ultimately to become President, succeeding his father.

Quality engineering was matched by intensive field support for the equipment buyer. When dryers were purchased, for example, they were shipped "knocked down." Steel, sheet metal, fans, castings



A Coe lathe that gave many years of service at The Wheeler Osgood Company in Tacoma, Wash. during the 1920s and '30s.

A Model 1930 lathe at the Swedish plant of Ljusne Woxna, A/B.

Unloading a Coe lathe destined for a mill in India.

and chains were transported in bulk and had to be assembled at the plant. A certain amount of field fabrication was always needed, along with on-site modification. Coe developed a skilled team of erectors to work closely with the plant's own assembly personnel. This hands-on approach did more than build lasting customer relationships. Many young engineers and technicians who gained early field experience as Coe erectors were later to reach the senior ranks of the company.

The Forties: A key decision for the company in 1940 was the acquisition of four acres of property adjacent to the existing Painesville operations. This investment was to pay off handsomely down the road. Also significant at this time was Coe's financing of all of the production machinery for the new Peninsula Plywood plant in Port Angeles, Wash. This worker-owned cooperative had principals who were well-known to Coe management through their employment in other successful plywood plants. Coe had previously financed equipment purchase in several "co-op" plants on terms requiring payment of 40 percent of the purchase price by time of shipment, the balance to be paid over an 18-month period.

In the case of Peninsula Plywood, Coe for the first time purchased machines from other manufacturers, then resold these as well as its own under the agreement it had worked out with the "co-op" plants. The flexibility of such arrangements reflected the highly personal nature of negotiations between buyer and seller. There was a high degree of trust, as well as confidence in the future. The agreements were honored, new businesses were able to get started, and all became good Coe customers.

Springfield Plywood, a subsidiary of Washington Veneer, was also built in 1940. The machinery order then placed was the largest for a plywood plant that Coe had received up to that point. During the same period, the company installed the first dryer sold in the Wisconsin hardwood industry to Penokee Veneer Company. Compared to Springfield, Penokee was a midget, yet the sale was significant. Hardwood veneers and plywood soon were in great demand in both the U.S. and Canada as part of the war effort. Very large integrated plywood plants were subsequently built in South Carolina – by U.S. Plywood at Orangeburg, and by Plywood Plastics Corporation at Hampton. These West Coast-style operations made stock panels from hardwood species, an unusual venture for the Southeast at the time.

During World War II, many of Coe's plywood industry customers were granted priorities to purchase machinery for the replacement or expansion of their operations. Plywood was a strategically important material in countless wartime applications, including PT boats, troop gliders, crating and personnel housing. Early in the war, the Coe plant was directed to rearrange its machine shop to produce parts for a gun mount. When this project was canceled due to changing military needs, it was recognized that the nation's best interests would be served by allowing Coe to continue to manufacture veneer machinery. During the war, Coe further proved its resourcefulness by developing processes for drying synthetic rubber – a vital product when the war cut off the rubber supply from Asian sources. Specially designed Coe dryers contributed to the volume production of synthetic rubber by a consortium which included the B.F. Goodrich Company, Firestone and Goodyear. The latter company built a synthetic rubber plant in Louisville, Ky., and Coe supplied 80 percent of the production line equipment.

"The Plywood Age:" With the end of hostilities in 1945, the company was able to devote more attention to the needs of the domestic plywood industry, which entered a new period of dramatic expansion in the postwar years. Helped by the market leadership of equipment like the Model 244 lathe, Coe shared in the prosperity of what came to be known as "the plywood age." Large new plants built in Oregon included Southern Oregon Plywood in Grants Pass; Umpqua Plywood, Roseburg; and Menasha Plywood, Coos Bay. Mount Baker Plywood started up in Bellingham, Wash. And in Northern California, the plywood industry made its appearance in the Forties with Humboldt Plywood, Arcata; Mutual Plywood, a co-op, in Eureka; Shasta Plywood, Redding; M & M Plywood, Eureka; and Calpella Plywood, Calpella.

Wet and dry ends of a Coe Model 28 veneer dryer at Robinson Manufacturing Company, Everett, Wash.

Illustration from an early catalog of Washington Iron Works, a company with a long and distinguished history of its own which has been part of the Coe family since 1985. This section of the catalog describes overhead logging engines used to remove timber "at high speed and low cost from hills and rough mountainous country."

Frank W. Milbourn, Jr., who succeeded his father as Coe's chief executive. He served as President from 1957 to 1976.

Export business also thrived. Equipment for one of the largest plywood plants in the world was installed in a Gabon, Africa plant affiliated with U.S. Plywood. Other orders followed for plants in Africa and South America. Coe also supplied equipment for plasterboard plants in Australia, Ireland, Finland and Chile. Booming markets also spurred Coe business in the domestic board industry. Orders completed in this period included equipment for two new plants of a long-established customer, National Gypsum Company, plus modernization of facilities at ten other National plants. Many other major company names appeared at that time on Coe's order files, including Armstrong World Industries, Celotex Corporation, U.S. Gypsum and Johns Manville Corporation.

The company completed its first major expansion at Painesville in 1948. A 30,000-square-foot machine assembly building was built on the property that had been purchased in 1940. The additional assembly and machine shop space was immediately utilized in meeting the expanding needs of customers worldwide.

Coe's official history lists November 20, 1947 as "very significant." On that day, the company hired a young engineer who would become the company's President and chief executive officer 30 years later. His name: Fred W. Fields.

Maintaining the Momentum: 1952-1977: Brisk business in all areas served by the company marked the 1950s. The proud anniversary of 100 years in business was appropriately celebrated in 1952. A milestone sadly observed was the death in April, 1957 of Frank W. Milbourn, Sr., President of Coe since 1920. His legacy was continued dedication to the highest standards of quality and service by the new management team. Frank W. Milbourn, Jr., succeeded his father as President. E.P. Morris and Arthur S. Holden became vice presidents. J.S. Dodds, who had started with Frank, Sr., in 1920, continued as secretary.

The decade was notable for the further rapid expansion of the softwood plywood industry. New plywood plants using Coe machinery were built by Cottage Grove Plywood, Coast Plywood, Roseburg Lumber Company, Simpson Timber Company, Fruit Growers Supply, Martin Brothers Box, Weyerhaeuser Company, Multnomah Plywood, Del Norte, MacMillan Bloedel, Willamette Builders Supply, Canadian Western Lumber, Mount Baker Plywood, Zip-O-Log, Milwaukee Forest Company, Fir-Ply, Vancouver Plywood, Durable, Coos Head, Evans Company, Eureka, Siskiyou, Natron, Oregon Veneer, Fullerton, Jefferson, Bate, Long Bell, Kogap, Port Orford, Hult, Trinity Alps, Pope and Talbot, Fort Seward, Willamette Valley, Rochlin, Georgia-Pacific Corporation, Winton, Powers, Snellstrom, Cal-Ore., Coquille, Plywood Corporation of America, International Paper Company, Rosboro Lumber, Pickering, Paragon, Brookings, U.S. Plywood, Medford Company, and others. Annual production from the West zoomed from 2,500,000,000 square feet, 3/8-inch basis in 1950 to 7,810,000,000 in 1959. The dominant machine in the industry was the established and reliable Coe Model 244 lathe. A few larger versions, taking larger logs, were also produced as the Model 247. Coe introduced the veneer dryer feeder in 1952. After initial resistance, the new machine caught on. By 1959, 150 Coe feeders were in daily operation. The ability to lease these machines rather than purchase them was a marketing "first" for the industry as a whole. The customer usually agreed to rent the machines for four years, and to make monthly payments.

Coe also leased clippers on the same basis. Among the benefits was the ability to remove and relocate feeders and clippers comparatively easily in the event that the lessor failed to pay the rent! Plywood plant construction also took off in the Philippines during the 1950s. Coe's sales team, assisted by The United States Machinery Company, its export sales office, won most of the equipment orders for complete plant installations. Many other orders followed in later years. Several new plywood plants in Mexico also contributed to the company's growing export business.

Concurrently, Coe participated vigorously in the dramatic postwar expansion of the plasterboard and fiberboard industries. Plant installations across the

country and overseas benefited from a wide range of process innovations designed and built by the company. Constant enlargement of the engineering staff was a necessary adjunct to adequately serving the needs of the plywood and board industries.

Early in the 1950s, Fred Fields was assigned to the Pacific Northwest in a sales and service capacity. His decision to leave Coe in 1951 was prompted by an attractive business opportunity. In partnership with the Conway family, the Conway and Fields Company was formed. It received the rights to all sales of Coe plywood machinery and parts in the western region. Coe ultimately bought out Conway & Fields in 1959, and Fred returned to the company as its West Coast manager. Through its acquisition of Conway & Fields, Coe also became sales agent for Ederer Engineering (crane manufacturers); Durand Machine Works (feeding and handling machinery); Laucks Laboratory (instruments); Baldwin-Lima Hamilton (plywood presses); and Williams White & Company (plywood presses).

By the mid-1950s, it was becoming more and more apparent that the Painesville engineering and manufacturing facilities were bursting at the seams. As order files climbed, some routine production work had to be "jobbed out" to other companies. The inevitable questions were: "Should we again expand Painesville?" and "How long will this last?"

A major expansion was authorized in 1957 – a 37,500-square-foot assembly building on the site of the original Coe family homestead. The new building was further enlarged in 1958, when a 15,000 square foot addition was built to better accommodate the structural shop. Just as the addition was being completed, an alarming plunge in market demand resulted in a 35 percent workforce reduction. But markets recovered before the end of the decade, and the climate appeared right for a bold new capital investment in the West.

Although Coe had operated a comprehensive parts warehouse in Portland, Ore., for many years, the desirability of a West Coast manufacturing plant had long been advocated by Fred Fields. The huge growth of the plywood industry had encouraged other manufacturers to enter the market. Competition was intense, and pressure mounted to bring manufacturing closer to large numbers of good customers. Making another major commitment to the future, Coe resolved in 1959 to build a plant in Oregon. Ten acres were purchased in Tigard, close to Portland. This became the site for a 10,000-square-foot complex housing sales, engineering and production departments.

The jet age of transportation began in the late 1950s and the expansion of Coe's facilities at that time greatly enhanced its ability to serve its nationwide and global customers. It also demonstrated the company's depth and stability resulting from many years of astute planning and good stewardship.

Role of Southern Pine Plywood: Perhaps the most fascinating and unexpected era of growth in Coe's history came simultaneously with the advent of the southern pine plywood industry in the early 1960s. This industry emerged with the construction of major plywood manufacturing facilities by Georgia-Pacific Corporation in Fordyce, Ark. and Kirby Lumber Company in Silsbee, Tex. Coe provided the bulk of the machinery for these two new plants and this equipment set the standards for the industry at that time.

Foreseeing that southern pine plywood was "here to stay," Coe established a sales, service, applications engineering and parts facility in Atlanta, Georgia in 1964. Ralph Gage, now vice president of all the company's operations in the southern states, transferred from Coe's Portland plant to open Coe's first southern facility. Since the establishment of this first location, Coe has subsequently moved twice to larger operations in the Atlanta area to parallel the expansion of the southern pine industry from the early 1960s through the early 1980s. During this time frame, approximately 70 plywood and veneer plants were built in 14 states spanning from eastern Texas to southern Maryland. Coe supplied nearly 125 veneer lathes and 175 veneer dryers to meet the needs of the industry.

It was obvious during the late 1970s that this rate of plywood growth would not sustain itself. It was also apparent that timber availability and log diameters would decrease and signal a new era where ultimate

usage of every log would be essential. Coe was fortunate in foreseeing this reality and in the mid-1970s allocated considerable research and engineering resources to new machinery which could be "retrofitted" to meet changing manufacturing requirements. First came the computerized X-Y charger, which provided the means to peel more logs per minute with more usable veneer per log and at a labor savings. Subsequent retrofit inventions included medium pressure spindles, the core drive, driven roller bar, hydraulic carriage drives and others. During the 1980s and 1990s Coe has also been heavily involved in supplying machinery to new or existing softwood and hardwood plants across the United States and in Canada and Mexico, as well as offshore facilities in New Zealand, Australia, the Phillipines, Indonesia, China, South America and France.

Since the 1960s Coe has been the major machinery supplier to the expanding hardwood veneer and plywood industry in the U.S. and Canada. In the South, significant new plants or expansions occurred at Kearse Manufacturing, Howell Plywood, Burkeville Veneer, Hasty Plywood, Tyler Plywood, Darlington Veneer, Anderson-Tully, Weldon Veneer, McLeod Plywood, D & L Veneer and several Browder Veneer companies. In the northern and upper midwestern states, similar installations took place at Rutland Plywood, Birchwood Manufacturing, Cliffs Forest Products, Manthei Veneer and Columbia Forest Products. In Ontario and Quebec, major production lines were installed at Canada Veneers, Normick Perron, Cochran Industries, Bellerieve Forest Industries, G.W. Martin Veneer and Commonwealth Plywood.

Coe's steadily expanding diversification since the 1960s was also marked by internal growth and by acquisitions such as Skoog Manufacturing Company of Olympia, Wash., an original designer and manufacturer of veneer patch machines. Furthermore, Coe acquired a line of wide belt sanders for finishing plywood and other panel products from Tidland Manufacturing Company of Camas, Wash. These acquisitions enabled Coe to produce machinery for virtually an entire plywood plant, extending from the log deck to the finishing department or boxcar.

Impact of Technology: Coincidentally, at the time Fred Fields acquired Coe in 1976, it also was the beginning of the Computer Age for the wood products world. Through the use of computers and such devices as lasers, cameras, fiber optics and sophisticated hydraulic systems, Coe developed its first computerized lathe charger in 1978. These new tools enabled Coe to turn its basic machinery into high speed efficient equipment that has enabled the panel industry to improve log yield and productivity by upwards of 35 percent.

Many other uses of computer technology have evolved and been put to use for lathe controls, clipper scanners, automatic handling systems, dryer controls, patching, gluing, pressing, sawing, and sanding systems. Coe has been deeply involved in all of these development projects and has helped producers set new standards for making plywood.

In response to the challenge of new levels of technology, Coe has assembled a large multi-disciplinary staff of engineers, including mechanical, electrical, electronic and computer scientists supported by mathematicians and physicists. The total workforce

Contributors To Coe's Growth

The Coe Manufacturing Company has been able to expand and diversify not only through internal developments but by numerous acquisitions of other companies, including: Nosler Systems (Laser Scanners); Saab Systems; Skoog Manufacturing Company; Morvue; Applied Scanning Technology; Moore International – established in 1867 as Moore Dry Kiln in Jacksonville, Fla.; Georgia-Pacific Corporation Machinery Division; Klamath Iron Works; Albany International; Prescott Iron Works; Powell; CAE (Sawmill Machinery Division); Mann-Russell Electronics; Speco; Ward Systems; Energex; M.K. Research; Pathex; and Washington Iron Works – established 1882 in Seattle. Each of these companies has contributed to the experience, strengths and wisdom of Coe and each has its own history and story to be told. Many veterans of these companies continue with Coe and provide significant technical and practical expertise.

A recent photo of the Painesville plant.

Coe's western research, development and production facilities near Portland, Oregon.

The diverse businesses that are now part of Coe's family of companies are honored in this lobby display at Coe's Portland offices.

of approximately 750 is dedicated to maintaining and improving the company's well-earned reputation as a single-source supplier where the customer always comes first. Information from a maintenance manual for each piece of equipment ever sold can be sent in seconds to a customer's modem anywhere in the world. Essential duplicate engineering drawings and other data are stored on microfilm and digital media in fireproof vaults.

The experience and knowledge developed by Coe over the past 20 years have positioned the company to enter into and lead the field in the manufacture of new machinery for the production of a widening array of engineered wood products – laminated veneer lumber (LVL), basic lumber products, particleboard (PB), medium density fiberboard (MDF), and oriented strand board (OSB).

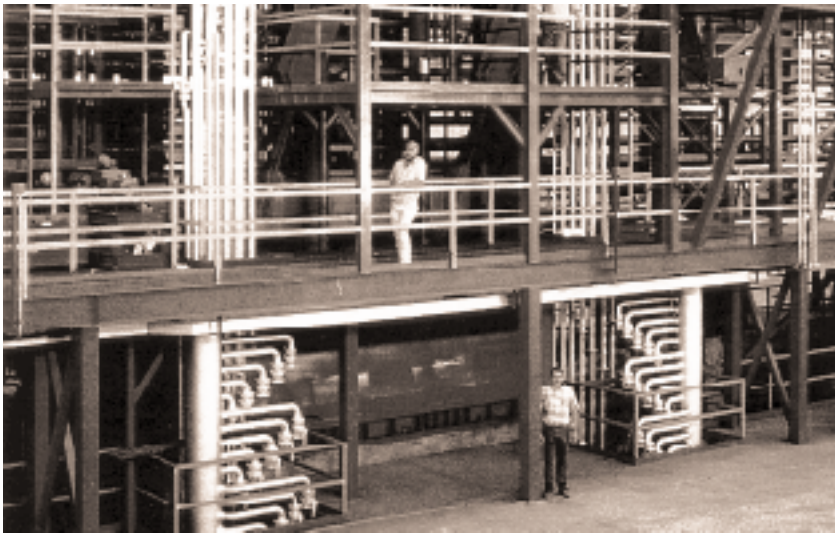
Coe's operations extend to much more than wood products machinery manufacturing. The company will tackle in-house anything it can efficiently accomplish, including even making its own ink for moisture detectors and scanners. It provides machinery for many other products, from gypsum wallboard to ceiling tile. One of the many specialized markets is Coe equipment for electronic non-contact page counting of multimillion circulation national magazine and newspapers.

Team work has inspired Coe's remarkable growth and diversification for nearly a century and a half – team work within, utilizing its superb human and technological resources, and in joint projects with customers. But the greatest chapters in a proud story have yet to be written.

As The Coe Manufacturing Company draws closer to its 150th anniversary in the year 2002, the achievements that have made it a world leader in machinery manufacturing are but the prelude to fresh challenges in the years ahead. Intensive research and development have made it possible for 65 percent of the fiber in each log to be utilized in today's plywood products, compared to about 45 percent 50 years ago. With constantly escalating log costs, there is ample incentive for continued efforts to improve yield still further through the use of even more sophisticated computer-controlled automation. Many of these developments stem from Coe's innovations in laser and other camera scanning equipment. Important advances up to the present have included veneer X-Y lathe chargers, non-destructive panel testing, and complete sawmill optimization for primary breakdown of saw logs. An exciting new project now under way is grade scanning, mainly for use in the manufacture of plywood and lumber. The first production models have recently been installed in International Paper Company and Georgia-Pacific Corporation plants.

The company launched by Harold Hayes Coe and Leonard Anderson in 1852 will not rest on its laurels. It is eager for the challenges of the 21st Century.

Coe was selected by the U.S. Government in 1979 as one of the first American companies to demonstrate its manufacturing technology to senior representatives of the People's Republic of China. Seen here at Painesville with leaders of China's National Forestry Machinery Equipment Corporation are (front row) Fred Fields, Yang Yen-Sen, leader of the Chinese delegation, Coe President Frank W. Milbourn, Jr., and Yeh Yung-Lu.



This Coe press installation in Roxboro, North Carolina is designed to manufacture 8 ft. wide by 24 ft.-long OSB master panels. It produces 72 ft.-4 in. by 8 ft. panels each press cycle.

The Coe Veneer Grade Scan system for automatic sorting and stacking in plywood mills is typical of the leading edge technology flowing from the company's ongoing research and development efforts. The recently-introduced scan system makes accurate grading decisions piece by piece. Defects are extracted with the help of high-speed image processing computers. Software evaluates the optimum grade based on entered grading rules.

The Management Team

Coe President Fred W. Fields has spent his entire adult working career of over 50 years in the construction and machinery industries – particularly with The Coe Manufacturing Company, of which he has been President for 21 years and owner since 1976.

He learned early the meaning of hard work on the family farm in Indiana. He looks back on those eight years of labor, shared with a loving family and their horses during the Depression, as one of the key influences upon his life.

Fred attended Ball State and Indiana Universities just before World War II. He was then inducted into the Air Force and spent three and one-half years training and teaching navigation and instrument flying. His service years included studies at Oklahoma A&M and at Rhode Island State College. After the war, he finished his engineering studies at Purdue University.

His introduction to industry was as a project engineer for a New York construction company, which was building a rock wool plant for National Gypsum Company. After a year he moved on to join Coe, which even then was the world's leading plywood and veneer machinery manufacturer. He quickly moved up the ladder as a field engineer, overseeing projects throughout the U.S. and in Canada, Mexico, Europe and Africa. These years brought Fred into close collaboration with plywood and lumber producers of world stature such as M & M Woodworking Company, Roseburg Lumber Company, Weyerhaeuser Company, Georgia-Pacific Corporation, MacMillan Bloedel, Canadian Forest Products, Crown Zellerbach, Boise Cascade Corporation, and nearly 25 major co-op producers.

In 1960 Fred directed construction of Coe's first plant beyond Painesville, Ohio – in Portland, Oregon. In the following year he became a vice president of Coe and served on the company's Executive Committee. This promotion was a stepping stone for many major events to follow, including a steadily accelerating period of expansions and acquisitions. Included were four major expansions in Portland plus the acquisition of the Georgia-Pacific Corporation Machinery Division, which was located immediately adjacent to Coe's Portland plant. Coe acquired Washington Iron Works in 1985 and proceeded to build a state of the art press manufacturing plant in Painesville. This operation, specially designed to handle very large oriented strand board press components, was completed in 1987, and marked a ten-fold increase in Coe's manufacturing plant capacity over a 30-year period. Other major acquisitions included Moore Dry Kiln Company, Saab Systems, Mann-Russell Electronics, Albany International, Ward Systems, A.S.T. and Pathex.

Fred is justly proud of Coe's innovative design and development work in the drive to constantly improve and refine heavy process machinery for a wide range of construction products essential to the economy. As an inventor, as a financial backer and as a team member, he has participated directly in almost all of the company's numerous research and development projects frequently undertaken jointly with the major wood products producers. He is equally proud of Coe's management team, some of whom are profiled here, and of the entire workforce.

Members of the Coe team who have been closely involved with Fred in Coe's continued growth – including current staff members and others who have retired in recent years – are well-known to leaders of the wood products industry throughout North America and overseas.

Eugene (Gene) Knokey has been associated with the plywood and lumber industry for over 50 years, serving in various management positions related to the manufacturing and sale of solid wood products. Gene, who is Coe's vice president of western operations, has spent the last 31 years with the company in sales, engineering and production.

Ralph Gage grew up in Painesville, Ohio, and began his 40-year Coe career as a field engineer. He participated in the installation and startup of Coe machinery in plants producing hardwood veneer, hardwood plywood and softwood plywood. In 1962, he was transferred to Tigard, Oregon as works manager. Since 1965 he has been associated with the company's operations in the southern United States. He helped establish Coe's southern office in Atlanta, and has had a leading role in furnishing the equipment needs of southern pine plywood mills. He currently serves as vice president of southern operations. A U.S. Army veteran, he is an industrial management graduate of Ohio State University.

George B. Milbourn, representing the third generation of a family which has notably served the company, is currently a vice president and consultant to Fred Fields. His 33-year career in all phases of operations has included field service, sales manager of plywood machinery, and vice president and general sales manager. He is an Air Force veteran and an economics graduate of Denison University.

Norton Oehling began his Coe career in 1936. His diversified service included design work in synthetic rubber drying and fiberboard manufacturing equipment during World War II. After extensive sales and engineering experience with the company in the U.S. and Canada, he joined the Conway and Fields Company in 1958. Two years later he returned to Coe when it acquired Conway and Fields. Prior to his 1993 retirement, he held a number of senior management positions, including vice president of sales and responsibility for gypsum and fiberboard machinery.

Arthur L. McGee has played a leading role in the progress and growth of Coe, serving as chief engineer from 1973 to 1996. Based in Portland, Art contributed his technical and management expertise to numerous developments that have substantially improved fiber recovery and grade quality in plywood and sawmill manufacturing. These developments included introduction of the first commercially viable computerized lathe charger in 1974. This led directly to the Model M775, M777 and M778 lathe chargers that dominated the market for X-Y chargers for many years. Basic design of the first M1380 core drive was completed by 1979 and has continued to evolve since then. The large roller nose bar and hydraulic carriage drive developments started in the mid-1980s. The combined evolution of the core drive, large roller nose bar, hydraulic carriage drive, veneer lathe, lathe charger and coordinated control systems have become Coe's high speed, high recovery, small log veneer peeling system that is the industry standard of the late 1990s. Now retired but continuing to serve as a consultant, Art McGee holds a master's degree in mechanical engineering from the University of California at Berkeley.

David Dorman began his career at Coe in 1960 as an electrical engineer, and now serves the company as engineering manager in Painesville.

Arthur S. Holden was told by Frank Milburn, Sr., in 1937 to "throw his hat in the ring," learn about the business and see what he might do that was constructive. He first worked in the engineering department, then in field installation (erecting), and in sales in the northeast and Canada. Moving back to the home office, he worked closely with E. P. Morris supervising sales and engineering activities. During that time, he traveled extensively in the U.S., Europe and South America. Eventually, he was designated executive vice president, cooperating closely with President Frank Milburn, Jr. for some 20 years.

Longevity of service is striking in The Coe Manufacturing Company. Currently there are seven employees with over 40 years' service, 21 with over 30 years, 34 with over 25 years, and 37 with over 20 years.

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