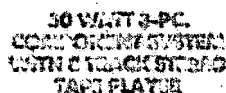


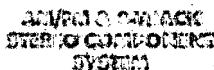
solid waste management



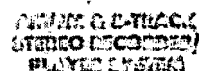
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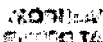
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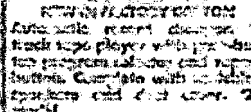
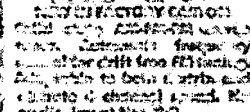
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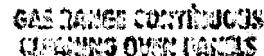
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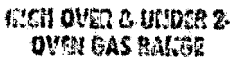
Electronic string tape, player with push-button or automatic program changes. Slide volume, balance, and tone controls. With two 2-way circuit breakers, speed of advance, and stand.



Second year with Office of
from the air. A large number of pho-
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057 NEW IN FACTORY CARTON



288 NEW YORK FACTORY CANTON



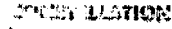
\$239 NEW ICE
FACTORY
CARTON



\$2,200



3760



On this date, the undersigned and the undersigned's wife, Mrs. [redacted], of the County of [redacted], State of [redacted], do hereby certify that the above is a true and correct copy of the original of the same, as the same appears from the records of the County of [redacted], State of [redacted].



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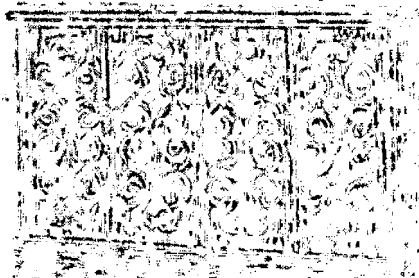
Lowry
A small power driven turbine
for water and steam power plants.
The turbine is mounted on a base.

*an environmental protection publication (sw-117)
in the solid waste management series*

U.S. ENVIRONMENTAL PROTECTION AGENCY
1974

3d printing

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solid waste management

recycling and the consumer

As the American people have become aware of the environmental crisis the Nation faces, many have come to look on the recycling of materials and products as the way to conserve valuable resources, and cut our waste disposal problems down to manageable size. Unfortunately, neither the problem nor its solution is simple. For despite all the attention that recycling has received in recent years, the United States today recycles a lower percentage of its resources than ever before in history.

what is recycled

In recent years, the United States has consumed roughly 190 million tons of paper, major metals, glass, textiles, and rubber annually. Of the 190 mil-

lion tons, 48 million tons—about a quarter—were acquired through recycling operations. The rates at which the classes of materials are recycled vary:

<i>Materials used</i>	<i>Percent recycled</i>
Paper	19
Iron and steel	31
Aluminum	18
Copper and lead	50
Glass and textiles	4
Rubber	26

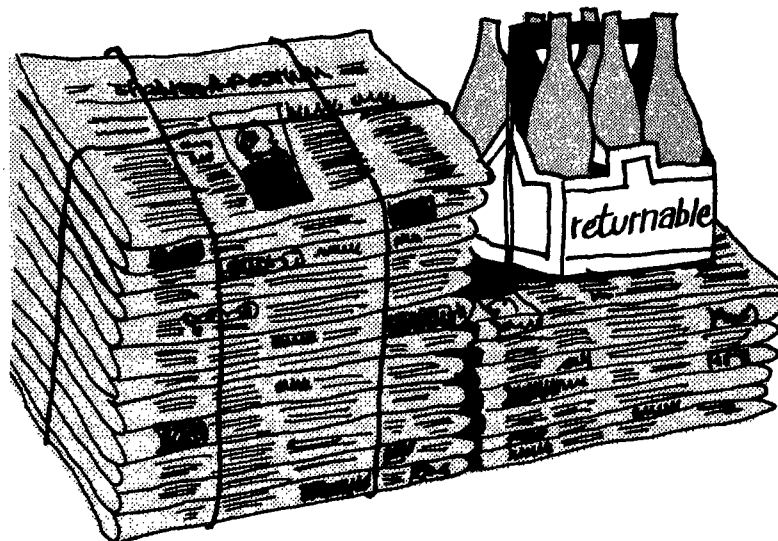
Almost all the wastes salvaged today come from manufacturers and businesses, where large amounts of relatively clean and homogeneous wastes accumulate. They are collected, and sometimes processed by the secondary materials industry, a well-established industry with 80,000 employees and annual sales of approximately \$8 billion. The wastes are then sold to manufacturers for reuse. In addition to the wastes salvaged by the secondary materials industry, large tonnages of scrap are derived from basic manufacturing processes and are recycled without leaving their point of origin.

what is not recycled

At least 125 million tons of solid wastes are collected by American communities every year. This figure excludes industrial, demolition, and construction wastes, for which little statistical data exists. The annual throw-away includes 39 million tons of paper, 4 million tons of plastics, and 55 billion beverage containers. Unfortunately, almost nothing is salvaged once it is in the garbage can. Salvage requires that the wastes be separated into basic categories such as paper, iron and steel, aluminum, and glass; the wastes are then purified and processed to make them suitable for reuse in manufacturing operations.

efforts to recycle household wastes

Some household wastes are recycled by being kept out of the garbage can—for example, the newspapers put aside for the Boy Scout drive and the old clothes and other useable items given to charity. But in the affluent America of today, this is done much less than it once was. Since Earth Day 1970, these familiar examples of “separation at the source” have been supplemented by some 3,000 collection centers set up and operated by public-spirited citizens determined to overcome the barriers to recycling. Despite many difficulties, local recycling projects, manned by dedicated volunteers, are striving to make resource recovery from household wastes a current reality. The importance of these citizen efforts goes well beyond the relatively small amounts of wastes they have succeeded in recycling. The centers, a concrete and useful symbol of our Nation’s new environmental awareness, have shown that many citizens are willing to work to help solve environmental problems. Concerned industries have established depots to facilitate the redemption of such materials as glass bottles, steel cans, and aluminum cans. Governments and industries have responded by paying more attention to recycling. Increasingly, municipal officials, who may have once regarded their solid waste problem solely in terms of collection and disposal, are expanding their considerations to include resource recovery, especially where disposal costs are high and the relative costs of waste recovery are attractive.

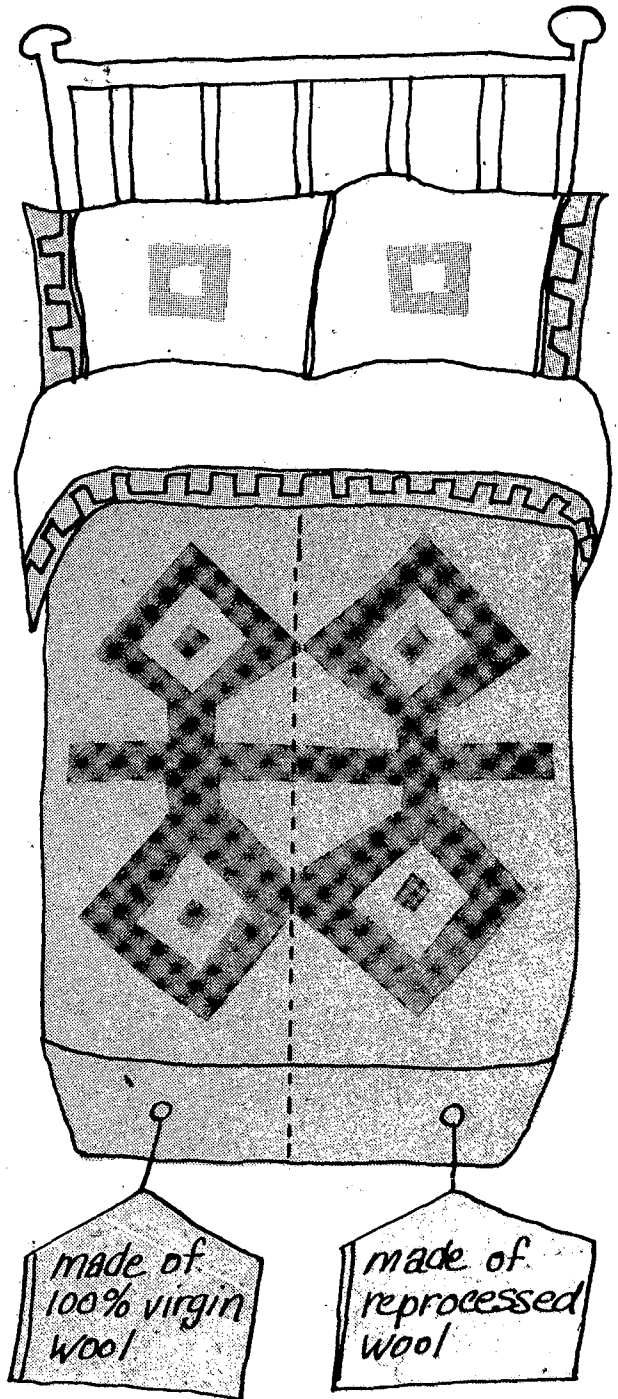


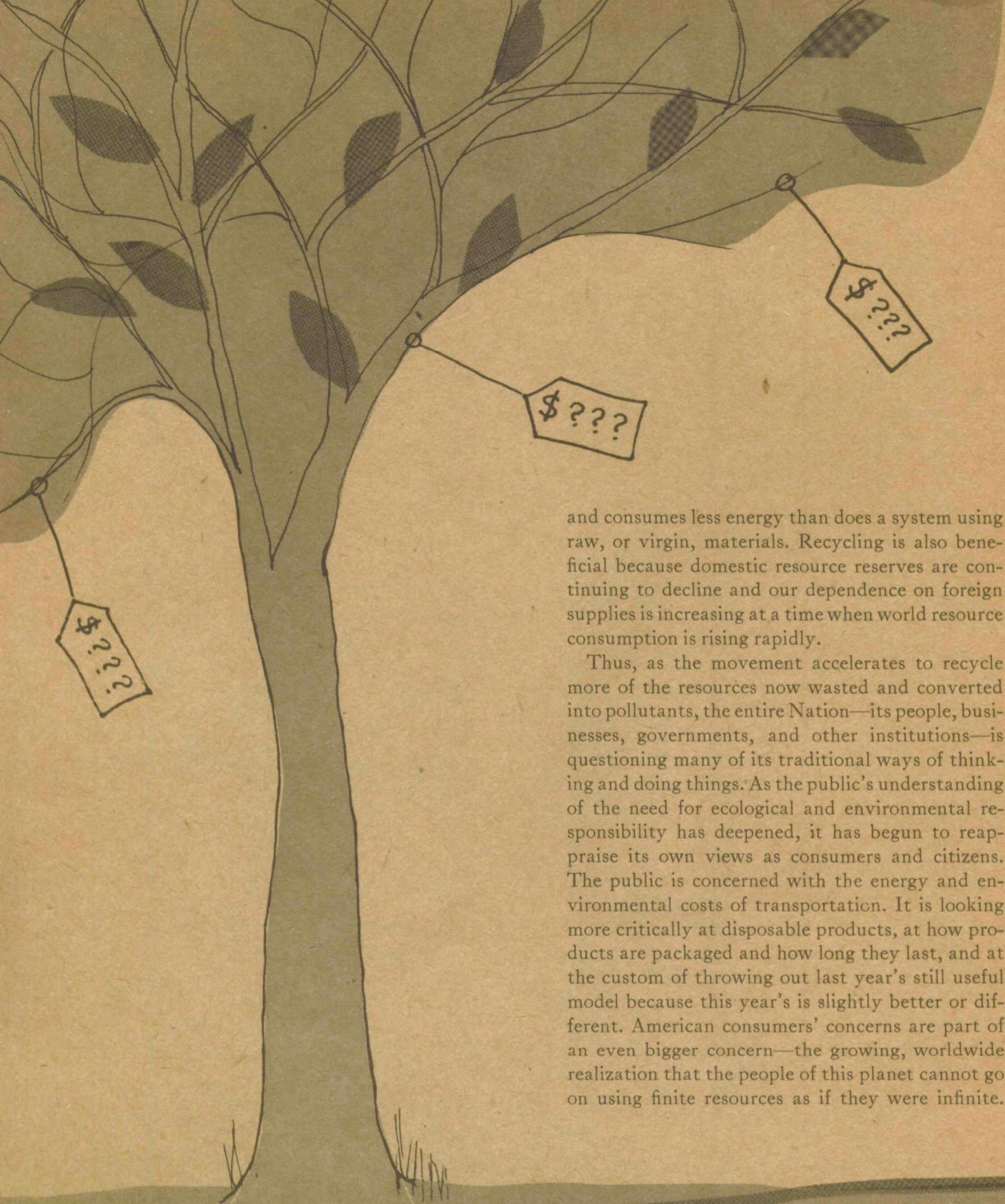
barriers to recycling

Recycling is thwarted by a network of circumstances that are a longstanding and integral part of the American scene. When the United States was a young and growing nation, tax laws and government regulations were designed to encourage exploitation of our plentiful resources. Special tax incentives, such as depletion and capital gains allowances, and depreciation schedules, favor use of natural resources. So do some shipping rates and policies on use of Federal land. And so do the locations of industrial plants and their labor supplies. For example, most paper mills are close to forests—but far from large cities and the concentrated supplies of wastepaper that the mills are capable of recycling. After years of development and attention, American industry has become remarkably efficient at processing raw materials. In contrast, relatively little attention has been placed on methods of processing raw waste materials.

Some traditional attitudes and habits of the American people also stand in the way of recycling. To most people, a blanket labeled “made of virgin wool” seems more desirable than one labeled “made of reprocessed wool,” even though the reprocessed wool blanket may be entirely suitable for its intended purpose.

These conditions that discourage recycling are a culmination of a concerted national effort to exploit natural resources. There is evidence, however, that we are beginning to understand that, historically, our concept of cost has been too narrow. Information is emerging to show that recovering resources is indeed economical if we put a price on other factors, such as protecting the environment and conserving energy and other natural resources. If we look at all the steps involved—extracting, harvesting, processing, manufacturing, transporting, and disposing—we find that the system using recycled materials almost always causes less air and water pollution, generates less solid wastes,





and consumes less energy than does a system using raw, or virgin, materials. Recycling is also beneficial because domestic resource reserves are continuing to decline and our dependence on foreign supplies is increasing at a time when world resource consumption is rising rapidly.

Thus, as the movement accelerates to recycle more of the resources now wasted and converted into pollutants, the entire Nation—its people, businesses, governments, and other institutions—is questioning many of its traditional ways of thinking and doing things. As the public's understanding of the need for ecological and environmental responsibility has deepened, it has begun to reappraise its own views as consumers and citizens. The public is concerned with the energy and environmental costs of transportation. It is looking more critically at disposable products, at how products are packaged and how long they last, and at the custom of throwing out last year's still useful model because this year's is slightly better or different. American consumers' concerns are part of an even bigger concern—the growing, worldwide realization that the people of this planet cannot go on using finite resources as if they were infinite.

encouraging trends

A number of forces are already at work that may in time encourage recycling by narrowing the price gap between virgin and recycled materials. As new and more stringent air and water pollution control laws are enforced, industry's costs for processing raw materials will increase, and this may direct attention to the opportunities for the increased use of waste materials. Rapidly rising energy costs will also favor waste materials, since their processing generally consumes less energy than processing raw materials.

At the same time, local governments are taking another look at recycling, sometimes because of citizen enthusiasm, but—in the case of large cities without land for disposal—out of sheer necessity. As disposal becomes more difficult and expensive, recycling solid wastes becomes an attractive and economically competitive option for local governments. Rising energy costs are making the recovery of heat energy from wastes a particularly promis-

ing option.

Even communities with land available for disposal may turn more to waste recycling as they are forced to close their open dumps. Thousands of communities still use open dumps, which may appear to be inexpensive in terms of disposal costs, but are very expensive in terms of the damage they do to the environment. As cities reject open dumping, recycling becomes more competitive economically. A recycling option need not be totally self-

COAL \$?

IRON \$?

BAUXITE \$?

COPPER \$?

value of our resources

supporting. A community can afford to subsidize recycling if the costs to the local public are in the range of what would be required to dispose of the wastes by environmentally sound methods.

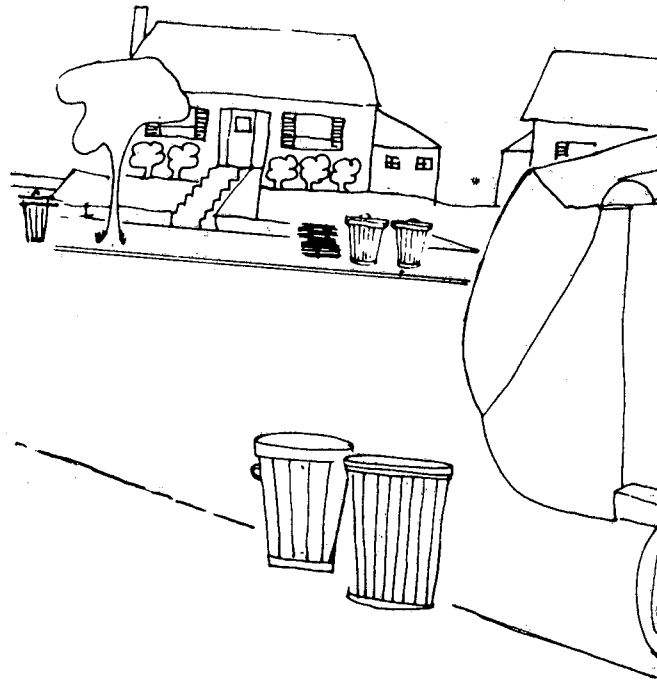
As these forces gain momentum, they may begin to encourage recycling by narrowing the cost gap between natural and waste materials. As part of the Nation's growing environmental awareness, methods are being explored to close the cost gap. One method is to use governments' purchasing power: Federal specifications, for example, once prohibited use of recycled fibers in paper purchased by the Government. All Federal restrictions against use of recycled fibers have now been removed, and 77 paper specifications have already been rewritten to require some percentage of recycled fibers. The Department of the Army has stepped up its use of retreaded tires for automobiles and trucks. The Federal Highway Administration is evaluating various waste products for use in constructing and maintaining highways. By these actions, the Government can establish the technical and economic practicability of using recycled materials and so promote the growth of larger markets. Changes in Federal labeling laws offer an additional opportunity for increasing markets for recycled materials. Present Federal laws or regulations require that materials such as lubricating oils and wool be labeled in ways that suggest to the consumer that they are inferior.

Freight rate schedules are another area where the search is on to find ways to further the cause of recycling. The Federal Government is now studying shipping rates on both rail and ocean freight. Transportation costs are a significant portion of the total cost in marketing recycled materials, so it is essential that they are equitable and do not discriminate against waste materials.

Modifications to the Federal tax structure are also being studied as a possible means of encouraging recycling. Among the proposals that have been put forth are eliminating or reducing the long-standing tax incentives available to processors of raw materials, imposing new taxes on raw materials, or subsidizing waste materials to lower their prices.

approaches to municipal recycling

Until the end of World War II, significant amounts of materials were salvaged from municipal wastes. Some wastes were set aside in the home for separate collection, either by a collection agency, civic group, or social service agency. In some communi-



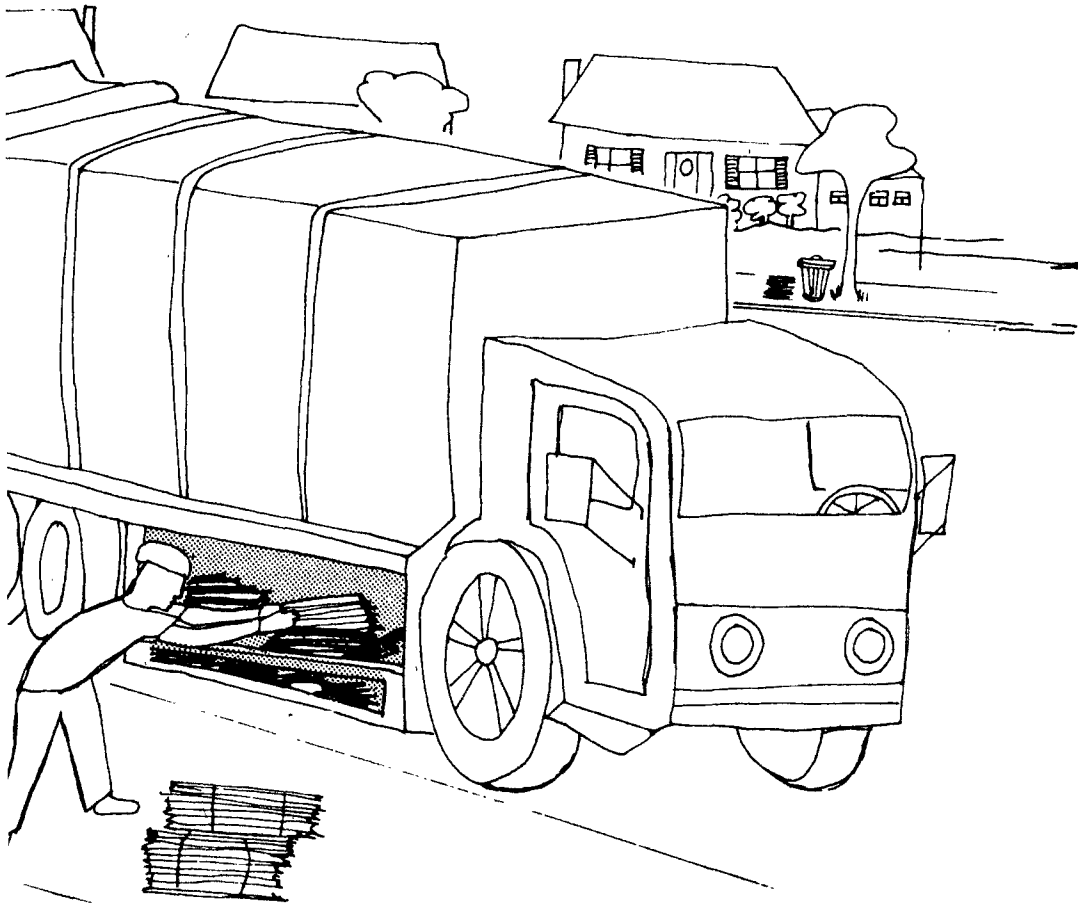
*Separation
at the
source
is one
approach*

ties, workers on trucks or at dumps and incinerators removed salvageable materials such as newspapers, cardboard, metals, glass, and rags. As labor costs rose and the compactor truck was introduced, picking operations became more expensive and difficult, and so they were slowly abandoned.

At the beginning of this decade when Americans became more aware of environmental quality, almost nothing was being recycled from municipal wastes. Attention soon focused on technological recycling systems involving separating and reusing wastes after they had been transported to a central point. But some environmentalists who wanted to take more direct and immediate action advocated a return to the old method of keeping wastes sepa-

rated at the point where they are generated.

Compared to technological systems, separation at the source is simple, inexpensive, and capable of being put into effect quickly. At least 80 communities are collecting some wastes (usually newspapers) separately as part of their regular service. In 1969, Madison, Wisconsin, for example, began asking its residents to bundle their newspapers and put them at the curb with other wastes. The city's regular sanitation trucks collect the papers, placing them in special bins below the truck body. The papers are sold and made into newsprint in a plant about a hundred miles from Madison. Almost 60 percent of Madison householders participate in the voluntary program. Some separate-collection pro-



THE MUNICIPAL SOLID WASTE STREAM

NEWSPAPERS

FOOD AND YARD WASTES

grams are required in other cities by ordinance—as in Hempstead, New York. Newspapers have been collected separately since 1971, and currently about 80 percent of the households in Hempstead participate in the program.

A number of American cities are exploring new technological systems for recycling mixed municipal wastes. One especially promising system involves burning the organic portions of the wastes for the production of heat and electrical energy. For many years, some European cities have used

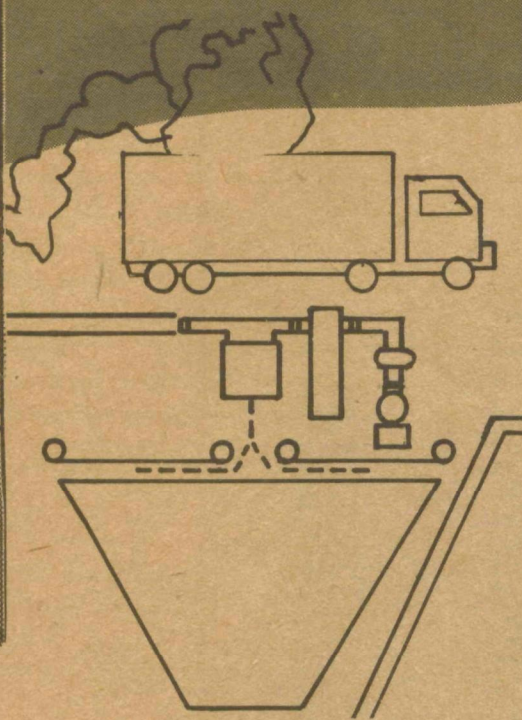
the heat produced by incinerators to make steam and electricity. But in the United States, accustomed as we were to abundant supplies of cheap fuels, this approach has until quite recently received only scant attention. Now the City of St. Louis, assisted by a grant from the U.S. Environmental Protection Agency, is burning some of its wastes with pulverized coal in the boiler furnaces of the Union Electric Company. The waste is shredded. Then metals, glass, and other noncombustible materials are removed by air classification.

BOTTLES

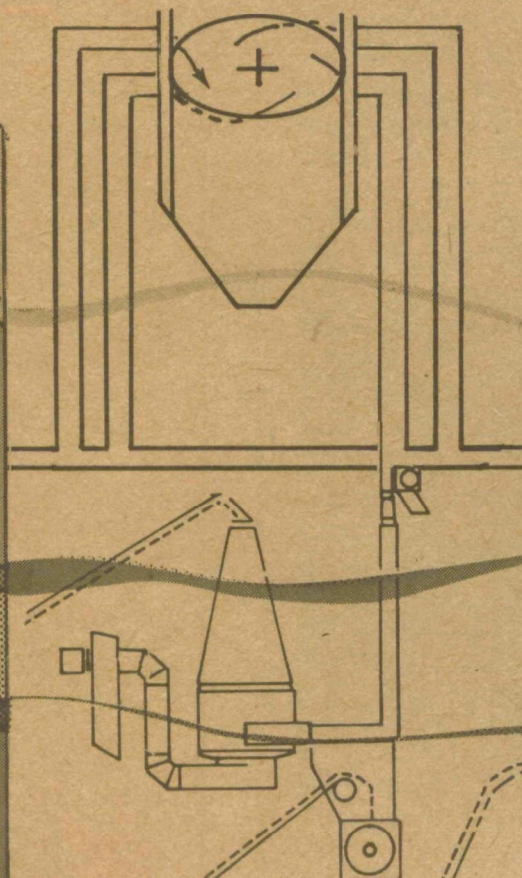
CARS

CANS

page eight



*Another approach
uses some of the
new technologies
to separate waste
after collection*



PAPER

ENERGY

About 1 pound of this shredded and classified waste is burned with 4 pounds of coal. Very few changes were required in the power plant, and it appears that any technical problems from burning wastes can be solved. The St. Louis project has attracted widespread interest since existing power plants in many communities could be adapted to burn municipal wastes as a supplementary fuel to produce energy and at the same time cut down significantly the quantity of waste requiring disposal. Similar operations are already being planned

GLASS

IRON

ALUMINUM

page nine.

in other parts of the country. In fact, the State of Delaware recently decided to change the emphasis in an EPA-supported demonstration project from humus production to energy recovery, patterned after the St. Louis project. The shredded wastes will supplement fuel oil in an existing steam-electric boiler of the Delmarva Power and Light Company.

Other types of recycling plants are now being built with EPA assistance in three other cities. Two of the plants—in Baltimore and San Diego—will use a pyrolysis process involving heating wastes in a controlled-oxygen environment. The organic matter is converted to a liquid or gas that can be burned as a fuel. Both plants will reclaim metals and glass. The third plant, in Lowell, Massachusetts, will process the residue from incinerators to recover metals and glass.

For several years a recycling plant at Franklin, Ohio, has been demonstrating a method for processing municipal waste through the use of techniques developed in the paper industry. In this highly automated plant, built with EPA assistance, the wastes are disintegrated in water in a vessel resembling a huge kitchen blender. Paper fibers can be separated by screens and other mechanical devices. Paper fiber is a promising target for recycling because it is the largest single component of municipal wastes and potentially very valuable. At Franklin, metal and glass are also separated from the mixed wastes. Plans are under consideration to duplicate a part of the Franklin system in other cities.

As these new technologies are demonstrated, they will add to the alternatives available to a community if it decides to recycle some of its wastes as part of its total solid waste management system. And, indeed, numerous alternatives are needed, for local conditions vary widely and probably no single approach is capable of meeting every community's needs. Large cities experiencing very high costs because they have no conveniently located land for disposal may conclude that one of these technologies, or a program involving separating some wastes in the home, if there is a market for secondary materials, is the best answer to

their needs. This is especially true if the energy or material recovered can be sold to nearby markets that do not involve large transportation costs. But no matter what approach a community selects, it will still have wastes which cannot be recycled and which must be disposed of on land in ways that do not contribute to environmental or public health problems. Moreover, at this time the problem of disposal—particularly in large urban areas—can only be described as critical.

what the consumer can do

Today, resource recovery is still in its infancy. The infant will grow, but just how fast depends on the American people. The problems are not primarily technical. They are political, social, and economic problems that an informed and involved people can solve. The phenomenal growth of public interest generally, and of citizen recycling centers—as well as the involvement of important segments of industry—suggests that the Nation is ready now to attack those problems.

One important way the consumer can help is to become conscious of how his attitudes, actions, and habits affect the future prospects of recycling waste resources and conserving natural resources. By showing his willingness to buy products made from recycled materials, he can influence industry to turn out more such products. Once the consumer makes himself heard, manufacturers can find new ways of conserving and recovering resources. They can re-orient many of their practices, finding new ways of using waste materials and new processes that produce less waste. Manufacturers can make an important contribution to our resource and waste problems if they consume fewer resources in the first place. Thus they can avoid overpackaging their products. They can design their products so



that they last longer and are easier to repair, and easier to salvage or dispose of when their useful life is at an end. Once American industry applies its skills and ingenuity to the final steps of salvage or disposal, it should be able to cut costs and improve efficiency just as it has in all other industrial operations.

It is important for the individual to be heard as a consumer, but it is even more important that he be heard as a citizen. Once the citizen fully understands the complex political and social issues involved, he can make his views known to those in government and industry who are grappling with solid waste management problems. Our institutions need the support of an informed and involved

citizenry to bring about the kind of changes needed to ensure that we use our resources more wisely and protect the environment. The informed citizen is particularly effective at the local level as the community tries to find the best solid waste management system for local conditions and needs.

To start today to help make recycling a national reality, seek out environmental, professional, civic, and service groups involved in solid waste management efforts in your community. If you should need additional information on the subject, write to the *U.S. Environmental Protection Agency, Office of Solid Waste Management Programs, Washington, D.C. 20460.*

page eleven

What you as a consumer can do to help encourage the recycling of waste materials:

- Let manufacturers and distributors know that you are willing to buy products made from recycled materials.
- When such products come on the market, buy them and encourage others to buy them.
- Be a thoughtful shopper and consumer. Be sure that the packaging and disposability you pay for is what you need. Don't throw products into the trash heap when they still have useful life. Consuming less is a sure way of conserving our resources and reducing waste.
- Support—or start—recycling projects in your office, business, or school.
- Use citizen recycling centers, and take part in other community recycling projects.
- Assist your community in closing dumps.
- Above all, let your government officials know of your concern. Many of the important decisions on resource use and recycling have far-reaching political and social implications. To bring about the changes needed in public policies, officials must have the support of informed and involved citizens.

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