

of residential wastes, however, and most of the packaging materials which reach the home, could be conveyed to central facilities by pipe following some form of waste reduction. Automation could substantially reduce the costs of collection: gathering and transport of wastes absorb approximately 90 percent of all expenditures on waste handling today, or about \$3 billion, and the bulk of collection outlays are in the form of labor costs.

Separation of wastes by type cannot be accomplished without manual labor. Innovative techniques of sensing materials and separating them by materials handling equipment are needed. Such hardware, once developed, might be too costly for today's use; but without such equipment, a major problem of future waste reuse would remain unresolved.

Suitable technology should be developed for refining heterogeneous "waste refinery" by pipe. Such a technology might encompass chemical refining and extraction, mechanical separation, magnetic removal, mechanical sorting, et cetera. Our ingenuity in the processing of virgin materials would indicate that such a technology is within our reach.

Research should be intensified for secondary use of wastes—waste combustion to generate electricity, production of soil conditioners, use of selected waste components as substrates for animal feed production, conversion of wastes into building products, and the like.

Most urgent is the need to work closely with the packaging industries to increase the quantity of waste materials they recycle. This could involve such moves as elimination of tin from steel cans substitution of new paper coatings for those which create difficulties in the repulping of these fibers, elimination of inks which resist de-inking or improvement of de-inking processes. All of these steps would require much work and would be far from easy to accomplish.

Work to improve the technology of salvage would also pay dividends in the long run. Most needed are new techniques of pelletizing, shearing, baling, compressing, and sorting of scrap materials.

Finally, and this lies beyond the strictly technological scope, sufficient economic incentives should be created to tap industrial talents for the accomplishment of the tasks enumerated above.

Waste disposal, including waste reuse, is an area we have largely ignored. Only recently have we come to recognize the existence of problems connected with large accumulations of waste resulting from affluence and urban congestion. The genius of our Nation has not yet been aroused to deal with this problem. When it is, solid wastes—and particularly packaging wastes—may be transformed into a national asset.

That, Mr. Chairman, concludes my statement.

Mr. DADDARIO. As the result of your study, what would you deem to be sufficient to tap industrial talents?

What are you talking about?

Mr. DARNAY. Specifically, it might be an investment tax credit that would be applicable to machinery to handle or process wastes. For instance, de-inking type plants, which make it possible to recycle more wastepaper, or pelletizing machines to reduce paper into pellets, or scrap handling machinery in general. Or if we were to use disposal