



**O**NE MACHINE will chew an entire 50-ft tree into chips in less than 15 seconds. The other one will chip a six-foot section of a tree up to four feet in diameter.

Together, these machines may represent the solution to the massive tree disposal problems of major cities. The bonus benefit is that the end product—the chips—are marketable.

Chips are being sold, depending on quality, for use in making paper, building materials, livestock bedding, temporary ground cover for areas such as fairgrounds, pathways, and parking lots, erosion control on slopes, and for a variety of mulches. They're also being used to charge municipal incinerators to hasten the combustion of heavy-moisture garbage.

The two machines were designed to combat a compounding problem that has come about in the past few years. As Dutch elm disease was killing tens of thousands of trees in cities and multiplying removal and disposal costs, air pollution became a public issue. Many cities have banned open burning. The result has been a rapidly building mountain of logs and brush. The only disposal—for cities that could not burn—has been for landfill. But as these sites disappeared and as distance to new dumping locations increased, hauling and dumping costs soared, both in terms of labor and utilization of trucks.

The new machines are the Metro Chiparvestor, manufactured by Mor-

bark Industries, Inc., Winn, Mich., and the Vermeer 604 Log Chipper, made by Vermeer Manufacturing Co., Pella, Ia. Morbark is a large-scale equipment manufacturer serving the lumber and papermaking in-

dustries. Vermeer is a leading manufacturer of a wide range of equipment for the nursery and tree-care industries.

While he still believes that burning is the most efficient and total dis-



Bud Taylor and Jerry Kloostra of Vermeer's Jackson, Mich., sales office answered questions at a demonstration of the 604 in the Detroit area. The machine below was a popular attraction at the International Shade Tree Conference Field Day in Rochester, N.Y.



# TREE CHIPPERS

## Problem-Solving Moneymakers



posal method, Jim Garvey, district tree foreman for the Chicago forestry division, called the Chiparvestor "a tremendous step in the right direction."

According to unit price tag, the machines are expensive. The Vermeer 604 Log Chipper is tagged around \$20,000; models of the Morbark Chiparvestor exceed \$85,000.

"But just from an operating expense viewpoint, savings in time and labor justify the cost of the Chiparvestor," say Morbark officials. And Bob Peterson, co-owner of Peterson Wood Chip Producers, Lansing, Mich., exclaimed in scooping up a handful of chips at the site of Ver-

meer machine recently, "that's a pile of gold."

### Chipper Descriptions

Here's a brief profile of the two chippers:

**METRO CHIPARVESTOR** — It's 42' long, 8' wide and 12½' high. A 6110 mill chain on a 20'10" conveyor moves entire trees (placed on it by a Prentice loader) into a three-knife, 75" chipper operating at 500 rpm. Power is a 310 hp diesel with a 100-gal fuel tank.

Operating speed is hardly believable unless you see it in action. The maximum speed at which the machine turns trees into chips—for the biggest model—would produce 250 tons in a working day.

Describing the maximum capacity another way, Leo Bronson, assistant manager of the Chiparvestor division, talked about "filling a 20-ton van in 20 minutes." A more realistic figure," he said, including down time," would be 1,000 lbs. a minute."

Trees up to 20" in diameter can be handled by the Chiparvestor, provided there are no large lateral limbs. For more details about the Morbark chipper, circle (719) on the reader service card.

Bob Peterson, co-owner of Peterson Wood Chip Producers, Lansing, Mich., bought the first model of both machines. What's he holding? "A handful of gold," he says.



Some 200 persons watched both the Morbark Chiparvestor (above) and the Vermeer 604 log chipper (below) perform in the Detroit area in September.

Leo Bronson, left, assistant manager of the Chiparvestor division, chats with Samuel Nimlin, Jr., Wayne County air pollution control official.

### VERMEER 604 LOG CHIPPER—

The name implies what it is best suited for, although it will chip all parts of a tree. A coffin-like box, filled with a loader, will handle practically any size tree—unless you happen to find one with a diameter in excess of six feet. The receiving box, however, is designed to take tree sections 6' long and up to 4' in diameter. The box travels over a high-speed rotary cylinder with 45 carbide-tipped cutting teeth planing away chips at a maximum rate of about 40 tons per day.

Vermeer's machine is 22'5" long, 7'5" wide and 9'8" high. It can be towed from site to site and is a



practical machine to move about on city streets. It's power plant is either a 391 cu. in. Ford or a 453 GMC diesel. For more information about Vermeer's chipper, circle (720) on the reader service card.

**Machines evaluated**

Both machines were demonstrated at the same time the first of September outside of Detroit, Mich. Some 200 persons, representing municipalities, parks, highway departments, pollution control boards, and so on, watched the performance.

Among visitors were Bob and John Peterson, whose wood chip products company was the first purchaser of both machines.

Bob Peterson evaluated the two machines, conceding that they can't be compared with each other any better than comparing apples with oranges. "They actually complement each other," he said. If a city had to go the "either, or" route, then the kind of disposal program—whether and how the chips were to be marketed—has a definite bearing, he added.

Fewer saw cuts are necessary to

prepare a tree for the Chiparvestor, which takes any length, and has tremendous speed, he said.

For city tree disposal, Peterson believes that the 20-inch diameter limitation may be somewhat of a disadvantage. "Many of the trees dying in the city are the larger, older trees," he pointed out. "To get rid of these, you would have to get a log splitter at a cost approaching the price of the Vermeer machine."

"You never drop a whole tree in the city," he continued. "And many of these trees have large lateral branches. So the need for cutting trees into six-foot lengths for the Vermeer may not be a disadvantage at all.

While the Vermeer chipper is far slower than the Chiparvestor, Peterson reminded that for the same money a city could buy four or five Vermeer machines and get a greater volume of chips. The cost of operating five machines as opposed to one would have to be weighed against the advantages of judiciously employing multiple machines to lower hauling costs.

One of the hazards of chipping "trash trees," Peterson said, is encountering metal objects. During the Detroit demonstration, the Vermeer machine chewed into a 12-inch lag bolt, breaking two or three of the 45 cutting teeth. Had the bolt gone through the Chiparvestor damaging one of the three blades, Peterson estimated the chipper would be out of action longer in order to change the blade.

**Chicago Disposal Operation**

Chicago is one of eight cities and private contractors that have purchased Chiparvestors, introduced early this year. Ray Toren, who's directly in charge of the Morbark machine for the Chicago forestry division, said his crew on the 100-ton model had been averaging 30 tons of chips per day, a phenomenal amount, considering the "dead time" that inevitably occurs between feeds. Peterson reported the same operating capacity for his 100-ton model.

"We once turned out 12 tons in an hour and 17 minutes," Toren said. "Volume depends on skill of the clam operator, kind and condition of wood, moisture in the wood, and sharpness of the blades."

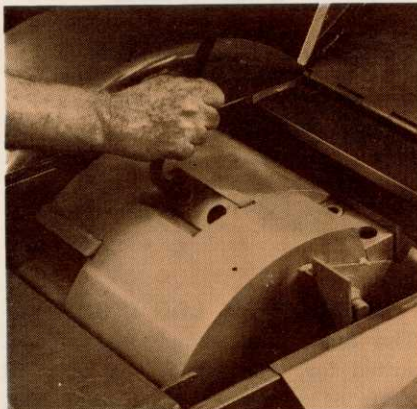
So far, Jim Garvey said, keeping the blades sharp has been a big problem. "You have to sharpen them practically every day. We ordered extra blades. Right now we're using the same grinder we sharpen

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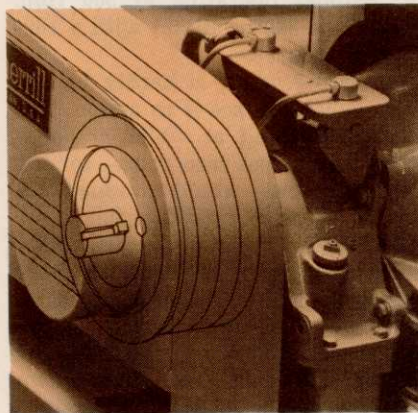


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Vermeer's 604 log chipper is designed to take tree sections six feet long and up to 4 ft. in diameter.

our standard chipper blades."

The high-speed Chiparvestor is working hand in glove with Chicago's speeded up system of tree removal, said Garvey.

Under the old system, Garvey explained, everything was cut down into "man-handling size," meaning one or two men could load the typical 2½-ton city truck. Now, the city has leased trailer transport trucks from commercial tree companies, including units equipped with clam-type loaders. The larger trucks, Garvey said, "have 10 times the capacity."

Formerly, the tree-removal crew consisted of the driver of the 2½-ton truck, foreman, and three men. Some of the trucks had a 1,000-lb. hoist. The removal task force now consists of a clam bucket loading truck, two heavy-duty dump trucks, the clam operator, six men, and a supervisor.

On the day of interview, by 2 p.m., a task force had felled and transported away nine typical-size street trees.

You have to be aware of the enormity of the tree-removal task that Forestry General Superintendent Robert Zralek faces in Chicago to appreciate the value of machines like the Chiparvestor. His bureau has a backlog of 23,000 dead trees to remove. "We expect 40,000 more to die this year and each succeeding year," said Garvey.

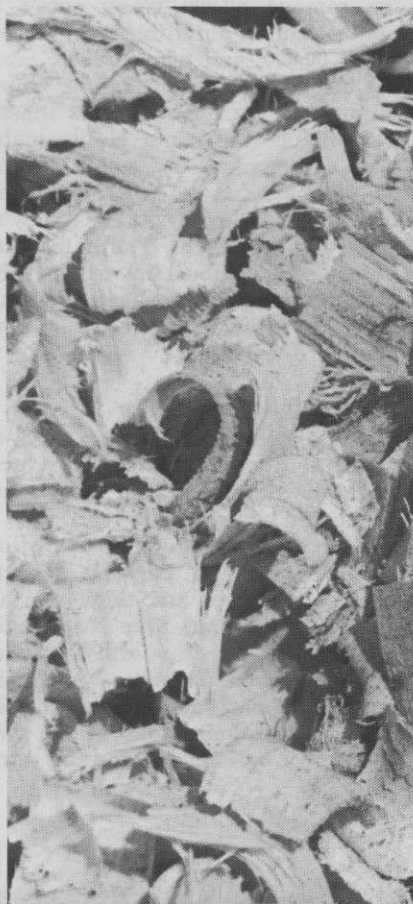
"Tree removal goal this year is 50,000. Through August we're about 300 ahead of schedule." That means crews have removed about 34,000 trees.

But tree removal is only half of the Chicago story. "We've planted

12,000 trees so far and will reach 30,000 before the end of the year," said Garvey.

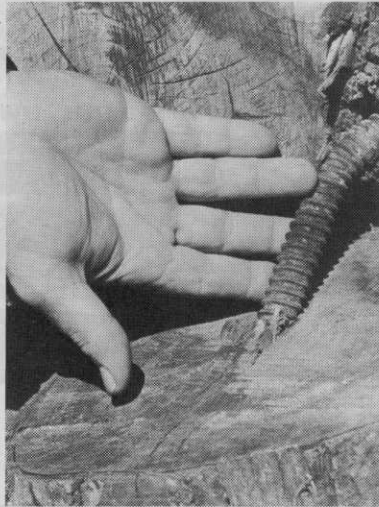
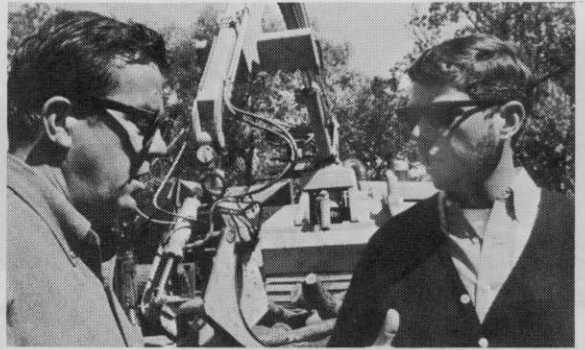
Trees that are going in are silver maple, Norway maple, green ash, honey locust, pin oaks, sycamores, and others. "The problem is getting

The Vermeer chip.



The Chiparvestor chip.





The City of Chicago has purchased a 100-ton model of the Chiparvestor, shown in action above. District Tree Foreman Jim Garvey, left, discusses its operation with Ray Toren, who's directly responsible for keeping the chipper running. A hazard, Toren says, are embedded metal objects, such as this old cable brace.

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big enough quantities—we have to take what we can get," he said.

The goals projected for 1971 are: To remove 60,000 trees; spray to control Dutch elm disease on 40,000; plant 30,000; and trim 20,000.

Chicago has been selling some chips to a firm that utilizes the fibers in making paper siding material and roofing material. "We've sent some loads of chips to our incinerators," Garvey said. "They're tickled to get them. The chips provide good combustion to aid the elimination of wet garbage. We have three incinerators and are getting one more in 1971."

#### Markets for Wood Chips

Bob Peterson offered an idea of what kind of wood chip products might be developed and what markets could be tapped.

"Our best is a premium chip that has less than 1% bark. It goes to paper companies, and they take all we can give them. Our No. 1 chip is a high quality chip with bark material screened. This goes as mulch around homes, commercial buildings, playgrounds and trails. We also sell a bark mulch for the same

places plus bedding for animals. We have a byproduct we call fines that's being offered as kitty litter and for mulching plants such as raspberries and strawberries."

Peterson said his rate to the public for chips was \$10 per cubic yard for the premium chip; \$8 for No. 1; \$7 for bedding material; and \$3 for bark.

He estimated a ton of wood would produce about 4-5 cu. yds. of chips.

#### Incineration vs. Utilization

David L. Phillips, superintendent of forestry, Lansing, Mich., discussed waste wood disposal—incineration vs. utilization, at the August International Shade Tree Conference. "Of the two solutions," he concluded, "I favor wood utilization because it uses the recycling principle." But he added that more research is needed on both methods before either could be considered permanent answers to the waste wood disposal problem.

Phillips talked about both big tree chippers and about the arrangement the city has with Peterson Wood Chip Producers. Problems that remain when using the chippers

are: the need for additional markets for chips, disposal of logs with metal objects, stump disposal, and more efficient handling and preparation of brush and log mixtures for the chippers.

He described the incinerators the City of Detroit built for waste wood disposal as even more costly than the chippers. The two, built in 1963 and 1965 each cost about \$250,000. About 100 feet long and 20 feet high, they're constructed of brick with a refractory lining.

Charging is done through two 14-ft. doors. Brush and limbwood goes in one at the end and logs through the other a midpoint. Forced draft is used, but no supplemental fuel. Temperatures are maintained between 1,800 and 2,000 degrees F. A 20-inch log burns in about four hours.

But during peak removal periods, Phillips reported, the burners are unable to keep up.

Exhaust gases are passed over a series of baffles and a water spray scrub chamber to remove fly ash before venting to the atmosphere via a 120-foot stack.

Emission is exceptionally clean,



Chicago has expedited its tree removal operations by using clam-type loaders and trailer transport trucks leased from area commercial tree companies. This truck is owned by Jackson Tree Service.

consisting entirely of carbon dioxide and water vapor, plus atmospheric nitrogen," Phillips said.

Disadvantages aside from initial and maintenance cost, he said, are

that no useful product is produced, modifications are sometimes necessary as pollution codes change, and stationary location means costly travel time.



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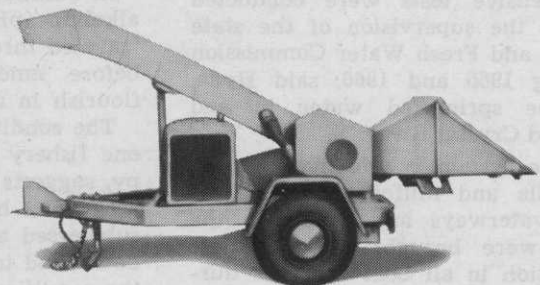
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