The original documents are located in Box C16, folder "Presidential Presidential Handwriting, 3/25/1975 (3)" of the Presidential Handwriting File at the Gerald R. Ford Presidential Library.

March 25, 1975

Dear Mr. Morey:

Thank you most sincerely for your letter of March 21 which was delivered to me yesterday by our mutual friend, Mr. Robert McBain.

I enjoyed looking through the descriptive material you enclosed with your letter, and I have passed along a set of the material to Mr. Frank Zarb, the Administrator of the Federal Energy Agency.

Thank you again for your thoughtfulness in sending this material to us. I appreciate your concern and wish to compliment you on the fine work you are doing.

Sincerely,

JERRY FORD

Mr. Norval K. Morey, President
Morbark Industries, Inc.
Box 1000
Winn, Michigan 48896

GRF:Downton
9
cc: Mr. Robert McBain
Mr. Frank Zarb

60 M wood fuel for energy

[WHCF UT 3/25/75 Exec]

Central Files:

The President sent the extra set of material along to Frank Zarb separately yesterday.

Dorothy

D/ Thank him etc!
Compliment & tell him I
love turned material over
to Frank Zark at 3 P.M.
Give me back printed
material

MORBARK INDUSTRIES, INC.

BOX 1000 • WINN, MICHIGAN 48896 • 517-866-2381 • TELEX 227 443 (MORBARK WINN)

March 21, 1975

The President of the United States
The White House
Washington, D.C. 20013

Dear Mr. President:

Like most concerned citizens, I have been following the news about the energy crisis and learn through recent reports that our nation is becoming increasingly dependent upon foreign imports of petroleum.

As an independent businessman who has enjoyed the benefits of the free enterprise system, my activities put me in daily contact with the forest products industry on a national scope. Through such activities, I have been keenly aware of the rich and abundant resource this nation holds in wood fiber. A vital source that can and should be utilized to alleviate our growing dependency for energy.

Realizing there are no simple solutions to complex problems, it would be well worth the effort and skills involved to make a serious study of the wood resources for energy purposes, especially when one realizes the potential rewards would be threefold. First, we could become more self sufficient; secondly, it would put tens of thousands of our unemployed back to work; and thirdly, such enterprise would significantly enhance our balance of payments.

Through our mutual friend and associate, Mr. Bob McBain, I respectfully submit some information we have recently compiled concerning wood fiber for energy.

In closing, I wish to express my personal willingness to assist in future efforts toward expanded utilization of our wood resources.

Sincerely,

MORBARK INDUSTRIES, INC.

Norval K. Morey
President

ner

D/ Kup in folio.

Geo. Bush -

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MORBARK INDUSTRIES, INC.

Norval K. Morey
President

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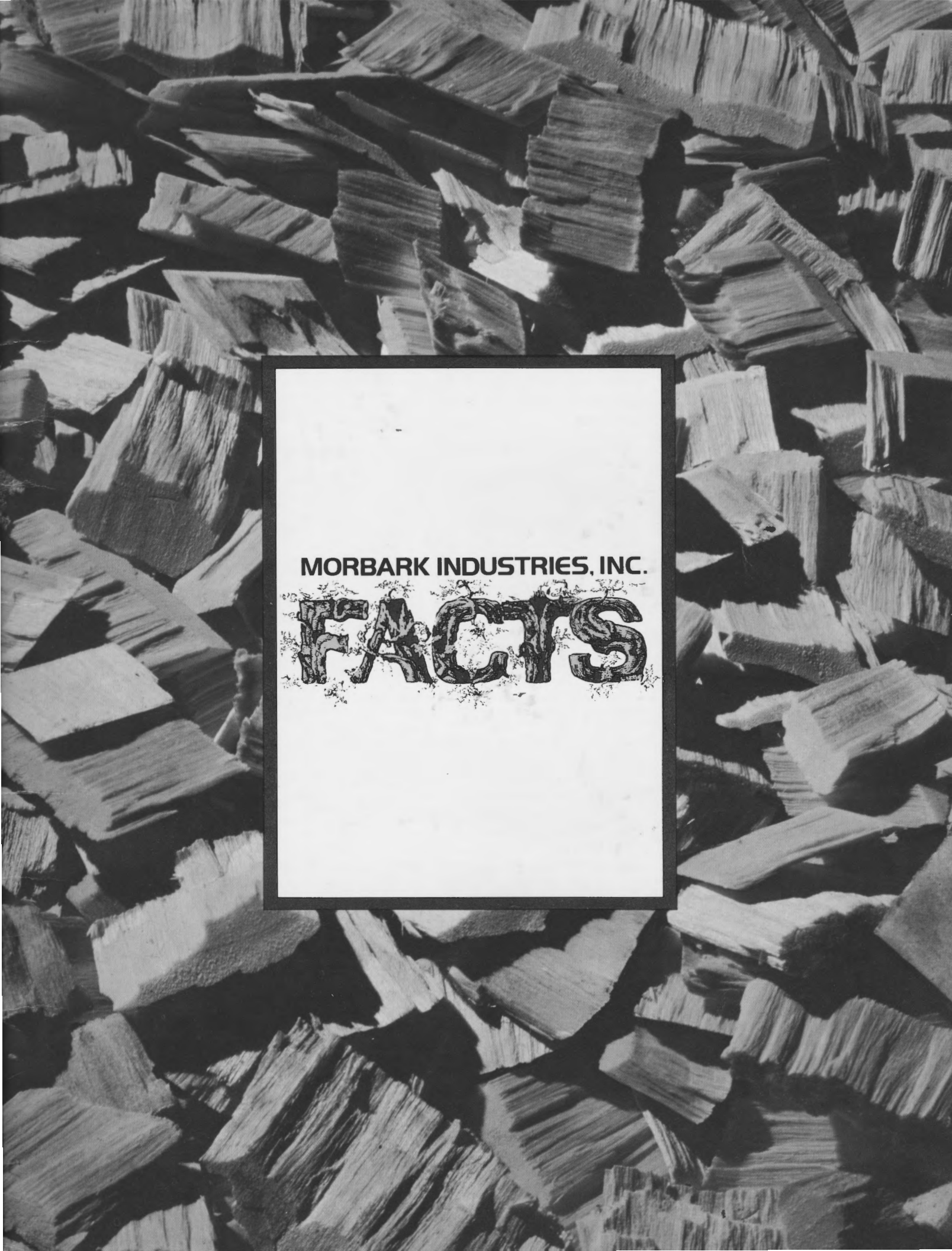
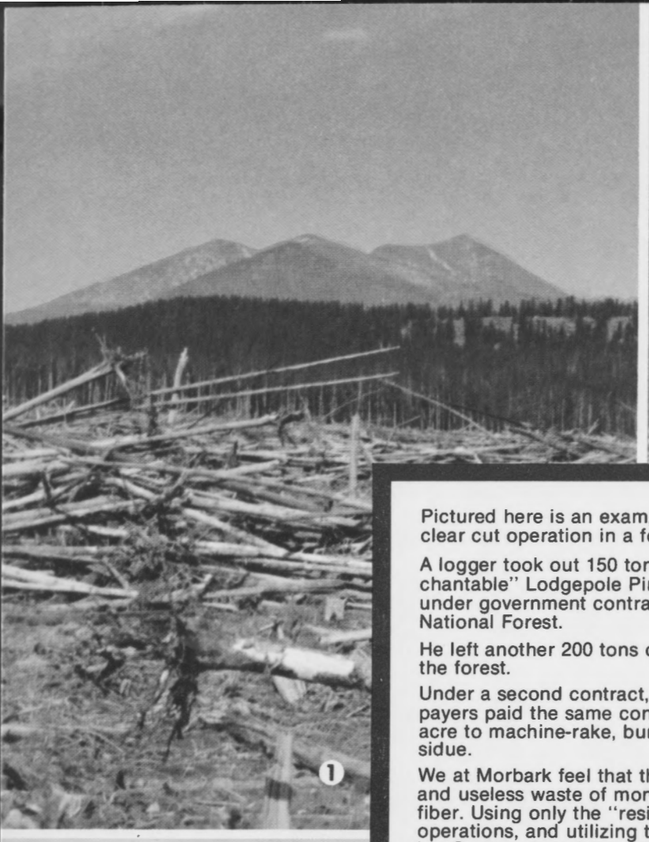

MORBARK INDUSTRIES, INC.
FACTS



Pictured here is an example of a conventional clear cut operation in a forest.

A logger took out 150 tons per acre of "merchantable" Lodgepole Pine which he acquired under government contract on 1,000 acres in a National Forest.

He left another 200 tons of "residue" per acre in the forest.

Under a second contract, the United States taxpayers paid the same contractor $100-$200 per acre to machine-rake, bunch and burn the residue.

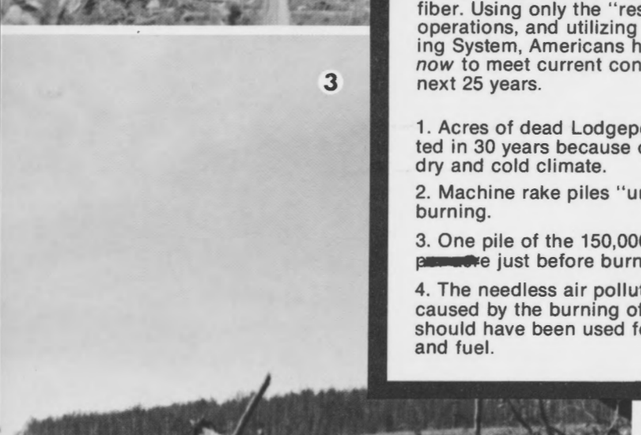
We at Morbark feel that this was an intolerable and useless waste of money and valuable wood fiber. Using only the "residue" from such logging operations, and utilizing the Morbark Chiparvesting System, Americans have enough wood fiber *now* to meet current consumption volume for the next 25 years.

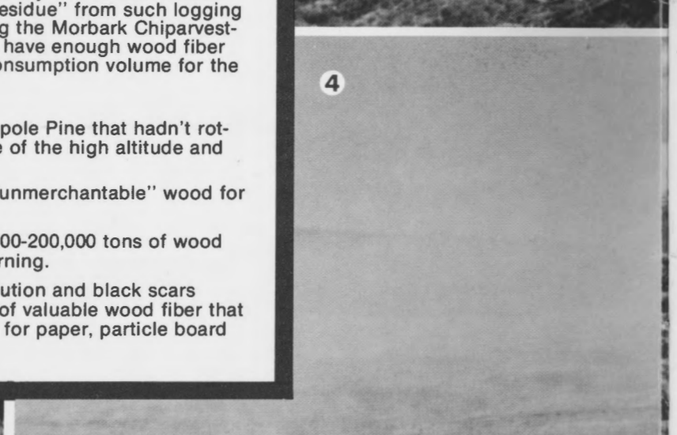
1. Acres of dead Lodgepole Pine that hadn't rotted in 30 years because of the high altitude and dry and cold climate.

2. Machine rake piles "unmerchantable" wood for burning.

3. One pile of the 150,000-200,000 tons of wood p[redacted]re just before burning.

4. The needless air pollution and black scars caused by the burning of valuable wood fiber that should have been used for paper, particle board and fuel.





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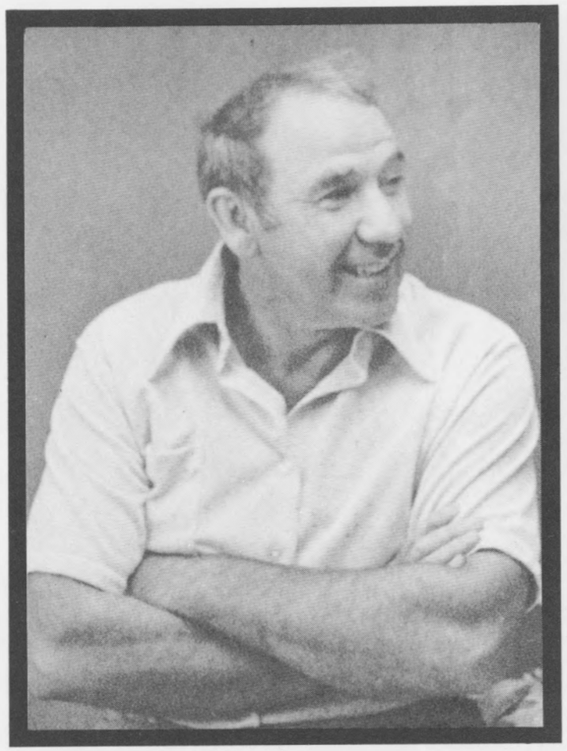


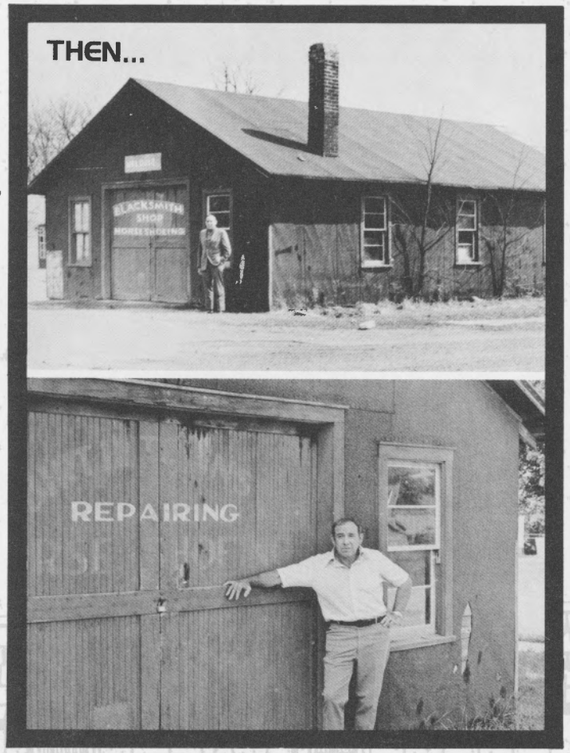
Norval Morey, Chairman of the Board, Morbark Industries, Inc. was one of America's top lumberjacks in his youth. In succeeding years, his inventiveness, business acumen and leadership have made it possible for Morbark to transform the traditional thinking and practices of an entire industry in order to better meet today's worldwide challenges.

MORBARK: A NAME SYNONYMOUS WITH INNOVATION, LEADERSHIP AND GROWTH

During his early years, Norval Morey chopped wood with his four brothers in the forests of Michigan, Oregon and Washington. Together, they later formed the successful Morey Brothers Lumber Company in their home town of Winn, Michigan.

Then, with his flair for innovations, Norval Morey in time developed and patented a machine to debark trees. In 1957 the Morbark Debarker Company was founded. Initial debarker prototypes were built in the Winn blacksmith shop.

At that time, the newly formed company had a total of $10,000 founders' cash and a $20,000 credit line. Today Morbark Industries' sales volume is over $25 million and growing. Since its founding, there has never been a need for a public offering of stock for capitalization.



Norval Morey, President, Morbark Industries, Incorporated stands in front of his former blacksmith shop where prototypes of the original Morbark Debarkers were created. The date was 1957.

In late 1957, the S.D. Warren Co., a division of Scott Paper Co., ordered five Morbark Debarkers to help supply its Muskegon, Michigan pulp and paper mill. That $20,000 order is still appreciatively remembered by Norval Morey as giving Morbark a major boost toward solid corporate standing.

By the end of 1958, Morbark's Debarker was beginning to make a significant impact on the forest products industry. So a manufacturing plant was constructed and equipped in Winn. The concept of the pulpwood debarker extended into the early 1960's and led to the development of a log debarker for small sawmills.

Morbark's growth has been consistent. Besides expanding the plant every year, the product line expanded as well . . . a new debarker for 36-inch logs (1962), a utility pole peeler and post machine (1963). Hardly a year goes by without new equipment being developed, patented and manufactured. The sales network was expanded in 1963 and in that same year the company's first outlet outside the U.S. — Canadian Morbark Ltd. — was established in North Bay, Ontario.

Canadian Morbark Ltd. was established in North Bay, Ontario ten years ago and now has a 200,000 sq. ft. manufacturing and sales facility of its own . . . primarily for the production of the type of Morbark equipment that is not manufactured in Winn, Michigan.

The latest addition to the Morbark plant in Winn is being used to develop and manufacture new lines of total tree harvesting equipment. The added space also makes it possible to increase production line capacity of the popular *Chiparvestor* to one-a-day.

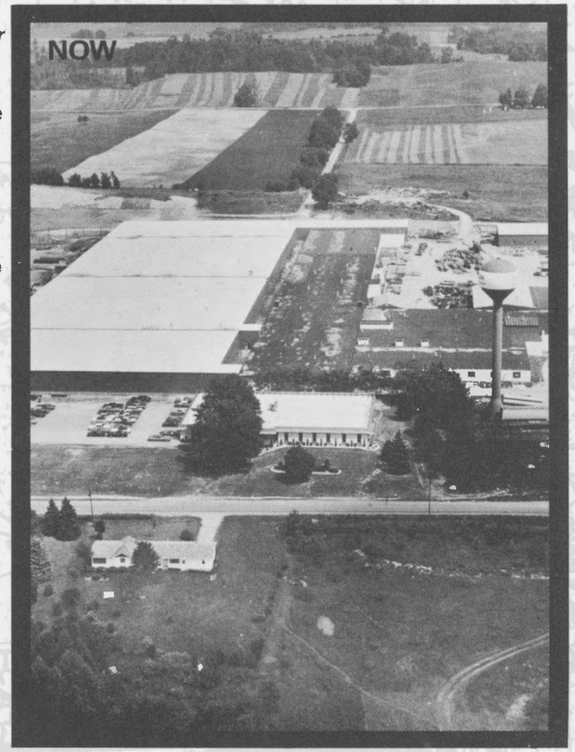
The assembly line for the Model *30/72 Total Chiparvestor* is the most extensive of any at Morbark. It covers 422 feet and contains 14 separate stations. Located next to the main *Chiparvestor* line is the chipper assembly line. Production is coordinated so that the completed chippers can be added to the appropriate station on the *Chiparvestor* assembly line.

To compliment the rapidly expanded factory area, Morbark has added a modern 23,500-square-foot office facility.

That new office building, which borders the western edge of the manufacturing plant, houses the sales force, conference rooms and the accounting, payroll, personnel and graphics department as well as some phases of drafting and engineering. Morbark now has 30,000 square feet of office space — which is more than five times the entire 1958 manufacturing facility.

Morbark Industries currently has 14 company-owned parts and service centers in various geographical areas of the United States with six more scheduled in the near future.

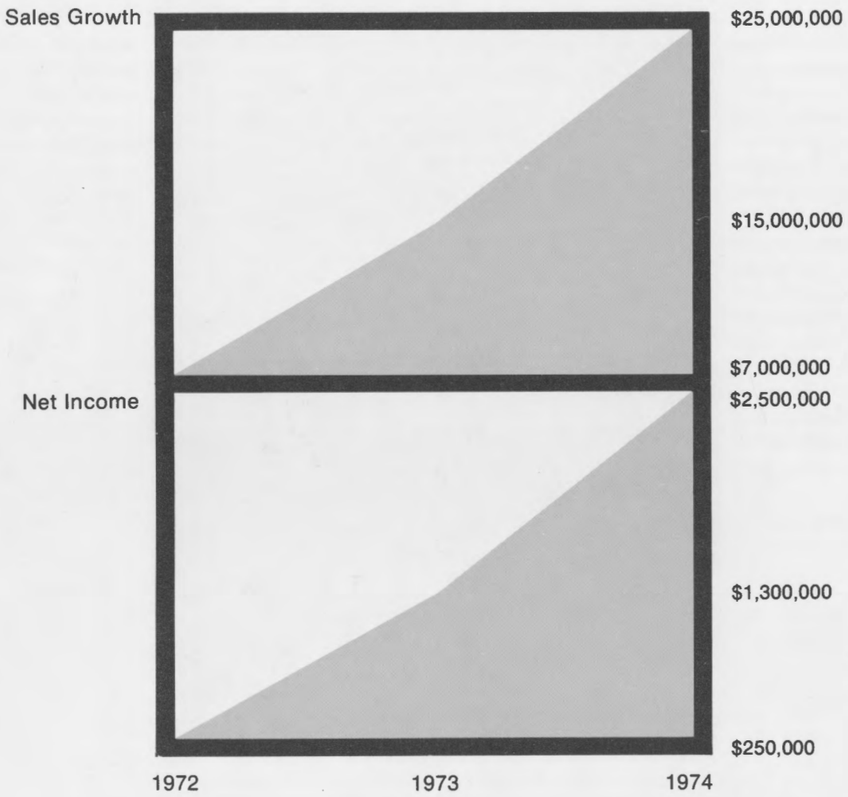
Recently Morbark formed Morbark Industries International, Inc. as a wholly-owned subsidiary to distribute and market Morbark's innovative line of dependable equipment throughout the world.



Morbark has expanded its Winn, Michigan manufacturing facilities every year until it is now 650,000 sq. ft. (or more than 14 acres).

MORBARK'S FINANCIAL RECORD OF GROWTH

	1972	1973	1974
Net Sales	$7,000,000	$15,000,000	$25,000,000
Net Income	$250,000	$1,300,000	$2,500,000
Net Worth	$1,700,000	$3,000,000	$5,400,000



DIMENSIONAL TOTAL WOOD CHIPS TAKE ON THE ENERGY CRISIS

In the mid-nineteenth century wood was the main source of energy in the world. With our advancing technology it can again be true today. Alcohol derived from dimensional total wood chips could power airplanes, trains and cars. Total chips can be used to turn turbines that generate electricity or used in heating to supplement the dwindling supply of oil and coal.

Schools, industries, office buildings and homes can be heated with total wood chips. Already, plants and offices in Tennessee, Kentucky and Texas have been converted to wood chip heating. By supplementing their heating with total wood chips, they have experienced great savings in fuel oil and coal.

At current prices, one dollar's worth of average quality coal produces 200 B.T.U.s of heat. A dollar's worth of *green* total wood chips on the other hand, will return 450 B.T.U.s. And it must be remembered that coal can't be grown, but wood is a renewable resource.

By utilizing the enormous reservoir of wasted wood throughout our forests, the U.S. could save four million barrels of fuel oil a day by 1976, and still not touch one lumber-quality tree. With current advanced harvesting techniques as much as 200 tons of dead or unmerchantable wood can be utilized in U.S. forest, while providing optimal growing conditions for the top quality trees left standing.

In October, 1973 a barrel of imported oil cost $2.10 in the U.S. By early 1975, this price had jumped to about $11.00 a barrel. The total cost of imported oil jumped from $7.7 billion in 1973 to $24 billion in 1974. By the utilization of our own wood resources for energy purposes, we can reduce this tremendous expense and help restore the U.S. balance of payments.

SELECTIVE ENVIRONMENTAL HARVESTING... A NEW OPTION FOR FORESTERS

In the past ten years there have been a number of reliable biological and technological studies concerned with the Total-Tree Concept. Usable information on the total availability of biomass in the standing forest and the practicality of using the whole tree — trunk, bark, branches, and leaves or needles — in the manufacture of various products has been reported.

The basic philosophy behind the Total-Tree Concept is to utilize as much of the standing vegetation as possible in order to minimize waste while keeping with the principles of forest ecology. Today, there should be no deterioration of the forest ecosystem as a result of harvesting wood fiber.

At one time in our history, the primary role of Forest Management was to protect the forest from fire, insects, disease and overcutting. Utilization of the tree was limited to the bole, from the stump up to the limit of merchantability; a height dependent upon regional customs. Because of this, merchantability was limited to certain species of trees of some minimum size in stands of specified volume. Under such conditions, annual production per acre from the forest was seriously and unnecessarily constrained.

On the other hand, by incorporating the Total-Tree Concept into their operations, chip producers more than double their yield in most stands of timber.

For tree harvesters, the name of the game is to extract the greatest amount of wood from an acre of land without damaging future regeneration. Yet there are many areas that would produce 100 tons per acre from residue without harvesting what is usually considered commercial forest or timber resource. In the U.S.A., there are many times more trees dying and rotting from combined natural causes today than the country is using. Enough dead trees are available because of climate conditions to immediately provide a minimum of a 25 year supply of wood fiber.

Millions of tons of wood fiber, created by the great windrows of slash, limbs, dead trees and other "unmerchantable" wood fiber that have been left behind in many forests, create an eyesore and a fire hazard. They are actually a valuable and abundant natural resource.

The most conservative projections of total consumption of wood fiber in the U.S. for the year 2000 indicate that demand will increase by 46%. Harvesting methods, without the Morbark Chiparvesting System, are totally inadequate for our small world with a more or less fixed forest acreage and a rapidly expanding human population.
No company, government or individual can afford to overlook the wood "residues" wasted in our forest lands any longer.

Morbark has developed what many people contend is the most significant advancement to meet this need — *Selective Environmental Harvesting*.

Today's foresters would like to harvest part of the millions of acres of U.S. forests left inaccessable by nature and take out diseased and heretofore unmerchantable wood fiber. The "good" timber would be left standing in a park-like setting encouraged by the best growing conditions. Up until now, foresters have lacked the technology and equipment to change old methods.

Selective Environmental Harvesting offers the forester an option to change his thinking on conventional harvesting techniques. Land is too valuable to simply grow cheap wood fiber. It must be managed to permit controlled harvesting and recreation while not risking continuity and improvement.

The development of the Morbark *Bunching Shear* for use on smaller, more maneuverable tractors now makes *Selective Environmental Harvesting,* as well as the total utilization of forest "residues," possible.

In *Selective Environmental Harvesting,* all diseased and pulpwood quality trees, plus hardwoods normally killed in the growing cycle, are cut from the stand and chipped. The remaining stand consists of the optimal number of trees for growth, depending on growing conditions peculiar to that specific area. With competition for nourishment reduced, the higher quality trees grow faster.

Subsequent harvests are based upon the growth achieved in the stand and the end-product's requirements. In some growing conditions, all the remaining trees are removed in the second cutting, but if the stand has trees of various ages, as many as four cuttings may be best. However, when the original stand is even-aged, the land can be clear-cut in the first operation.

When reforesting is desired, the land can be mechanically re-planted with speed and efficiency because there are no obstacles of stumps or slash to hamper economical procedures.

Selective Environmental Harvesting means no crown damage to standing trees and no useless stumps obliterating the landscape. Tops, branches, dead trees and other debris are utilized, and the forest is left with a park-like appearance, resulting in accelerated timber growth.

A *Selective Environmental Harvesting* project not only produces dimensional total wood chips at half the cost of conventional systems, but it also enables owners of private timber stands, who have never considered harvesting wood fiber, to now have their stands neatly improved in appearance, recreation and real estate value.

WOOD-FIBER HARVESTING WITH THE CHIPARVESTOR

chip *vb* chipped; chipping *vt* 1. to cut or hew with an ax, chisel, or other edged tool. 2. to cut or break (a small piece) from something. 3. to cut or break a fragment from. (slang *Brit:* chaff, banter) *vb.* contribute. *n.* chipper.

Chip-arv-est-or (Chip-ärv-ist-ər), *n.* 1. a 15-30 ton machine that converts whole trees to usable wood chips in 30 seconds. Used in tree-harvesting operations to double the wood-fiber yield from an acre of land. Also in municipalities for efficient and profitable recycling of diseased or storm damaged trees. (comb. form chip + harvester) Also; *p.p.* chiparvesting; *inf.* chiparvest

In 1970, a new word entered the forest industry's dictionary—*Chiparvestor*. "*Chiparvestor*" identified the machine that has single-handedly increased timberlands wood-fiber yield throughout the United States and Canada.

When the chain saw was introduced several decades ago, the harvest of one cord of wood per man-day at roadside was considered a remarkable yield. Until then, wood-harvesters had been using the laborious Swede saw. Skidding and hauling was done with horses and tractors. Next, choker-skidders, knuckle-boom loaders and grapple-skidders were introduced which pushed the per-man day rate ever higher.

With the invention of the Morbark *Chiparvestor*, this daily yield has soared to more than 20 cords or about 50 tons per man.

The *Chiparvestor* is taken right into the woods. There it picks up the whole tree—trunk, limbs and top, and converts them into dimensional total wood chips and blows the chips into a waiting van. The chips are then trucked directly to the mill at a fraction of the previous cost.

Before the *Chiparvestor* was invented, tree harvesters had to leave the limbs and tops (called slash) behind in the woods. This wasted tons of wood a day and created eyesores and fire hazards. The tree trunk, called roundwood, had to be trimmed and loaded at considerable expense in the woods. Then it was unloaded at the mill to be chipped. The *Chiparvestor* not only eliminates the expense of trimming and loading trucks in the woods, it also utilizes the total tree.

Through more efficient forest utilization and increasingly advanced equipment, Morbark projects a 30 cord per man-day yield by 1980. This increased production will not come at the expense of our wood resources. Instead, without cutting top quality trees, it will be accomplished through the use of dead and diseased trees and other so-called "unmerchantable" wood in the forests.

20 YEAR INCREASE IN PULPWOOD PRODUCTION

A CHIPARVESTOR FOR EVERY NEED

Since ~~1968~~ 1970, Morbark has manufactured over ~~400~~ 350 *Chiparvestors*. Production capacity is currently up to one each day. To meet the increasing demand of dimensional total wood chips for the pulp and paper industry, particle-board manufacturers, and units of governments, Morbark has ordered machinery to further increase production capacity to 10 *Chiparvestors* per day. This rate will include the current models *30/72* and *18/32* plus the new models *14/28* and *10/18*.

The ability of Morbark's *Chiparvestor* to utilize the whole tree and at the same time deliver dimensional chips at a cheaper price has attracted many and various people concerned with efficient utilization of timber. The pulp and paper industries have been using the *Chiparvestor* since it came on the market.

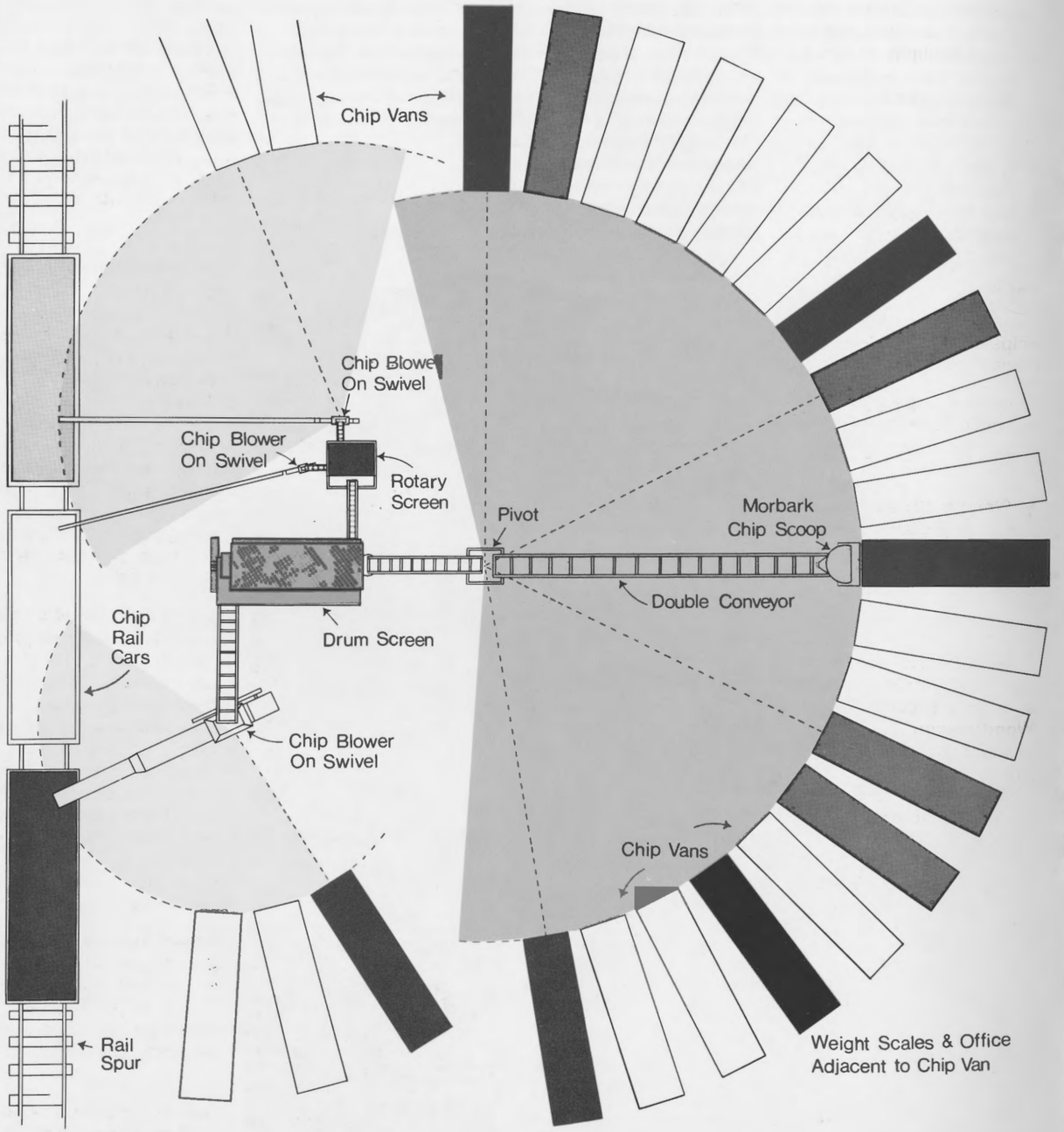
Large fuel producing companies are beginning to use total wood chips manufactured by the *Chiparvestor* to combat the ever rising price of coal and oil. Utilities use *Chiparvestor* to clear rights of way.

Municipalities regard the *Chiparvestor* as the best way to recycle their diseased or storm-damaged trees without burning or hauling them to distant landfills. Land clearing contractors use the *Chiparvestor* to dispose of trees; spreading the chips around new buildings for mulch and landscaping.

Wherever it is used, in landfill sites, on city streets, in forests in the United States, Canada, France, Austrailia, and in the Middle East, Asia and South America or in the jungles of Africa, the Morbark *Chiparvestor* provides portable, heavy-duty, one-man operation to harvest any species of tree.

With four models offered, there is a *Chiparvestor* to meet every terrain condition, size of forest and chip production requirement. The *30/72* Model *Chiparvestor* accomodates whole trees up to 30 inches by 72 inches in diameter (no tree grows perfectly round). Other *Chiparvestor* model numbers— *18/32*, *14/28* and *10/18* —describe the size tree each model *Chiparvestor* will handle. Price, weight and size descend from the Model *30/72* to the *10/18*.

THE MORBARK CLASS-A-FIBER SYSTEM



Nowhere in the world has there been a dimensional wood chip processing system capable of unloading, sorting and reloading 200 tons of wood chips per hour. Morbark's new *Class-A-Fiber System* can accomplish that feat routinely 24 hours a day.

Here's How it works:

1. Chip vans carry the wood chips from the *Chiparvestor* to the specified site . . . either to a landing away from the pulpmill or outside a mill or plant.

2. The newly designed Morbark *Scoop-Conveyor* extends directly into the chip vans parked in a half circle. Each chip van is entirely unloaded in less than 10 minutes.

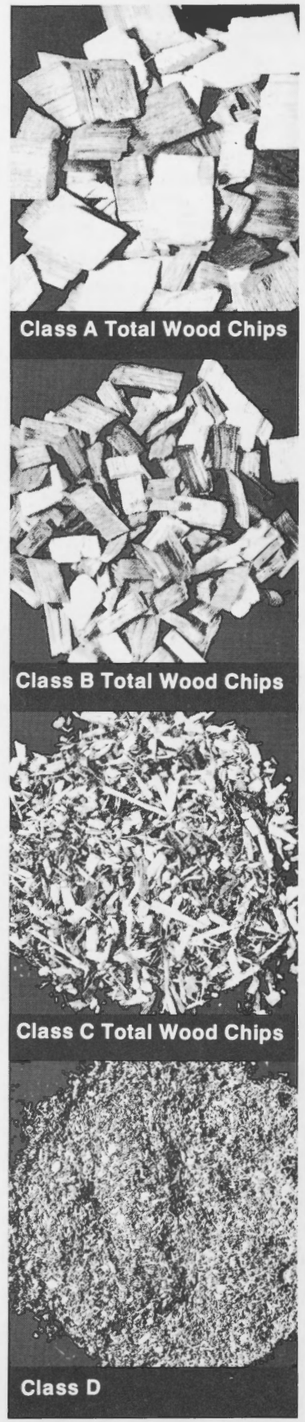
3. The *Scoop-Conveyor* automatically funnels the wood chips onto a conveyor which transports them into the *Class-A-Fiber* System for classification into four grades.

4. Class A chips are then conveyed to a large Morbark-designed blower which is swivel mounted. The blower shoots the chips by a jet-stream of air into either chip vans or rail cars.

5. Simultaneously, further refining of the Class B, C, and D wood chips takes place as they are fed onto an adjacent screening system. They are then fed into separate swivel mounted blowers for loading into chip vans or rail cars. The operator of the *Class-A-Fiber System* monitors the flow rate of the entire system from unloading through sorting to the final loading. If only total wood chips made from softwoods are desired, for example, the operator can move the *Scoop-Conveyor* from one chip van to another in seconds.

Wood fiber producers do not have to maintain large fleets of expensive tractors. Van can be dropped off and parked full for indefinite periods . . . or, they can be unloaded and be back on the road in less than ten minutes.

Averaging more than 200 tons of wood chips per hour through the *Class A Fiber System,* and operating 24-hours per day, 4,000 tons of chips per day can be conservatively achieved.



Classifying Total Wood Chips

For efficient utilization of the dimensional total wood chip, it is essential that classification by grades be accomplished prior to transportation to the end user. The Morbark *Class-A-Fiber System* makes this possible.

How Total Chips Are Classified

Class A Total Wood Chips
Class A total chips are ¾ to 1-¼ inch in length. These extra long-fiber chips are the highest grade and ideal for use in making the finest quality paper, such as the paper in your hands. High grade mills with continuous digesters employ these total chips. Bark content is low: from 2-5%

Class B Total Wood Chips
Class B total chips varying in length from ¼ to ¾ of an inch are excellent for nine-point corrugated paper production. They are highly desirable for mills with batch digesters. Class B total chips are also highly useful for any end use that can tolerate a higher bark percentage than Class A chips, such as linerboard, pressboard or fuel.

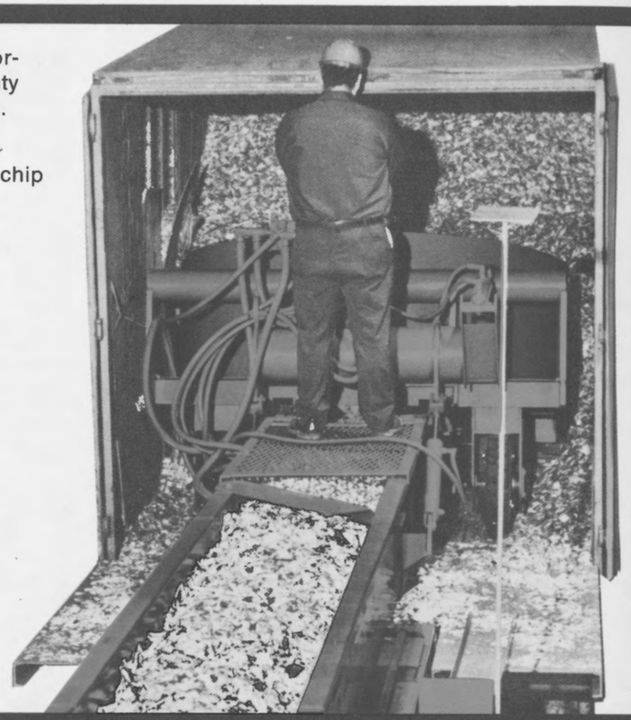
Class C Total Wood Chips
Class C total chips can be used as fuel or added to Class B chips to make linerboard, pressboard and particleboard.

Class D
Class D is made up of very fine bark and grit particles and is best suited for use as mulch.

THE MORBARK SCOOP-CONVEYOR

Morbark's *Scoop-Conveyor* is an integral part of the new *Class-A-Fiber* chip sorting and classification system. Close inspection of the high-speed *Scoop-Conveyor* reveals its durable construction that guarantees top performance even on twenty four hour operations.

Uniquely, the *Scoop-Conveyor* unloads a chip van *in less than ten minutes*.

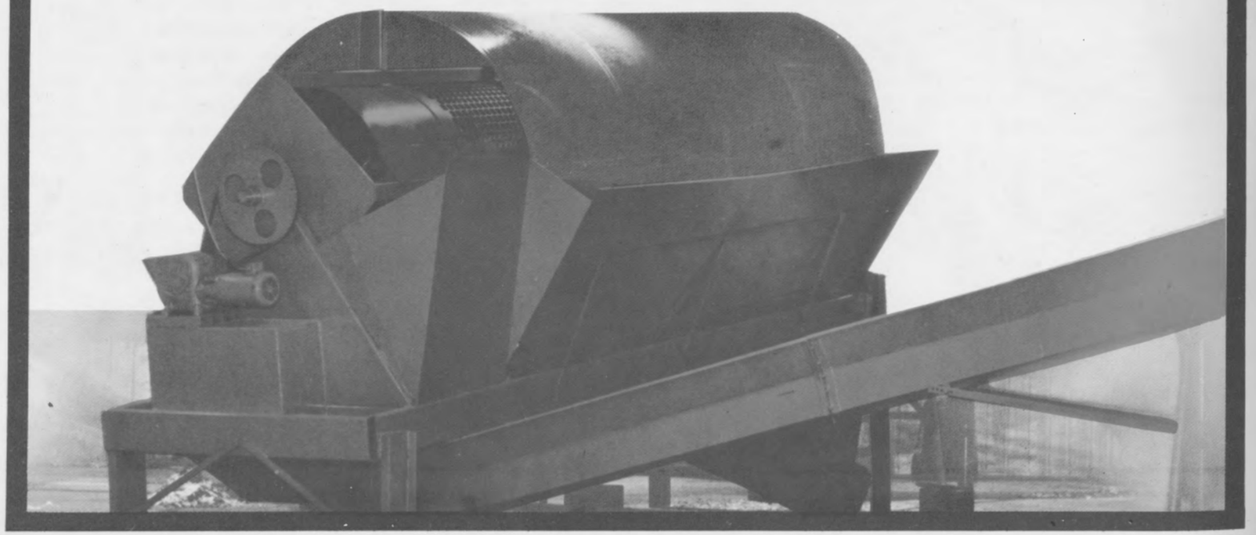


THE MORBARK CLASS-A-FIBER

To ensure that manufacturers using wood chips receive dimensional chips meeting their exact requirements, Morbark invented the *Class-A-Fiber*.

Chips are conveyed to the shaking, revolving screen unit where a series of perforated drums separate the chips into the four suitable grades; each with a good standard of uniformity.

Over 100 tons of chips per hour are classified.



THE MORBARK CHIP DISPATCHER

One Way To Unload, Spread and Load Chips

The Morbark *Chip Dispatcher* not only loads and unloads chip vans, trucks and rail cars, but it also spreads chips and similar materials over large areas with speed and efficiency. When unloading, the self-propelled; three wheeled unit can be quickly maneuvered into position at the back of the chip van. Hydraulic stabilizers align the bed of the Morbark *Chip Dispatcher* with the van's floor.

The Morbark *Chip Dispatcher* is a workhorse piece of equipment that can spread chips, unload trucks, load chips into vans, unload vans and load chips into rail cars.

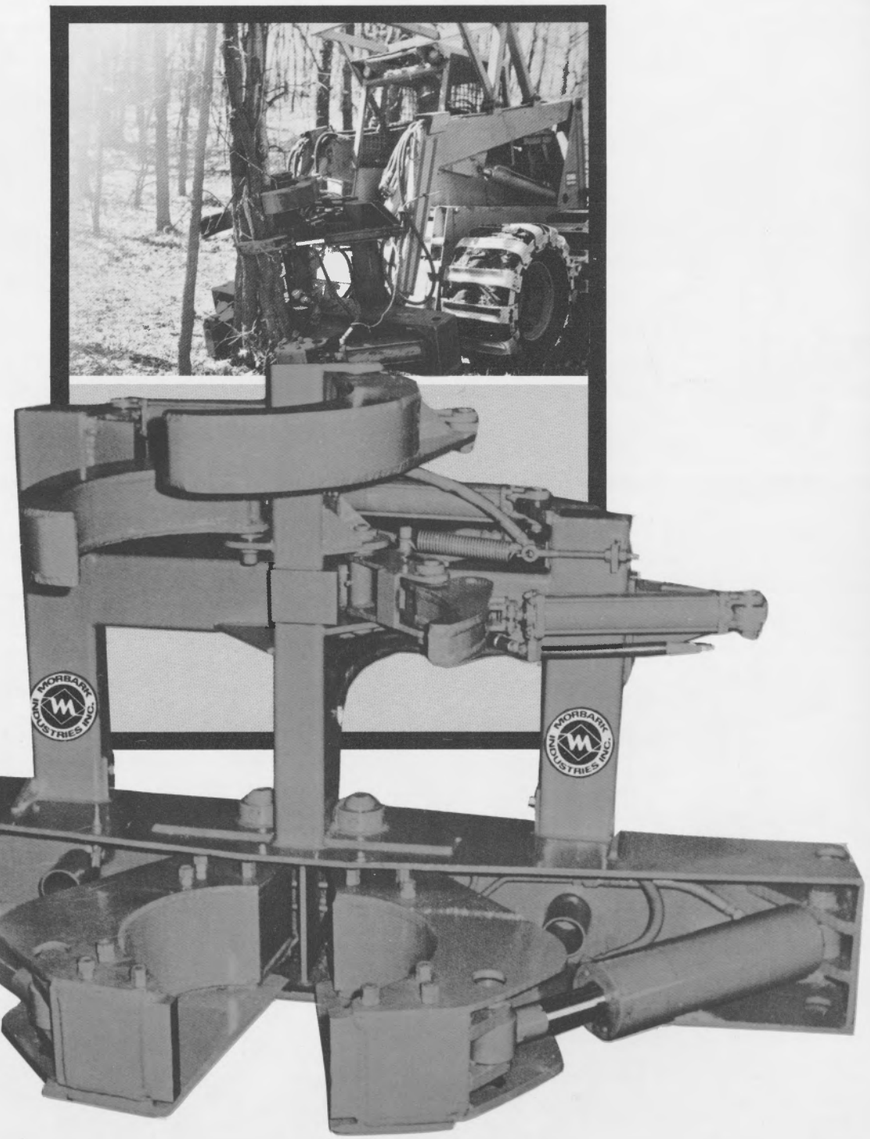
A tractor with bottom-dumping bucket makes it possible to unload a 25 ton, forty-foot van in about 25 minutes. As material is unloaded into the Morbark *Chip Dispatcher,* it falls through a grated platform into a bin. There, a series of augers forces the chips into a powerful airstream that blows them into a stockpile or transport vehicle. The Morbark *Chip Dispatcher* can also be used to blow dimensional wood chips onto highway embankments to prevent soil erosion; onto large land areas to be planted; or over landfills.

THE MORBARK FELLER BUNCHER SHEAR

Dependable Morbark *Feller-Buncher Heads* fell trees from 16 inches down to two inches (including brush). A second model for trees up to 20 inches in diameter is scheduled for market soon.

Morbark's *Feller-Buncher Head* is equipped with a *patented* accumulating arm to allow the operator to shear and gather several small diameter trees (down to 2") before having to unload.

Morbark *Feller-Buncher Heads* are already in service on woods equipment manufactured by Melroe, John Deere, Timberjack, Case, Caterpillar, Allis-Chambers and several others.



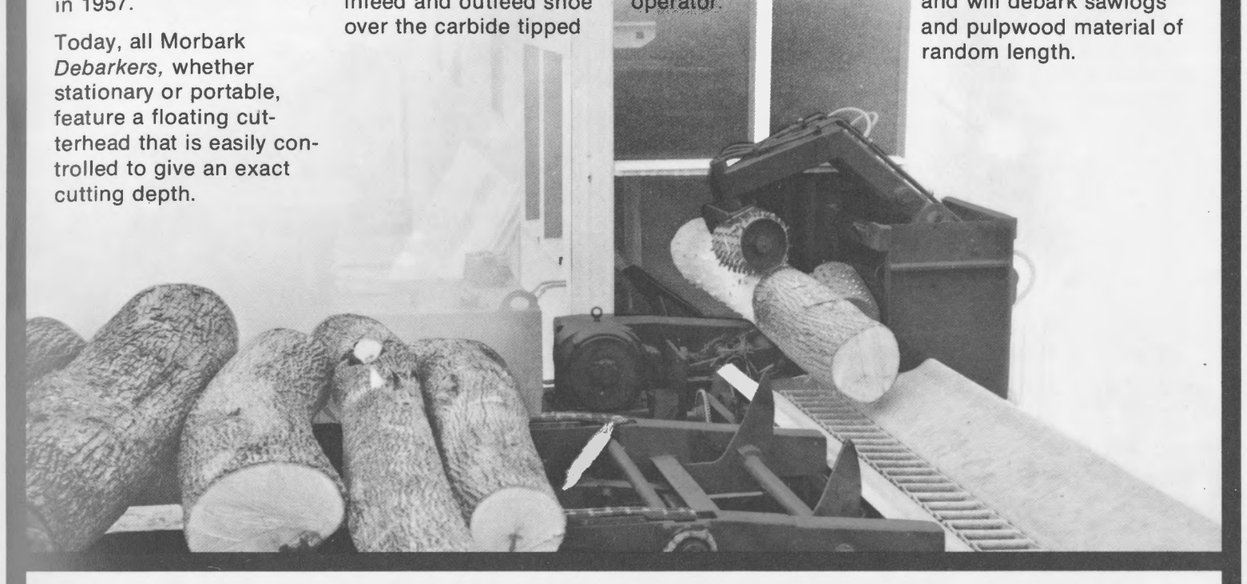
MORBARK'S DEBARKERS

Morbark's original passport to success was the Morbark *Debarker . . .* invented and patented in 1957.

Today, all Morbark *Debarkers,* whether stationary or portable, feature a floating cutterhead that is easily controlled to give an exact cutting depth.

Barks, nubs, and knots are swiftly removed by spiralling the log forward at variable speeds on an infeed and outfeed shoe over the carbide tipped cutterhead. All facets of the Morbark debarking method are under positive control of the machine's operator.

Each model of the Morbark *Debarker* handles wood with a diameter between 4 and 36 inches and will debark sawlogs and pulpwood material of random length.



MORBARK'S PORTABLE AND STATIONARY POST PEELERS

Posts and poles require a smooth and straight finish. That's why more posts and poles are peeled on Morbark *Peelers* than any other Peeler in the world.

Morbark's *Peelers* come in stationary and portable models. Both have a patented dual cutterhead that produces posts of excellent quality regardless of material.

The post is first cleaned of bark, dirt and knots by a cutterhead equipped with carbide teeth which leaves the posts with an ideal surface for the *Peeler* knives to plane and smooth. The carbide tipped cutterteeth greatly extend the life of the planer knives.

Cutterheads are mounted on a floating table so they follow the contour of even the most twisted posts, yet still produce a post of top quality.

The *Stationary Pole Peeler* can be equipped to clean a pole up to 60' in length.

MORBARK'S MOR-TRAC LOG SORTER

Saw mill owners know that "the fewer times wood has to be handled the greater the profits." Once a log arrives at the mill and is unloaded next to the *Mor-Trac*, it is not handled again until it is processed.

Mor-Trac, being a *mobile* loader, affords the operator every log in his inventory at his fingertips, thus eliminating the need for fork lifts.

The base, or track, of this ingenious loader is also a conveyor that feeds the random length logs into the plant. Conveyor length is determined by the amount of inventory needed.

Hydraulically powered, Morbark's *Mor-Trac Log Sorter* loads logs up to 16,500 pounds with a "full cycle" time of only 18 seconds.

STAC-TRAC LUMBER SORTER

Hydraulically operated Morbark *Stac-Tracs* lift sawn lumber or cants from the green chain, then sort and stack the material into appropriate lumber carts.

The Morbark *Stac-Trac* has two hand and two foot controls for complete movement and operation. *Stac-Trac* handles lumber at a rate of eight pieces per minute and loads up to 500 pounds with ease.

The *Stac-Trac Lumber Sorter* saves money because it can efficiently do the work of as many as four men.

MORBARK'S CHIP-LOC BLOWER

The *Chip-Loc* provides the first method of loading chips without bruising or breaking wood fiber.

Chips fall from the blower's bin into a powerful jet stream of air. Chips then ride the air stream out of the swivel spout.

Unlike other throwers, the chips are never touched by whirling blades that damage valuable wood fiber.

The *Chip-Loc Blower's* swivel-spout ensures complete and uniform loading of trucks, chip vans and box or open top rail cars.

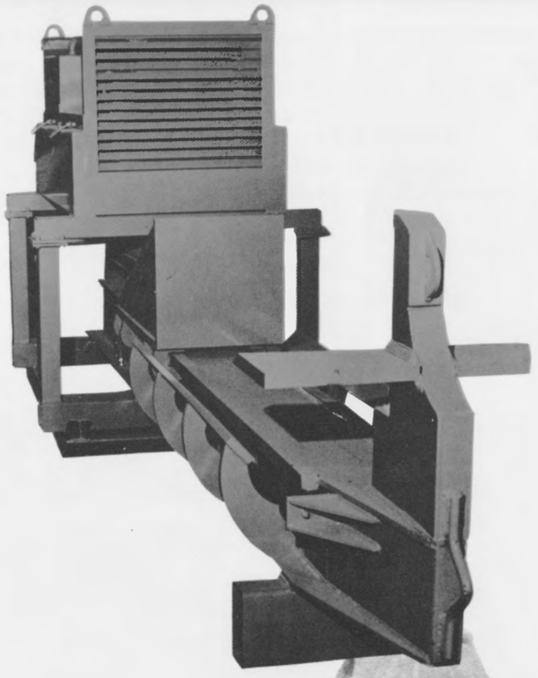
MORBARK'S SLASHER

Morbark's *Slasher* enables saw mill operators to cut tree length logs into varietal lengths to eliminate long crooks as well as to furnish dimensional lengths for lumber, cants or cross ties. The Morbark *Slasher* is semi-automatic and remotely controlled so that any log can be bypassed. Another feature of the *Slasher* is the electric eye actuation of the saw with an operator controlled override where cutoff is not necessary.

MORBARK'S FOUR-WAY LOG SPLITTER

The *Four-Way Log Splitter* adds a new dimension to wood residue utilization. Oversize logs and odd size tree trunks can now be split in one continuous operation.

Once split, the material is easily processed. Morbark's *Four-Way Log Splitter* offers economical processing, saving thousands of dollars in trucking costs. Cities plagued with wood disposal problems are using Morbark's *Log Splitter* to reduce big diameter material down in size to be recycled through the Chiparvestor.



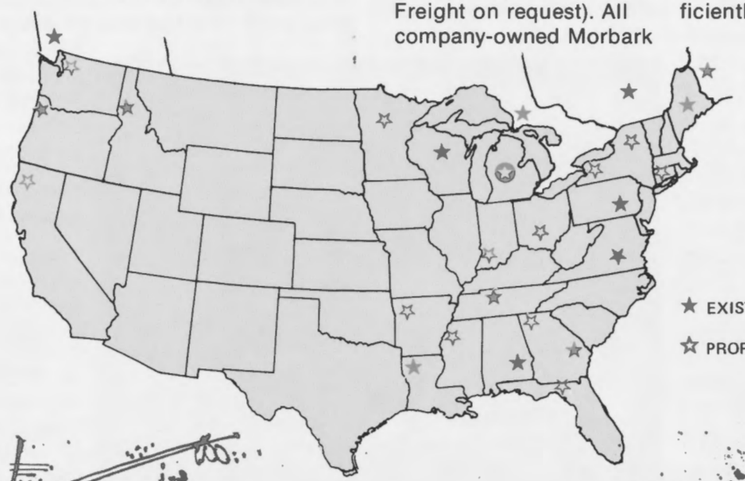
The *Four-Way Log Splitter* will split any species of wood up to four feet in diameter and up to five and a half feet in length.

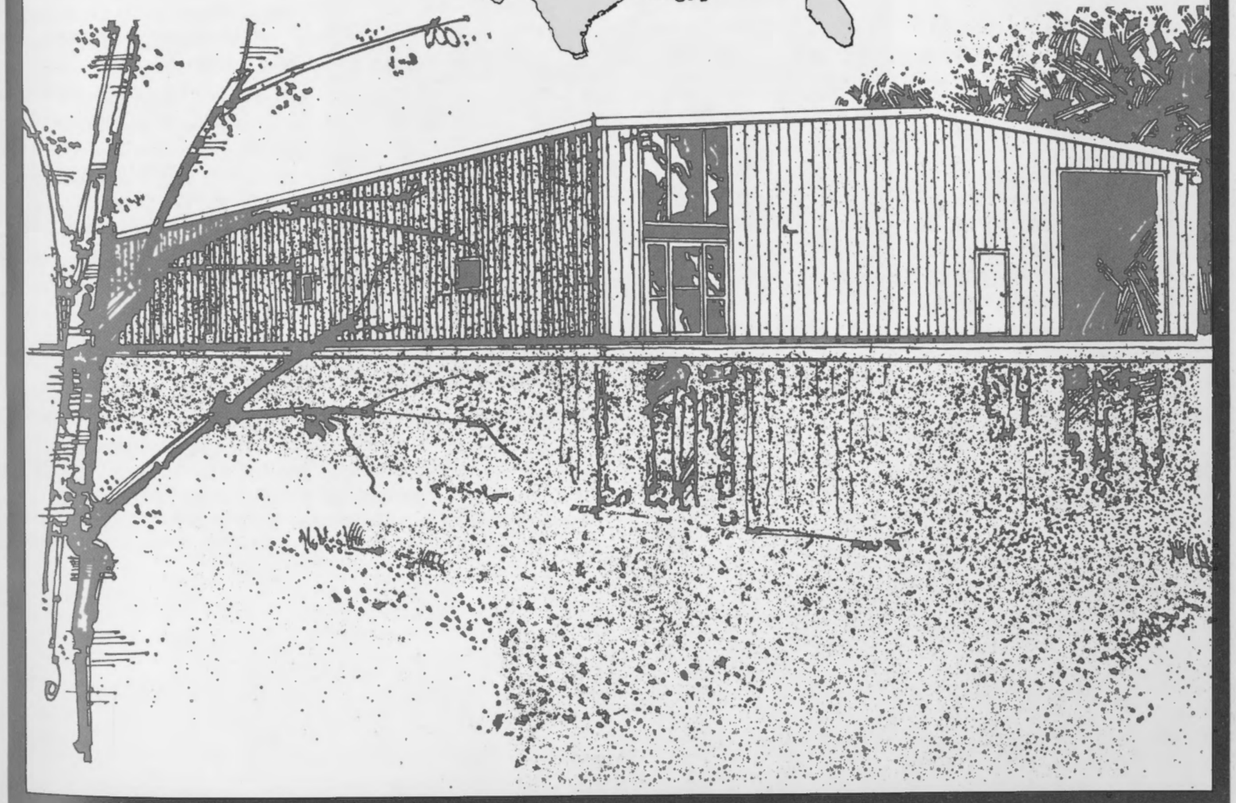
MORBARK'S PARTS/SERVICE CENTERS

Fourteen Morbark Parts/Service Centers are strategically located according to existing equipment population centers so that costly downtime is cut to a minimum.

This map illustrates existing and proposed company owned Morbark Parts/Service Centers. Geographical tabulations of Morbark equipment sales are carefully noted to anticipate future needs for new centers.

Complete inventories are available at the centers which are ready to receive orders any time of the day or night. Replacement parts are often sent the same day by UPS, bus, Parcel Post or Motor Freight (and Air Freight on request). All company-owned Morbark Parts/Service Centers are closely tied to the main Morbark plant in Winn, Michigan to ensure that parts are of the same high quality as original Morbark equipment and that customer service needs are quickly and efficiently handled.





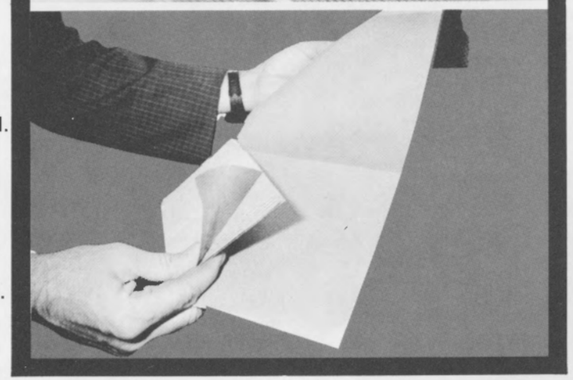
LET THE CHIPS FALL WHERE THEY PAY

The pulp and paper industry needs a continuous supply of dimensional wood chips in order to meet the increasing world demand for paper products. Proof that dimensional total wood chips make a paper of the finest quality can be seen beneath the print in magazines such as *National Geographic.* Take a good look at the paper in your hands . . . it too is made from total wood chips. With the perfection of Morbark's *Class-A-Fiber System*, the speed at which top quality chips can be classified and routed to their proper destinations has been increased many times.

The great availability of low cost total wood chips has also made them an excellent raw material for kraft and corrugated paper, fiberboard, particleboard and roofing paper.

But using total wood chips just for paper products is like using water just for drinking. Civilizations have dominated over others because of their better utilization of water resources. Though today's civilizations may not depend on the dimensional total wood chip . . . economies of the world will.

The only renewable resource on earth today, wood fiber, will play an increasing role in our lives. Coal and oil is dwindling but wood is replacing itself.



Uses of total wood chips are limited only by our imagination. In the past few years, wood chips have shown their utility in hundreds of new ways. They have provided excellent highway embankment erosion control because once spread on an embankment, the serrated edges of the total chips interlock and provide a blanket that remains stable through heavy wind and rain.

Whether shrubs or trees are planted along the roads, total wood chips provide excellent cover because they entrap moisture yet allow the seedling to grow through. A blanket of wood chips induces natural growth by trapping air-born seeds.

Then, they provide fertilizer as they decompose.

Total wood chips can be spread with Morbark's *Chip Dispatcher* right after bulldozing to provide immediate erosion control on embankments that are too steep to plant grass. Total chips provide instant protection against siltation into streams.

Dimensional total wood chips can be made on the spot from trees removed during highway construction; from forest residues; or they can be hauled to the site from nearby total-tree chipping operations.

Stabilizing a slope from erosion with sod costs a governmental agency $5,000-$6,000 an acre with an added $2,000-$3,000 per acre in yearly mowing and fertilizer costs. With 60-120 tons of chips per acre (depending on the depth of coverage) and the cost of chips about $10 per ton, an acre of wood chip erosion control costs between $600 and $1,200 per acre and never requires maintenance.

Excellent inherent qualities in wood chips provide moisture retention and fertilization, at low cost. Total wood chips make an excellent mulch for tree farms and gardens and for landscaping buildings and homes.

The fifth largest city in the U.S. plants over 1,300 trees a year mulched with Morbark total wood chips. And because the carrier of the Dutch Elm disease, the Japanese Beetle, can't survive in wood chips, that same city and a score of others recycle their dead Elms with Morbark Chiparvestors and safely spread the total chips around healthy trees.

After cities or landfill contractors bury wastes in landfills, no topsoil is left for vegetation growth. By spreading total wood chips over the landfills, an excellent medium for growth is naturally created while the appearance of the landfill site is improved.

Total wood chips are more preferred than straw for bedding in cattle and horse stalls because of the wood chips' quality for superior moisture absorption. Wood chips are also cheaper than straw and the animals won't eat the wood chips.

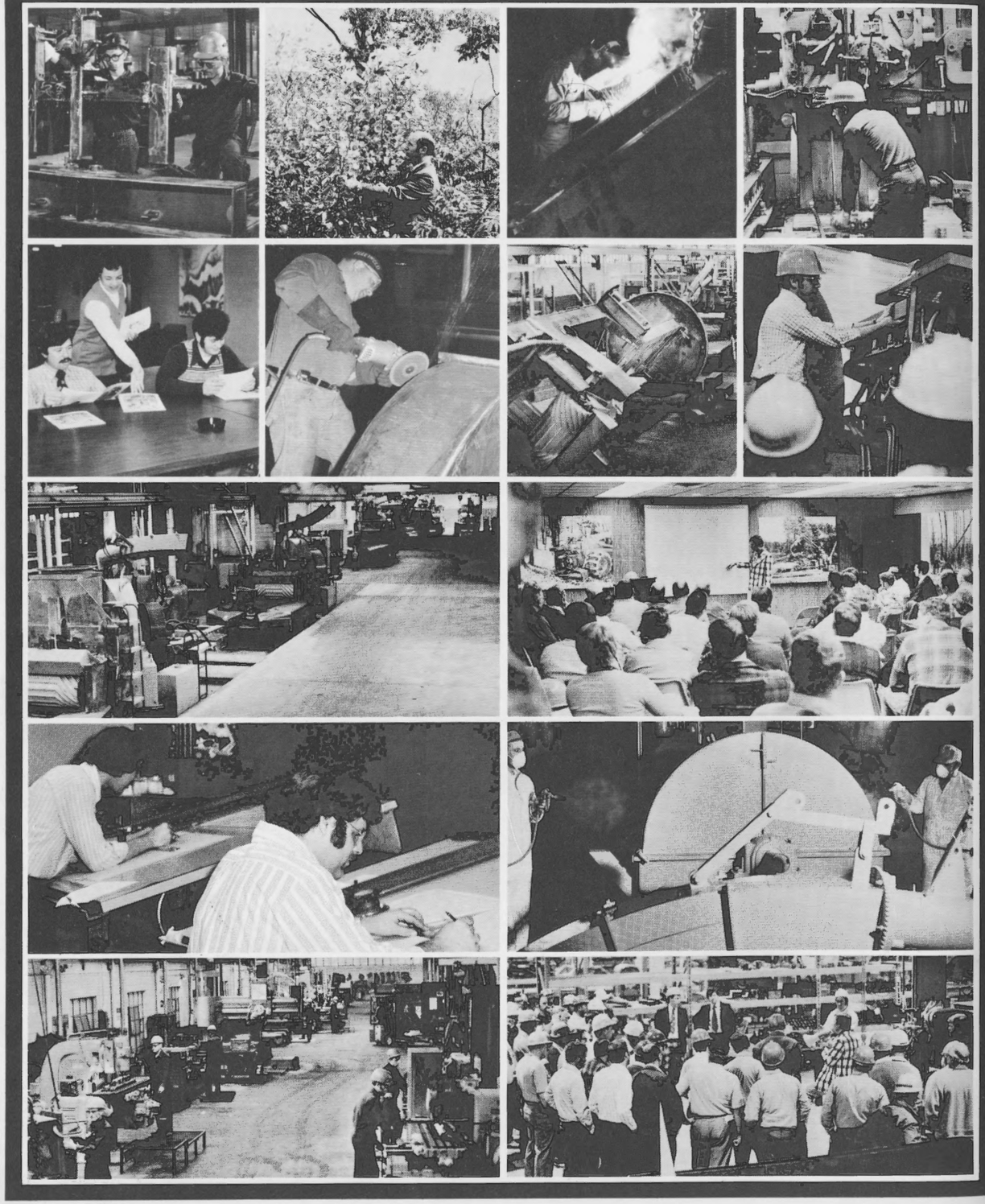
Chemists and chemical engineers have expanded the utilization of the dimensional total wood chip in areas unheard of a few years ago. They have even coined a new word — *silvichemicals.* Silvichemicals made from wood chips have yielded ammonia, alcohol, formaldehyde and even crude oil, though its synthesis is costly now. Silvichemicals have hundreds of applications. They are used in solvents, deodorants, detergents, paint removers, adhesives, metal cleaners, drilling fluids and printing inks. Chemists can even rearrange the constituents of wood fiber to duplicate sperm-whale oil, insecticides and perfumes.

The total wood chip is edible, too. Chips go into an additive that makes chewing gum chewable and a specialty yeast with a meaty flavor used in sausages, bacon bits, baby food and pasta.

It is possible that wood fiber could help feed underdeveloped countries already suffering from an inadequate food supply.

While the world's supply of minerals, coal and oil decreases and prices increase, it is crucial that we continue to find new applications for dimensional total wood chips to support growing populations. Whether you write on it, walk on it or eat it, the total wood chip will always be a remarkable *and* renewable resource.

THE MORBARK PEOPLE BUILD AND TRANSFORM A VITAL INDUSTRY



Pictured here is a dimensional wood chip harvesting operation in a National Forest using the Morbark Chiparvesting System. The Morbark Chiparvestor is used to recycle the "residue" that was formerly burned following a "clear cut" logging operation. The logger originally took out 150 tons of lodgepole pine per acre. The Morbark Chiparvestor following later on a similar 1,000 acre tract manufactured 200 tons per acre of total dimensional wood chips. The usable wood fiber yield from the "residue" was greater than from what used to be called "merchantable" timber. And the forest floor is left clean of residue.

1. A machine rake pushes the remaining 200 tons per acre of formerly "unmerchantable" wood to the nearby Morbark Chiparvestor.

2. An early model Chiparvestor chips the pine into dimensional total wood chips and blows them into chip vans that take them, in this case, to the particle board plant.

3. The Morbark Chiparvestor easily converts any species of tree into usable wood chips in 30 seconds.

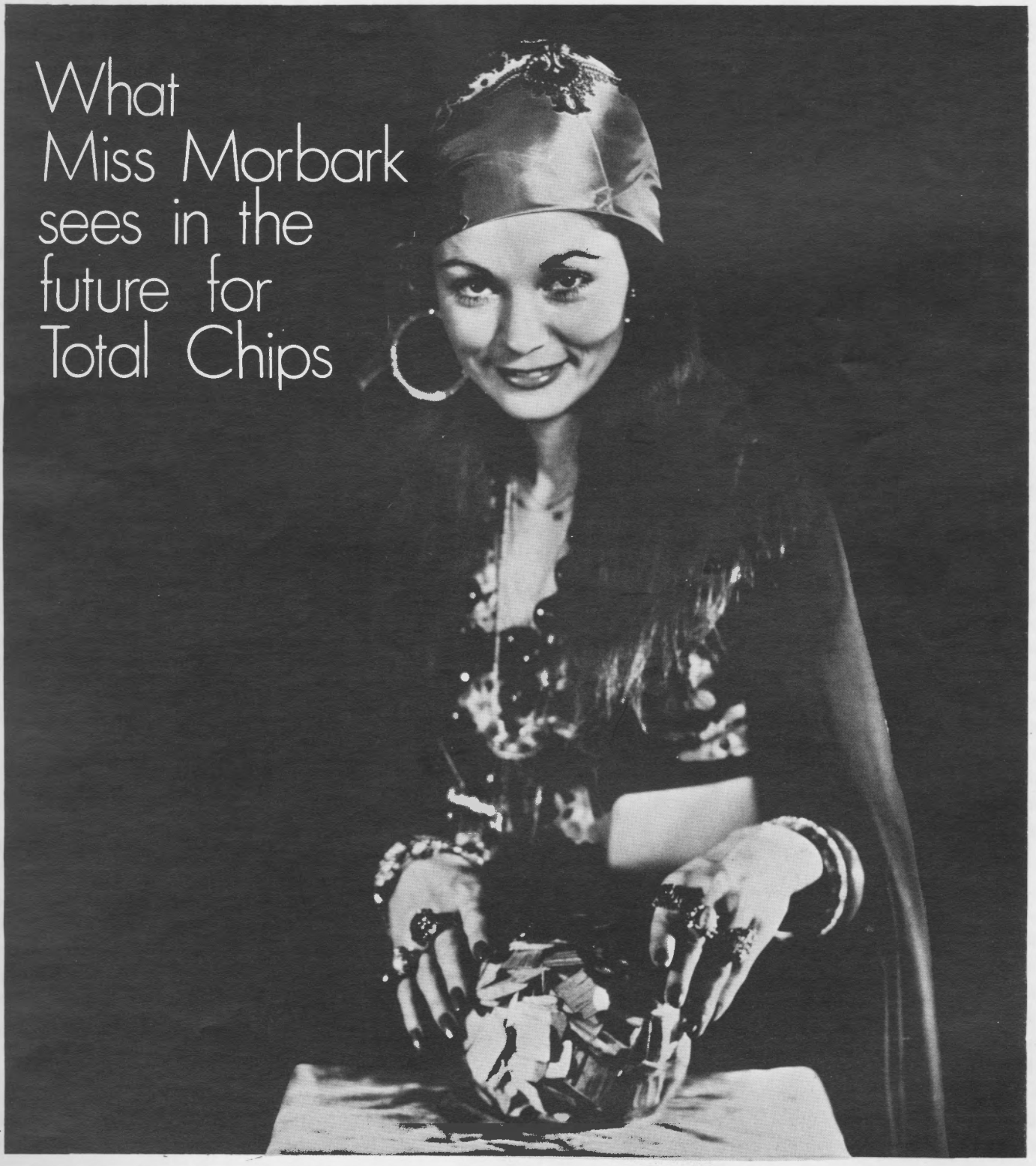
4. Dimensional wood chips are more than a by-product. They are sought after by manufacturers in several countries of the world as a basic ingredient. Wood chips are a renewable natural resource that serve the needs of modern man today while helping Mother Nature continue her job into future generations.

MORBARK INDUSTRIES, INC.
WINN, MICHIGAN 48896

What's new in Total Chip Harvesting

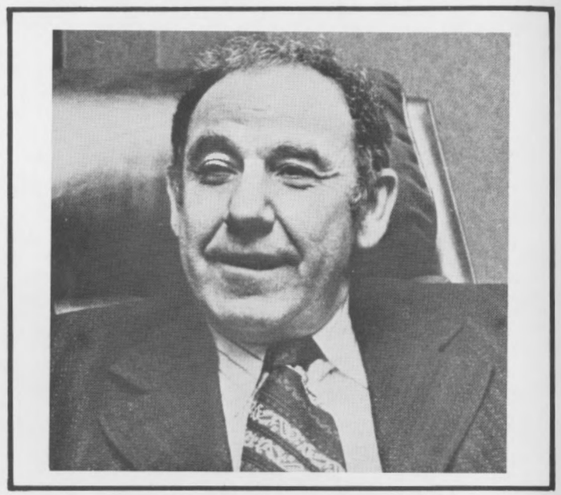
VOLUME 2 NO. 2 MORBARK INDUSTRIES, INC. WINN, MICHIGAN 48896 PHONE (517) 866-2381

What Miss Morbark sees in the future for Total Chips



President's Comments

" ...a most logical step for the future of Total Chips. "



During the past year we have cited several examples of the significant impact that total chips have had on this industry. The economic advantages, combined with the dramatic increase in utilization, have established total chip harvesting as a way of life. Proven results have determined that whole tree harvesting is not only here to stay, but that more universal practice of this method of harvest will be adopted in the future.

Through continuing cooperation and constant communication with the users of total chips, we have been aware of the need for expanded research into processing and screening. For the past several months, this research has been the focal point in our efforts. We briefly touched upon some of the general aspects of this research and the development of Morbark's Wood Refinery System in the previous newsletter. The following pages deal with more specifics of this system and many of the advantages that are obvious in the next logical step in the whole tree harvesting concept.

First, experience shows that digestors cannot use everything contained in total chips. Improved screening methods are necessary. Secondly, we have found through intensified screening that the class of dimensional chip ideal for pulp contains a very small bark content, so little in fact that it is insignificant. Also, the proven commercial value of total chips, the aesthetic, the environmental, and the economic demands require that we squeeze the maximum from our resources. Even the news media provide us with daily warnings of the urgent lessons to be learned from wasting our valuable resources. For these and other important reasons, we realize that even the most casual participant in this industry should have a vital interest in the advantages of the Wood Refinery System.

Essentially, the Wood Refinery System is a centralized chip processing and refining site that intercepts and receives total chips in transit. A typical station provides that as many as 25 or 30 chip vans may be placed within the radius of an intensified screening and classifying system. The pivoting chip scoop and double conveyors permit the processing by species regardless of when or where the van may arrive within the receiving radius. Because of this, all pine can be screened without mixing, interruption, or waiting. This is true with any species — mixed hardwood, poplar, etc. — in whatever sequence is desired or necessary.

Another advantage is that a producer is not required to maintain a large fleet of tractors. The Wood Refinery System will unload a 40-foot van in approximately 10 minutes. A van of chips may be delivered and, if all stations are filled within the radius, the van can be left at a set-out station. The system maintains a couple of tractors which retrieve the van, position it, unload it, and set it out for pick-up on the next trip.

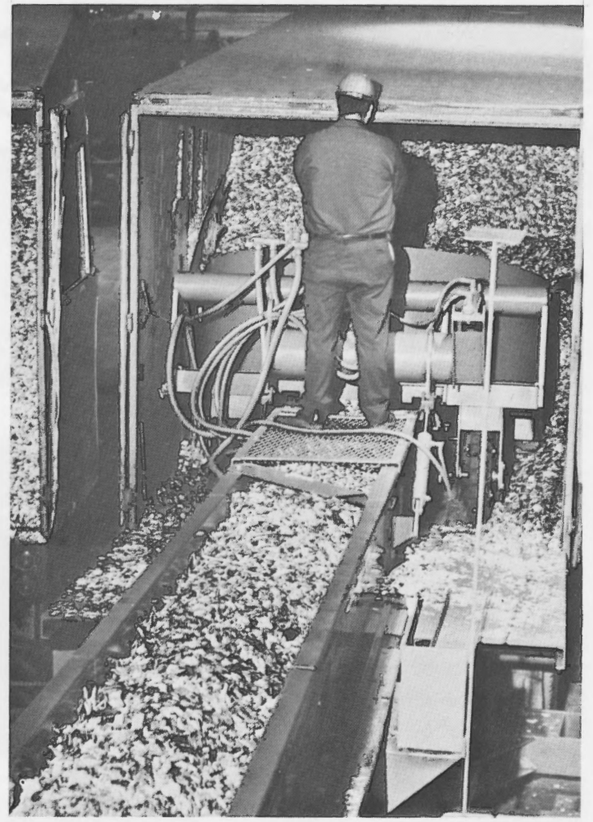
A recovery system may operate at a typical site. Chips can be dumped in piles within the radius of the large scoop and double conveyors. The scoop will operate at ground level and maintain efficient processing.

Averaging more than 200 tons per hour, the Wood Refinery System can operate on a 24-hour basis, processing approximately 5,000 tons a day. The chips are fed to a large drum screen, at which point the Class A chips flow to a large blower which is swivel-mounted. From this point, chips may be loaded into vans or rail cars. Further refining and screening takes place, with other class chips being fed to a rotary screen adjacent to the drum screen. At this point, separation is made, processing three other distinct classes of chips, and from this point the chips are fed to separate blowers, also swivel-mounted, and loaded into rail cars or vans.

From the ideally centralized location of the Wood Refinery System, specific markets are gained for each class of material refined through this system. Typically, the Class A chips may go to the high grade pulp or paper mill, Class B to the nine-point mill, Class C to a hardboard mill, and Class D for fuel. Each class would establish an appropriate market value and provide more equitable pricing according to the specific requirements of raw material and the resulting products.

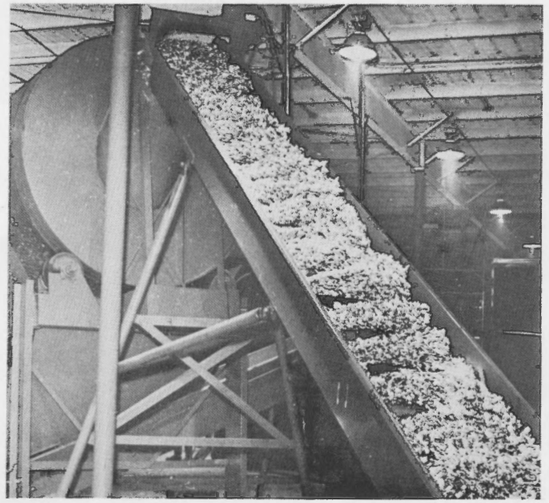
We realize that with each step of progress within any industry, there also remain certain problems along with the multiple benefits. The Wood Refinery System is engineered to solve those problems in utilizing the total tree. We're sure you will agree that it presents a practical and sensible approach for expanding the use of one of our most valuable natural resources, and this is the most logical step in the future of total chips.

Norval Morey
President



Morbark Chip Scoop enters a van of chips and unloads the van in approximately 10 minutes. Chips are conveyed directly to the central drum screen.

Pictured below is the pivot point of the conveyor system. Here the double conveyors dump into the upright conveyor which goes to the drum screen.



The equipment emplacement is as follows:

(A) Chip vans are stationed within the radius of the unloading system and also near blowers and conveyors for loading.

(B) The unloading system with the Morbark Scoop and telescoping, double conveyors.

(C) This pivot permits the unloading system to work in any sequence, so that vans may be unloaded according to species regardless of their position within the unloading radius.

(D) Drum screen.

(E) Rotary screen which further processes for chip separation.

(F) Blower for loading rail cars or vans.

(G) Blower for loading rail cars or vans.

(H) Blower from drum screen. All blowers are swivel-mounted for loading rail cars or vans.

(I) Rail spur.

(J) Weigh scales for incoming chip vans.

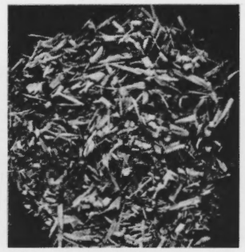
(K) Scale house and yard office.

The column to the immediate right illustrates actual specimens of the four chip classifications resulting from processing total chips through the Morbark Wood Refinery System.

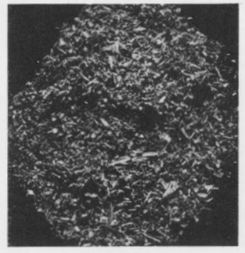
Class A

Class B

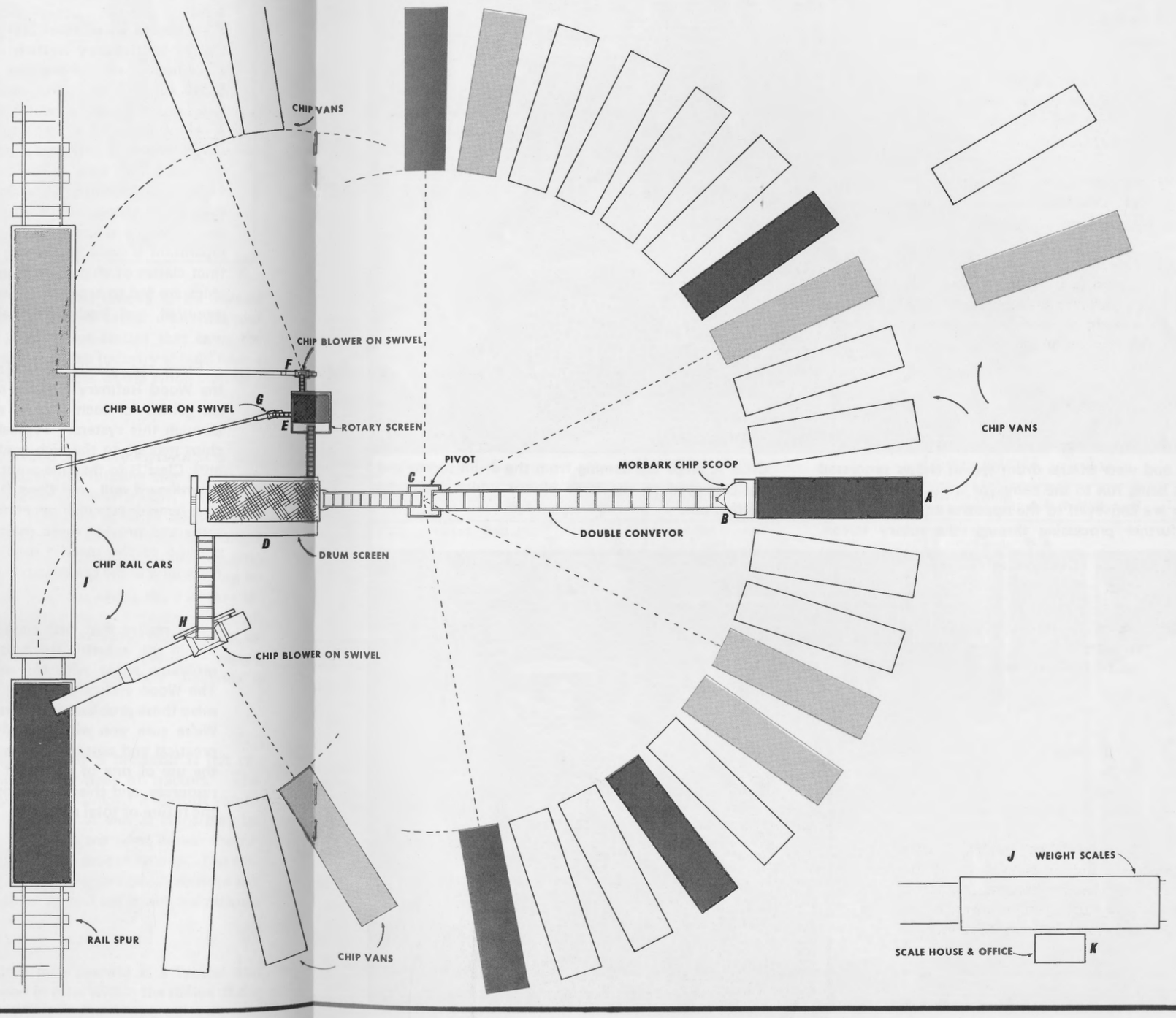
Class C

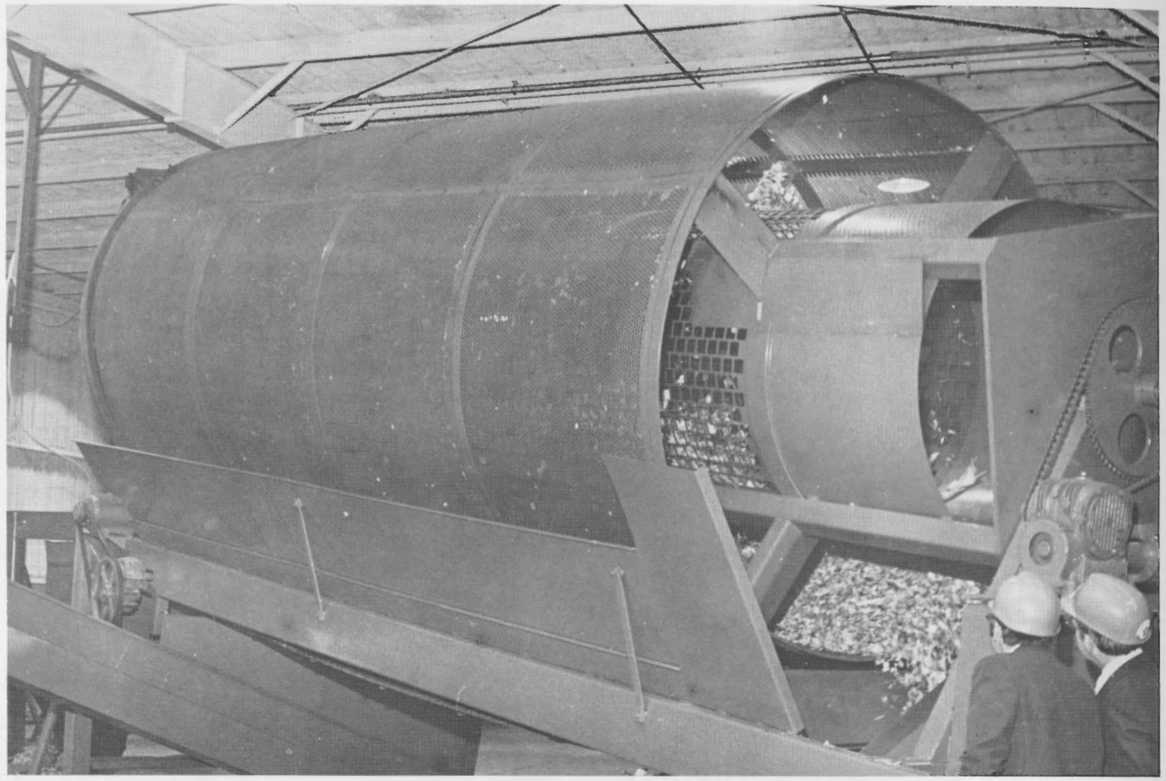


Class D



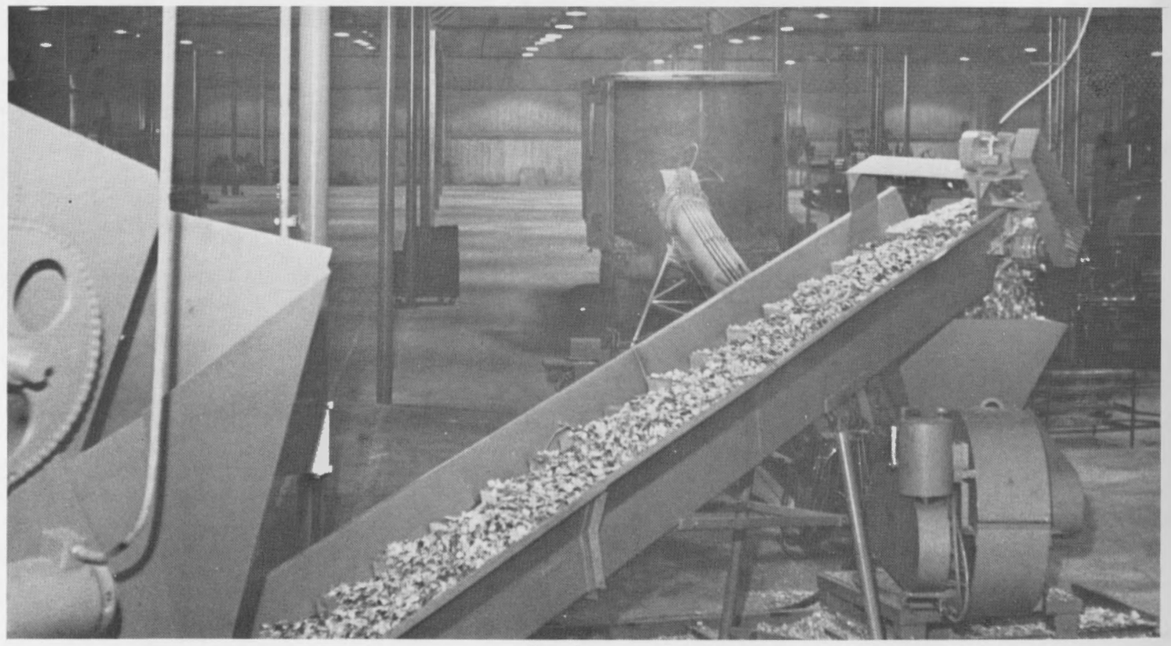
MORBARK WOOD REFINERY SYSTEM





This end view of the drum screen shows processed chips being run to the conveyor while finer screened chips are conveyed to the opposite end of the drum for further processing through the rotary screen.

Class A chips are coming from the drum screen and are conveyed to the large blower which loads the waiting van.



Who's utilizing the Total Chip Concept?

Those mills which now use "Total Chips" made by Morbark's Total Chiparvestor are listed below. Stars (★) indicate the number of Total Chiparvestors supplying chips to each mill. The Total Chiparvestors are either owned by the mills themselves or are owned by outside contractors who sell the chips to the mills.

Abitibi Forest Products 1 mill ★	Eurocan Pulp & Paper 1 mill ★★★	Olinkraft 1 mill ★★
Albemarle Paper 1 mill ★★	Federal Paper Co. 1 mill ★★★	Owens - Illinois 4 mills ★★★★★★★
Alton Box 1 mill ★	Georgia Kraft 1 mill ★★★	Paks Corp. 1 mill ★
Armstrong Cork 1 mill ★★	Georgia - Pacific 6 mills ★★★★★★ ★★★★★★	Pineville Kraft 1 mill ★★
Bird & Sons 1 mill ★	Glatfelter Pulpwood Co. 1 mill ★★★	Real Ste. Marie 1 mill ★
Boise Cascade 1 mill ★	Great Southern 1 mill ★★★★★	Potlatch Corp. 1 mill ★
Boise Southern 1 mill ★	Groveton Papers 1 mill ★★	Proctor & Gamble Cellulose 1 mill ★
Brunswick Pulp 1 mill ★	Hoerner - Waldorf Corp. 1 mill ★★	S.E.B.S.O. 1 mill ★
Calkraft 1 mill ★	Hohenlohe - Waldenburg K.G. 1 mill ★	St. Anne Nackawic 1 mill ★★
Canadian International Paper 1 mill ★	Interlake Steel 1 mill ★	St. Joe Paper 1 mill ★★★★★
Cariboo Pulp & Paper 1 mill ★	Inland Container 1 mill ★★★	St. Regis 2 mills ★★★
Celotex Corp. 2 mills ★★	International Paper 4 mills ★★★★ ★★★★	Stone Container 1 mill ★★★★ ★★★★
Certain - Teed 2 mills ★★	International Resources 1 mill ★	Superwood Corp. 2 mills ★★★★★
Chesapeake Corp. 1 mill ★★	J.D. Irving 1 mill ★	Union Camp 2 mills ★★★★★★★
Consolidated - Bathurst 1 mill ★	MacMillan Bloedel 1 mill ★★★	U.S. Plywood 2 mills ★★
Consolidated - Packaging 1 mill ★	Masonite Corp. 4 mills ★★★★★ ★★★★★	USUTU Pulp 1 mill ★
Container Corp. 1 mill ★★★	Mead Paper 3 mills ★★★★	S.D. Warren 1 mill ★★
Continental Can 3 mills ★★★	Menasha 2 mills ★★	Western Kraft 1 mill ★
Crown Zellerbach 1 mill ★		Weston Paper 1 mill ★
Diamond International 1 mill ★	B.F. Nelson 1 mill ★★	Westvaco Corp. 3 mills ★★★★★★★★ ★★★★★★★
Domtar Fine Papers 1 mill ★	Northwest Paper 1 mill ★	Weyerhaeuser 6 mills ★★★★★★ ★★★★★★
Dryden Paper 1 mill ★	Northwood Pulp 1 mill ★	Yuba River Lumber 1 mill ★
Escanaba Paper 1 mill ★	Ohio Ferro Alloy 1 mill ★	

These companies have recently received a Morbark Total Chiparvestor. A list of new deliveries will be a regular feature of this newsletter.

S.J. Groves & Son
Minneapolis, Minn.

Timber Salvage, Inc.
Junction City, Oregon

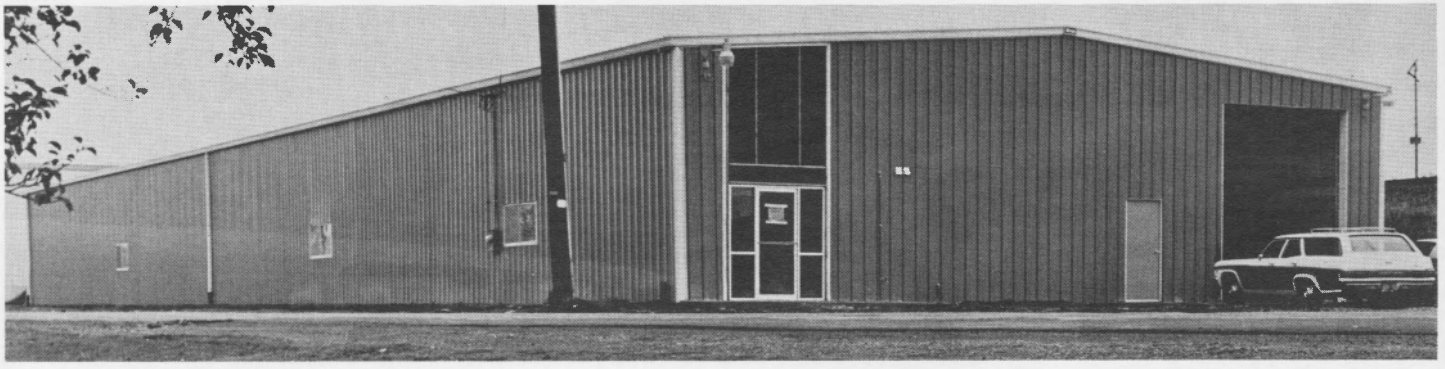
Wood Chips Corporation of America
Tomahawk, Wisconsin

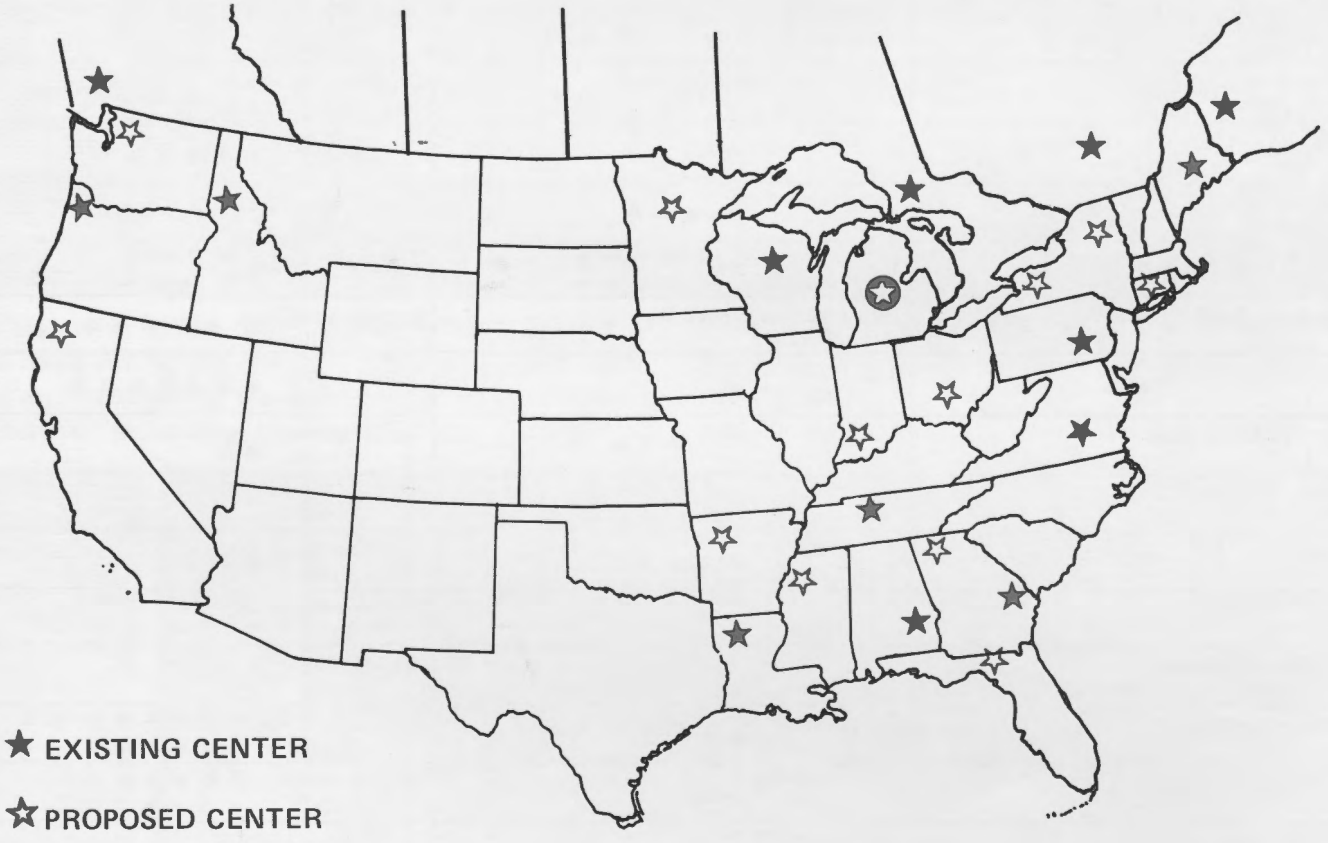
Gary McClellan
Anderson, California

City of Appleton
Appleton, Wisconsin

Great Southern Paper Co.
Cedar Springs, Georgia

Morbark Parts Centers...
to serve you better!



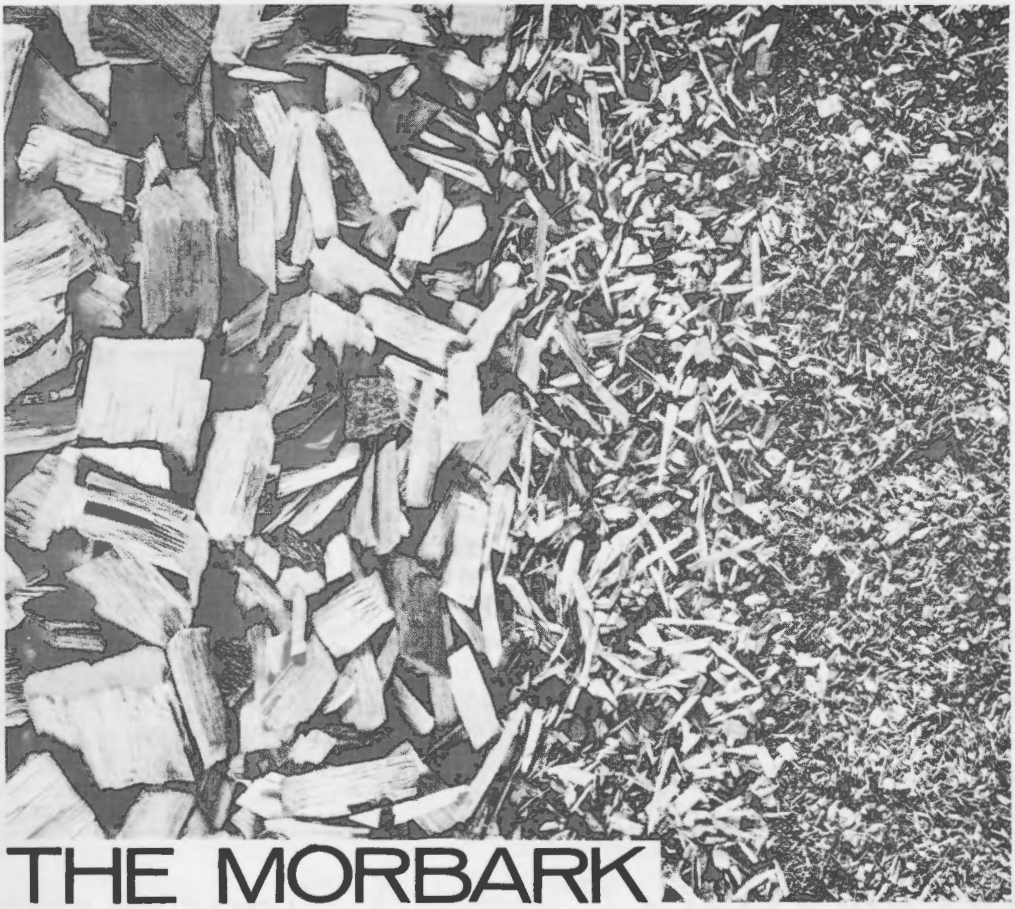


The above map illustrates the existing and proposed Morbark parts centers, all of which are company owned and operated. They are strategically placed according to the existing equipment population.

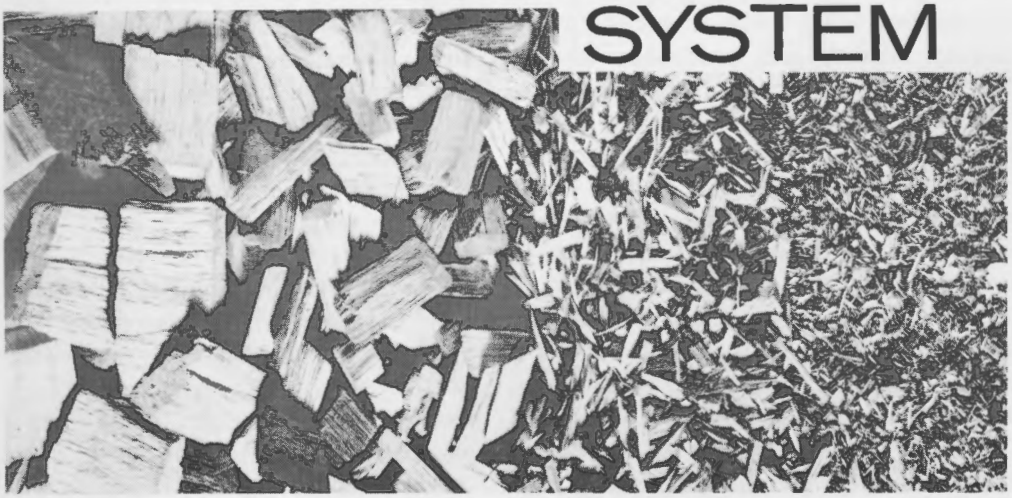
We stress the fact that all parts centers are efficient units with complete inventory of parts. They can provide fast service to avoid costly downtime to any operator, and each center has the service support of the main plant at Winn, Michigan.

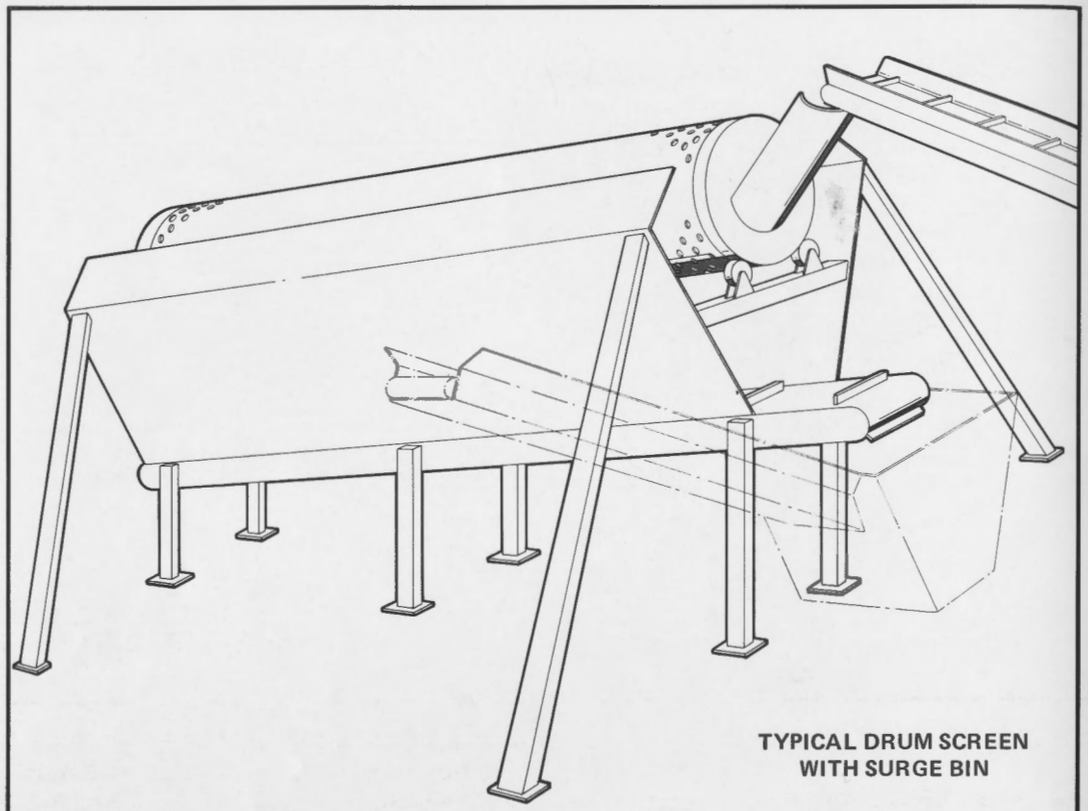
The established parts center shown above is typical of new centers that are soon to be established. As additional parts centers become operational, such information will be published as well as the appropriate areas being notified.

2/75



THE MORBARK CLASS-A-FIBER SYSTEM





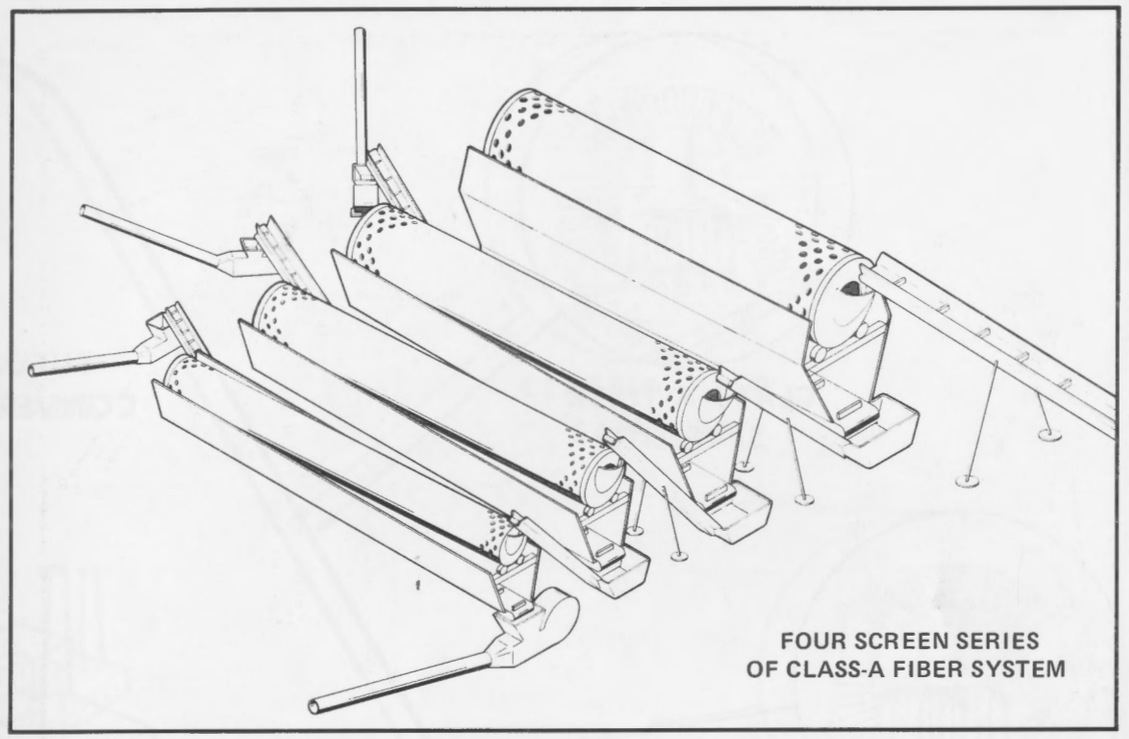
TYPICAL DRUM SCREEN
WITH SURGE BIN

The Morbark Class-A-Fiber System

The illustrations on these pages show the Morbark Class-A-Fiber system, comprising a series of four drum screens. The first in the series receives total chips directly from the unloading system and processes all the overs through a rechipper, from where they are fed back into the drum screen. All the chips are conveyed from the first screen in the series to the second drum screen where Grade A chips are separated and fed to a blower for loading vans or rail cars. Chips that are screened from the Grade A class are fed from the second drum screen to the third screen in the series, at which place Class B chips are separated and fed to vans or rail cars. The finer chips and material flow from the third drum screen of the series to the fourth screen, at which place Class C and Class D material is separated for loading into vans or rail cars.

The Class-A-Fiber system provides a method for obtaining the highest quality chips for fine grade paper. Actual field tests have shown that the volume of Class A chips runs anywhere from 40 to 70 percent, depending on species and condition of wood, while Class B chips average from 20 to 40 percent. Class C chips average 8 to 12 percent of the volume and Class D chips, one to three percent.

Bark content of the various classes of chips would, of course, vary according to species and condition of wood. But, generally, the overall total bark content runs as high as 10 percent. Therefore, the Class-A-Fiber system will screen from the four classifications the following: Class A, bark content from one to three percent; Class B, from six to 10 percent; Class C, from 15 to 25 percent; and

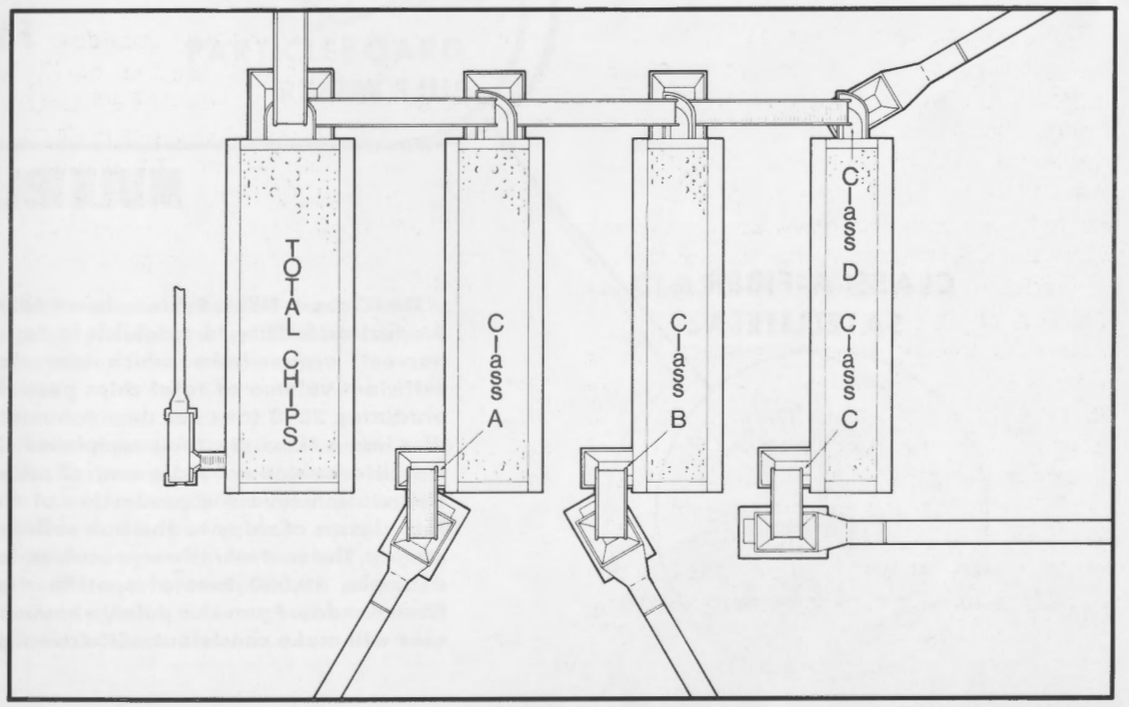


FOUR SCREEN SERIES
OF CLASS-A FIBER SYSTEM

Class D, from 50 to 75 percent.

The development of the Class-A-Fiber system firmly establishes a practical method of harvesting only the over-mature and the dead, down, and dying trees from which high grade fiber can be separated, as well as three other distinct classes of fiber suitable for specific commercial uses. By maintaining this harvesting practice, it is reasonable to find that raw fiber should never exceed 50 cents per ton.

The improved methods of harvesting and



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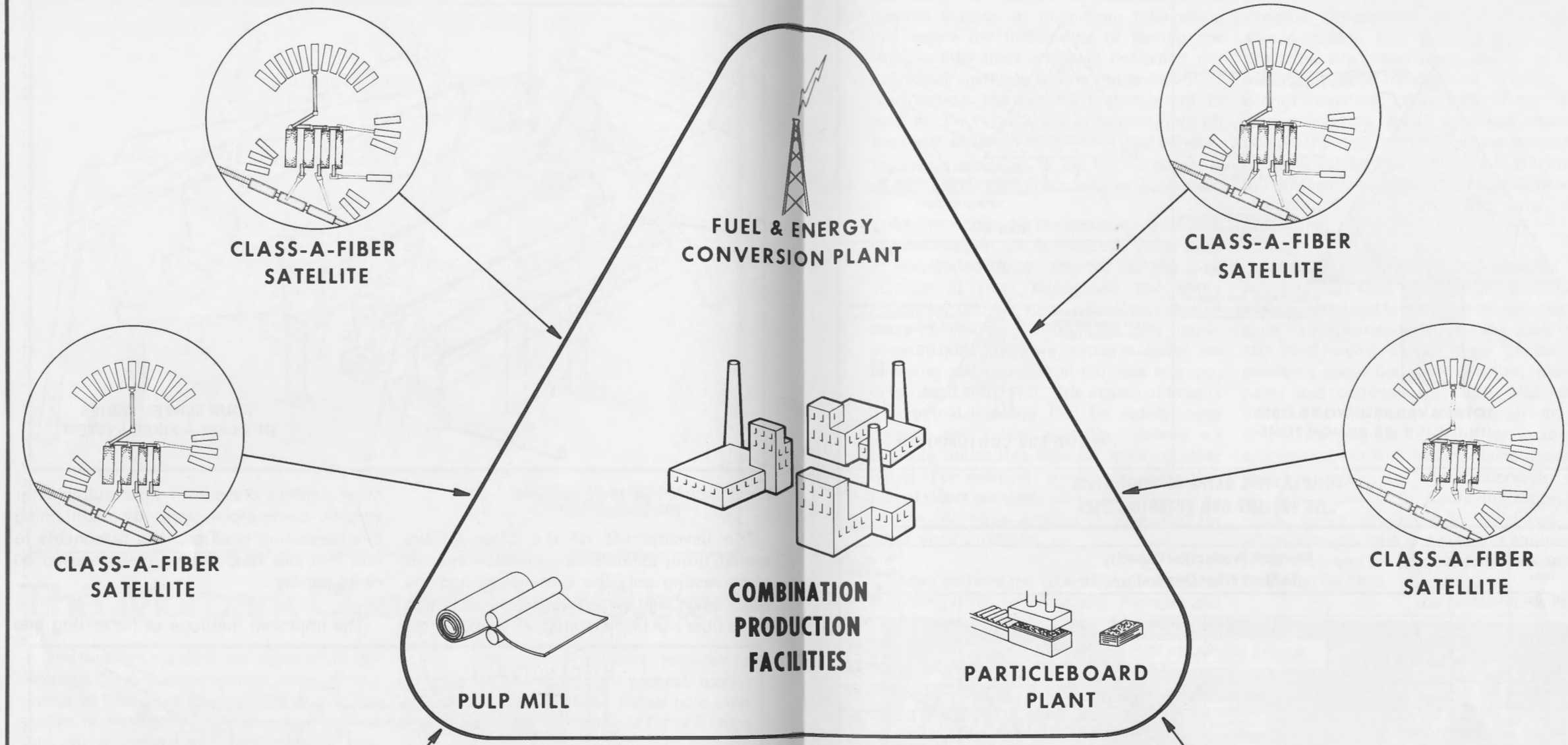
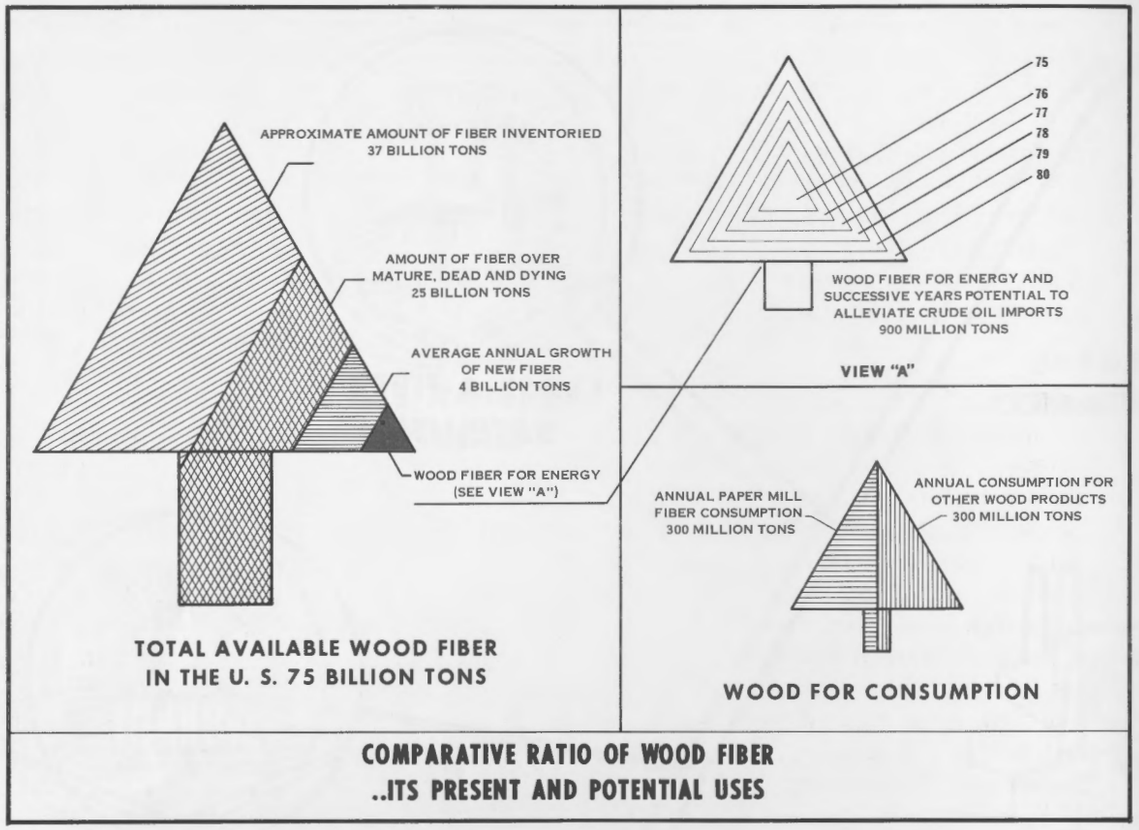
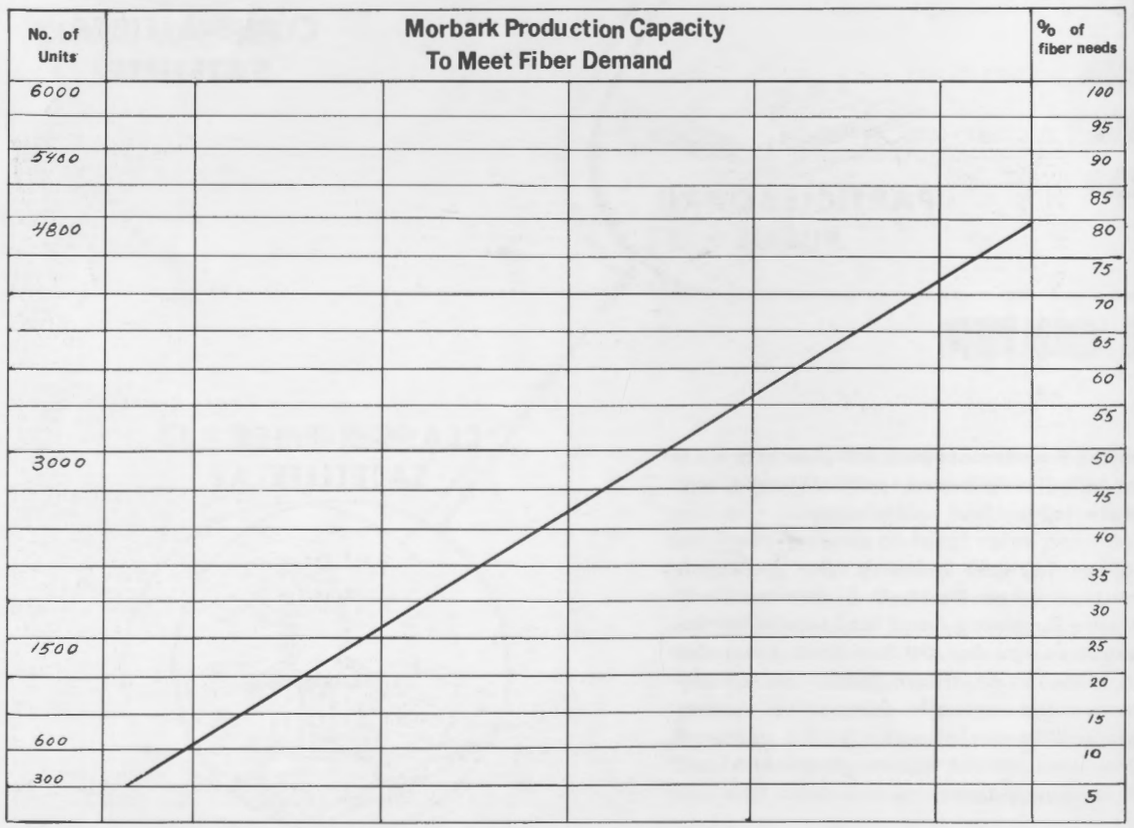


MULTIPLE USE CENTER

The Class-A-Fiber System is an ideal production facility to establish in dense harvest areas from which are fed sufficient volume of total chips possibly producing 2000 tons per day. A number of Class-A-Fiber Systems emplaced in satellite fashion around a central collection station feed the production of the four classes of chips to the hub refinery station. The central refinery receives, for example, 10,000 tons of specific class fiber per day. From this point, a common user will make consistent withdrawal of refined material ideal for products such as pulp, pressboard, particleboard and material for fuel and energy.

The logical industry to establish centralized particleboard, pulp mill, and plants for energy and fuel would be the paper companies. Rather than potential consumers of fiber such as utility companies or oil companies, paper companies are already prime users of fiber and should take a good hard look at such a system.





the new technology for separating the distinct classes of fiber from total chips underscore the importance of leaving the firm, healthy trees and also designing our harvesting methods for the improvement of land values. We can no longer afford to overlook the opportunity to harvest fiber on the basis of land improvement and enhancing values according to the highest potential of land use by leaving the healthy, good trees.

When we consider the tremendous amount of fiber-not just the commercial forest base or inventoried timber stands, but the total acreage of fiber throughout the entire nation-we find we have a vast resource of some 75 billion tons. From the lofty figure, some 25 billion tons are beyond maturity, are decaying and dying from multiple reasons, or are dead and down. This source of fiber is a perpetual reservoir that far outdistances present and future demands, unless we begin to utilize this fiber for meeting other needs. For example, our annual consumption of paper is estimated at 300 million tons of fiber. An equal amount is consumed for other wood products.

Today we have the type of equipment and technology to economically harvest and process the fiber to provide a very low cost material. The development of this equipment should ensure that we can enjoy paper products and other products at a very reasonable price for decades to come. We cannot overlook the fact that, while recognizing the great advances made it equipment and technology for harvesting and processing fiber, there are still many improvements needed in feller/bunchers, skidders, Chiparvestors, and total chip processing.

Morbark Industries has expanded its facilities to keep pace with production requirements and is prepared to continue the pace for future needs. Today, the more than 300 total wood chippers are capable of providing about five percent of the fiber for paper and particleboard mills. (We might mention at this point, that Morbark is not only expanding its facilities for increased production, but it is making some dramatic improvements in the Total Chiparvestor and its field capacity for future utilization.) A chart, within these pages, illustrates the preparation Morbark has made for equipment production and the unit capacity that can be produced by 1980.

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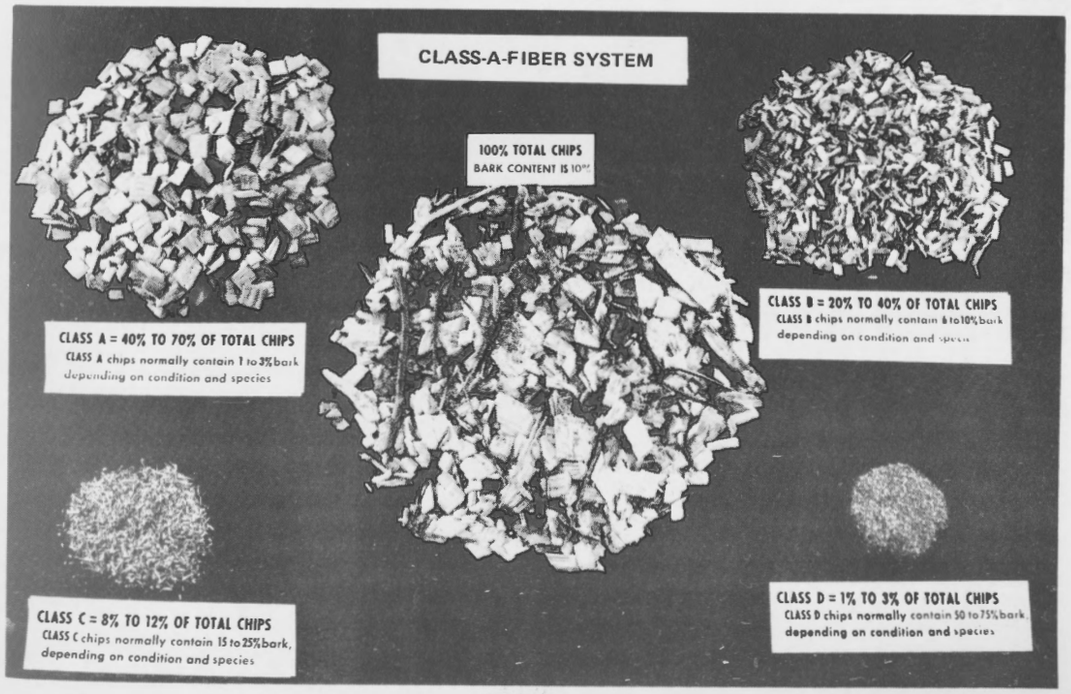

Throughout the history of this nation, we have faced crises of varying degrees-some during natural disasters, wars, and other causes. But we have always met the challenge and seemed to have gained in great measure for the experience of these many crises. Within that frame of thought, maybe our energy crisis offers us an opportunity to solve that problem through means other than what we have become accustomed for traditional sources of energy. Consider the fact that our abundant fiber resources are a source of energy. At one time, wood was the major source of fuel in the world and even as recently as the First World War, Japan and Germany relied heavily on wood alcohol for fuel. It is estimated that it would take approximately 900 million tons of wood fiber per year to offset the seven million barrels per day of crude oil imports. When one realizes that the government has allocated 11 billion dollars for research for new sources of energy, one could wonder if we are not able to see the forest for the trees, when wood fiber could be used immediately to reduce our petroleum imports. Maybe wood couldn't be considered a permanent answer, but we could start right now in 1975 to make progressive use of the dead and dying fiber, so that by 1980 we would have gained a great measure of independence and self-sufficiency in our sources of energy.

Chart C refers to the fiber distribution and potential fiber use. The proportionate fiber for energy graph illustrates a progressive development which starts in 1975 and utilizes as much as 100 million tons for energy, redoubling the amount through 1980, by which time we could equal the amount of oil imports.

Whether this nation rediscovers the use of wood fiber for energy or not, there exists an increasing demand for the products from fiber. And we must recognize the opportunity that lies before us in the wealth of this resource to make maximum use of the fiber that would otherwise go to waste. This is in essence the purpose of developing the Class-A-Fiber System-to provide a means for obtaining maximum utilization while maintaining low cost raw material.

MORBARK INDUSTRIES INC.

WINN, MICHIGAN 48896

THE END OF THE ENERGY CRISIS

Science writers during the fifties prophesized on the eventual shortage of fossil fuels and the inevitable day when petroleum resources would run dry. Now, everyone knows the facts of life concerning our petroleum resources, but what makes the science writers of the fifties different than the average person, is the fact that they had a solution to the energy crisis. To them, it seemed a natural step, if not an automatic reaction, that we would turn to our vast wood resources to supplant petroleum energy.

Producing methanol or wood alcohol from wood fiber is not a mysterious process, nor could it be considered an exotic source of energy. In other words, it wouldn't take years of research and billions of dollars to make this homegrown potential energy into a practical reality.

During the recent past when crude oil seemed plentiful and was bought for $2.10 a barrel, it may not have been as economically feasible to consider processing wood alcohol; but with today's prices of nearly $11.00 a barrel (and an imposed tariff pricing it at more than $13.00 per barrel), it places wood alcohol or methanol as a bright economical prospect, especially since experts estimate that methanol can be produced for fourteen cents per gallon.

It would seem that the only area of possible hesitation in utilizing wood fiber for methanol could be in the questions of sufficient resource to provide meaningful supplies of energy, and if we possess the proper technology to harvest the raw material. We can, unhesitantly, give a positive response to both questions.

Equipment to harvest and chip whole trees has proved to be highly effective and the techniques employed with such equipment have established economic benefits of unparalleled proportions. Complimenting the harvest and chipping system of whole trees is the recently developed Class-A-Fiber System. The Class-A-Fiber System is a series of drum screens that process in specific separation, the quality and dimension of wood fiber for the optimum product use.

Without going into greater detail, the Class-A-Fiber System is an important component of a process that anticipates a central production facility that could appropriately be termed as a wood refinery. Several Class-A-Fiber Systems would surround the wood refinery in satellite fashion.

A realistic projection of harvesting and processing a billion tons of fiber reveals some encouraging numbers as a healthy input to the ranks of the unemployed; for example, one Class-A-Fiber System plant can produce 200,000 tons per year; it would take 5,000 Class-A-Fiber Systems to supply one billion tons. If one wood refinery processes five million tons of fiber, it would take 200 refineries to equal the necessary volume. It is estimated that 100 people would be needed to produce the fiber and operate one Class-A-Fiber System. In other words, it would employ 500,000 people to supply the wood refineries. The production doubled in five years would employ one million people and doubled again in another five years, two million people would be employed in this highly important enterprise of self-sufficiency.

We have the natural resource in wood fiber in such abundance that far more goes to waste than we can ever use . . . we have the human resource that needs the pride and dignity of their individual enterprise coupled with the sense of national self-sufficiency . . . we have the technology and the necessary hardware . . . all we need now is the solemn resolve that this is the end of the energy crisis.

MORE BARK AND MORE WOOD FOR MORE PEOPLE

by

Norval Morey
President
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Winn, Michigan 48896
March 12, 1975

A great deal of the assessment of our forests resources is based on traditional concepts of how we use our forests. For example, published figures state we have somewhere around 750 million acres in timberland which includes commercial and non-commercial timber; however, the traditional method of estimating is focused upon the timber that is measureable in acreage sustaining sawlogs or pulpwood.

The development and introduction of new technology of harvesting practices and equipment to economically process wood fiber, regardless of size and condition opens a new horizon of available wood fiber if you assess this resource as wood fiber rather than sawtimber or pulpwood. And, within that frame of reference, of available wood fiber we can account for every conceivable area where wood fiber grows whether in fence rows, roadsides, be it large overmature trees or puckerbrush, it all is harvestable and in such terms, accounts for nearly a billion acres of wood fiber averaging some 75 tons per acre. In other words, we have a resource of some 75 billion tons.

How we use this vast resource can determine whether we can even afford to continue to grow trees on acreage that is constantly left behind practical economics of harvesting 50 cents per ton fiber on land that spiraling costs run from $100 per acre to $1,000 per acre. Consider what common wood products including paper would cost the average consumer when land values climb to $1,000 per acre and other land uses compete for the land that we use for wood fiber are pushing the land costs continually upwards. What will our daily newspaper cost – $3.00 per copy? Again, recent technology affords us the opportunity to keep fiber costs down and at the same time, improve the land value by the very means of our method of harvest.

The technology embraces the fact that consumer products are fast becoming products that result from fiber that includes the total tree. Even dimensional lumber is being manufactured from chips and fiber particles compressed and extruded into dimensional form such as the Com Ply products. Another fast-growing company utilizing total tree processes is the Scovill Company who manufactures doors. Scovill says they formerly used only 25 percent of the total tree in door-making operations, but now utilize 97 percent with the new process of using fiber which forms the base of a unique molding process for manufacturing interior doors.

This is just a small example of what is being developed but it foreshadows a broad spectrum of consumer products that will utilize more than 90 percent of the total tree in the primary product with the remaining percentage being used in secondary products such as fuel.

As a manufacturer, it is vital to our future to anticipate the trends if not contribute to them in the equipment we develop. Beyond such motives we feel committed to better utilize the forest resources for reasons that can be summed up by what we call the rule of the three E's — Ecology, Economy and Efficiency. In significant measure, ecology, economy and efficiency will demand the best methods of using our resources while assuring future generations of abundant sources of wood fiber.

I'm not here to promote our equipment but a good example of developments that ensure greater utilization of fiber that underscores ecology, economy and efficiency is materialized in the system we recently introduced at the APA in Atlanta. This system is what we call the Class-A-Fiber System. Basically, the Class-A-Fiber System is a series of four drum screens that receive total chips and process the chips through intensive screening resulting in four different classes of chips suitable for making everything from high grade paper, low grade paper, particle board, charcoal, mulch and fuel.

We recognized that total tree chips contained material that wasn't suitable for the finest grade paper, yet a great percentage of the material in total chips would be ideal for high grade paper if it was properly separated and the four basic classes resulting from the Class-A-Fiber System each had important commercial value for specific products.

It is extravagant and wasteful not to use the whole tree when every fiber of the tree has important value for some product. Even fiber for energy should be investigated and used when we seemed to become a nation dependent upon foreign sources of energy. Maybe, if we are able to see the forest for the trees, we can find a vast energy resource in our own abundant fiber supplies. Consider for a moment that one cord of wood can yield 50 bushels of charcoal; 11,500 cubic feet of fuel gas; 25 gallons of tar; 10 gallons of wood alcohol and 200 pounds of acetate of lime. And, of course, from acetate of lime it is a simple process to make acetic acid or acetone.

The fact that to approach our forest resources from a perspective of fiber and fiber meaning the total tree, immediately provides us with a bonus of more than 300% more resource in this important facet of our industry.

An acre of ground will produce a certain amount of fiber whether it's contained in 10 trees or a 100. This fact permits us to improve the quality of timber as well as the land value if we approach the timber stands with harvesting techniques that compliment as well as blend with the natural cycle of what nature will provide in healthy fiber growth. For example, consider a pine plantation averaging 600 trees to the acre. The first thinning should take about half of the stand, or 300 trees to the acre . . . in ten years

another harvest should be made taking 100 trees per acre, ten years later, another harvest of 60 trees per acre with the fourth harvest taking 30 trees per acre and the fifth harvest after another ten years, would take about 20 trees per acre. The results would be about 90 trees per acre of good straight, healthy trees from a stand that not only has been the source of good fiber yield on a ten year cycle, but which is now a more valuable area from both an ecological and economical point of view. The same procedure should be applied to any species including hardwoods. If such harvesting methods were applied consistently, we could have national forests as valuable and scenic as the famous Black Forest of Germany.

Maybe it wouldn't be necessary for paper companies to own large acreages of timber stands, which they consider is sort of protective insurance of the large investments made for the average paper mill. With harvesting practices that would ensure an increased value to the harvested area, the private land owners would welcome paper companies or anyone that left the timber stand with an enhanced value, and the fiber could be taken for almost nothing. Such practices would reflect added benefits by providing a constant source of cheap fiber which in turn would maintain low cost consumer products.

In the past, we've had such abundant fiber resources; maybe we could afford to overlook 200 to 300% of the fiber yield and let it rot and accumulate to become a hazard to the rest of the forest. Today we still have abundant fiber, but we cannot any longer afford to waste it. Here in the United States, published figures state that we're consuming some 700 pounds per capita of paper and roughly an equal amount of wood for other consumer products. Emerging nations that aren't using 100 pounds per capita, are projected to start consuming at accelerated rates in the next few years, while population continues to increase and fiber demands are increasing throughout the world. With the outlook of fast increasing demand both here and abroad, combined with land values increasing by dramatic proportions, will serve as a vise-like pressure for utilizing our fiber resources to greater advantage. In that sense, we stand at a crossroad of critical choices today. On the one hand, we can practice the traditional methods of harvesting where we pick and choose what one may consider the conventional pulpwood and prime sawlog, and as a result, find ourselves with what seems to be popular in some other commodities and that is to have a shortage sometime within the next 25 years. On the other hand, we can harvest and utilize our fiber under methods new technology

has already opened the door and thereby ensure abundant fiber resources to an unlimited future.

I have spent a great deal of my energy during the past 25 years, of developing the means of obtaining maximum utilization while maintaining low cost wood fiber and I am convinced we are going to have to use the "guts, feathers, and all" from our fiber resources. If we weren't already well known as Morbark, we might choose to call ourselves "Mor wood . . . more wood for more people"!

AMERICA'S FUTURE IN FORESTRY

Ever since the days of Gifford Pichot and the official mantle of forestry was established in 1898, the foresters and the profession of forestry has given a remarkable service and established a contribution to our valuable resource that may be measured for generations to come; yet, the practices of foresters today have been obsoleted by the improved methods of harvesting. For example, forestry schools have taught that certain species of trees were "weed" trees and they should implement procedures to eradicate such tree species and in their place, cultivate the growth of conifers or some evergreen specie on the premise that the fiber had more commercial value. Much of such culture was based on the time when paper mills used predominantly the softwood species for pulp and, of course, lumber for home building demanded the traditional species of pine, hemlock, fir and redwood.

During the era of select species for specific products, sound principles were congruent with forestry practices according to forest use. Today, technology has outgrown the forestry practices and a much more universal concept of forest use may be applied through the utilization of wood fiber of mixed species as it is harvested from the total tree.

The science of pulp and paper making has learned to use greater percentages of mixed species of wood fiber, lumber and other wood products are formed from wood chips and are manufactured through methods of extruding dimensional components for construction utilizing the fiber of the whole tree; even decorative interior panels are made from the bark of trees. It is important to recognize that the wood products of tomorrow will be infinitely better and will be the result of techniques applied to the utilization of the whole tree and the processing of wood fiber regardless of species.

This approach to forest use is ample reason to change our forestry practices and presents the opportunity to generate forests and forestry through a revolutionary concept resulting in new aesthetic benefits.

It is at this point for the entry of tomorrow's forester and the forestry practices of tomorrow. Specifically, the concerted effort to generate forests oriented to the maximum aesthetic value of land use as opposed to maintenance of species for products use. With the advanced methods of harvesting and new technology of wood fiber utilization we can perpetuate our present forest base by obtaining the fiber yield while harmoniously maintaining conditions for healtheir tree growth left at the very site of the harvest.

Proper harvesting practices would implement our forestry concept to maintain better forest by recognizing the life and death cycle of the forest population. Not unlike the human population, the forests have sick and diseased trees . . . trees that lose limbs and that become victims of natural disaster, the windfallen, insect infested; and, of course, some become stunted through overcrowding and some are continually dead and dying from old age. In a sense, the natural decimation rate of our forests could be considered nature's gift in fiber and in the United States that gift comes in a bundle of about four billion tons per year. That volume is what closely approximates the growth of new fiber and an equal amount if expended through a combination of natural causes. Presently, we are consuming less than a third of the fiber growth annually and with foresighted planning, we could maintain such fiber abundance in the future.

A meaningful measure of foresightedness could be realized if we were to implement a program of afforestation. A program of putting forests on some 150 million acres of wasteland and wasted land that would sustain fiber growth. Also, we should replace the 5 million acres we take out of forest production every decade, and by doing so, we would ensure future generations of available and reasonably-priced wood products.

As vital as the wood products industry is to our overall economy, it seems that government funding is inadequate, especially in the area of instituting programs of realistic incentives among the privately-held forest areas which constitute over sixty percent of our nation's forest resource.

Possibly an incentive that would, in effect, freeze the land tax in exchange for private forestry practices would help ensure the perpetuation of private forests in this nation. Certainly, our state and federal government needs to initiate some action to stimulate good forestry practices on private-held land as well as some program of afforestation for the millions of acres of fertile, but wasted land.