

Solid Research Needs for Solid Wastes

The well-known capacity of the modern city to drown in sewage is more than matched by its talent for smothering itself under a blanket of garbage and refuse. This is the implication of data and trend lines reviewed December 2-4, 1963, at a conference on research in solid wastes, sponsored by the Public Health Service and the American Public Works Association at the University of Chicago Center for Continuing Education.

The volume of solid waste has grown more rapidly than the population at the same time that available economic space for waste disposal has declined.

The consequence is that the garbage can, refuse pile, and junk heap have moved out of the individual backyard, garage, or attic into the public arena. The private nuisance has become a major public charge. Recurrent crises in waste management have grown progressively more acute, with the result that urban officials everywhere are looking to research for solutions. But management of solid wastes, a 3 billion dollar enterprise, has received a negligible amount of study. Whereas \$100 million a year for research would not be an unusual outlay in an industry of this magnitude, the total amount of research in nonradioactive solid wastes management is limited to that supported by \$200,000 in grants by the Public Health Service and the studies that other government agencies, universities, private enterprise, and professional associations sponsor. (The conference did not concern itself with radioactive wastes or with snow removal.)

Most of the crises in waste management arise from the need for sites for sanitary landfills. While the public rages over these projects, which it associates with open garbage dumps, it is oblivious to the fact that most solid wastes are discharged to water and air already heavily loaded with pollutants. Casimir Rogus, New York City Department of Sanitation, offered

the estimate that the daily per capita load of dry solid wastes consists of 200 grams discharged to the land, 865 grams to the streams, and 1,465 grams to the atmosphere in the form of particles and fumes, exclusive of carbon dioxide, water vapor, and other natural components of air.

The implication is that the present capacity and methods of treatment of solid wastes leave something to be desired. The desideratum is to convert wastes into useful and marketable forms, by processes which will be swift, inoffensive, silent, economical, and invisible. Short of that ideal, engineers will settle for methods of compacting bales of refuse for burial in conditions which produce no disease vectors or contaminants of ground water. They seek techniques for combustion which restrain fly ash and noxious fumes and diminish the weight of the load by 90 percent. They look for rapid methods of processing organic wastes to marketable forms. And they hope for better methods of disposing of residue and junk. The recent reluctance of scrap dealers and auto wreckers to accept old tires, jalopies, refrigerators, and stoves gives special point to this last ambition.

Although basic research was the main topic of the conference, conferees asserted equally pressing needs for developing standards of measurement and reporting of data, surveys and survey techniques, and demonstration projects.

Rogus emphasized that standards of sampling and measurement were needed as a basis for comparisons in research, as well as for guiding designs, operations, and administrative decisions. Many systems, he said, have been under-designed on the assumption that the load would amount to no more than 3 pounds per capita, instead of the figure of 4 pounds derived from more thorough methods of measurement.

Because collection and carrying costs amount to about 85 percent of the budget for handling

solid wastes, there is a temptation to hope for effective methods of waste disposal in the household. But garbage grinders simply transfer the load to the sewer system, and household incinerators, in a densely settled area, create an atmospheric nuisance. The major advance in collection technology has been trucks which compact refuse as promptly as it is picked up. The prospect is that waste processing will proceed on the same prodigious scale as the production of the commodities which eventually are regarded as waste.

The conference was told of several pilot models of waste processing, including a million dollar machine which shreds old automobiles, after removing the lead battery, the copper radiator, and tires and after burning the upholstery. Another machine was reported which pulverizes automobiles in a matter of seconds without burning and separates the metals, rubber, glass, and fibers mechanically. Philip Gentile described an elaborate San Fernando pilot plant which separates conventional mixed refuse and processes it into baled paper, briquets, bales of iron scrap, gaseous fuel, compost, and a brick tile composed of glass fragments and feldspar. Some of the separation is achieved by magnets, and some by blowers. The plan aims to eliminate as much hand separation as possible.

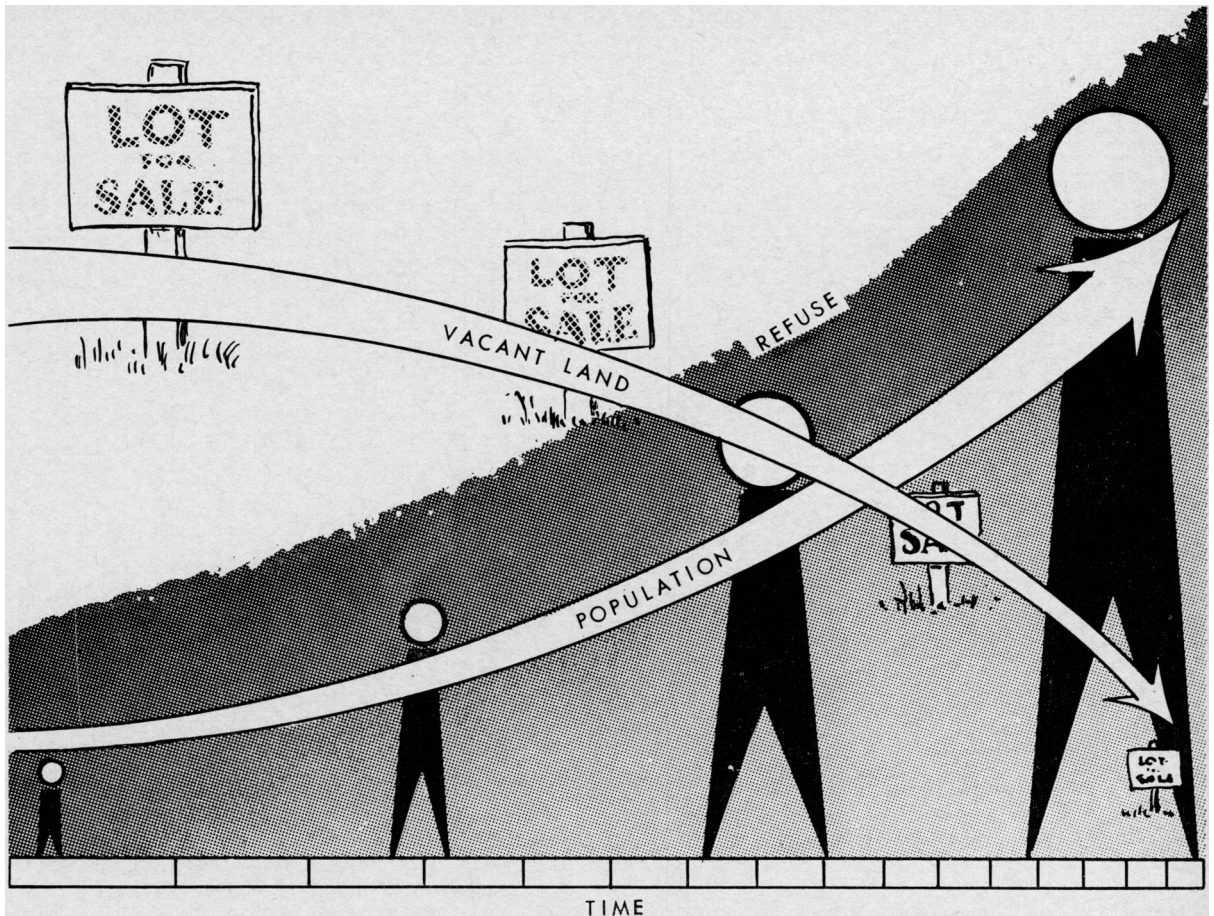
The heterogeneity of refuse, the variety and dispersion of sources, and seasonal and geographic variations in content, volume, and characteristics such as moisture are amplified by technological changes. Collectors and processors encounter anything from unpredictable synthetics to beached whales. Attended as they usually are by flies, rust, dust, rats, odors, and slime, solid wastes have inspired little public curiosity. The dominant public reaction is to urge someone else to dispose of the wastes, in some other jurisdiction.

There was some talk of seeking means of reducing the volume of waste at the source by new packaging methods, by reducing the degree of planned obsolescence in manufactured goods, and by designing merchandise to be more durable and more easily repaired. Packaging in fact has already changed materially the location and character of refuse; vegetable wastes formerly discarded by the housewife are now stacked up at the packing plant.

The proportion of tin cans has declined with the rise of paper, aluminum, and glass in packaging, but at the same time the tin cans have lost acceptability as scrap metal and may not become marketable as scrap again unless there are other technological changes in detinning or in steel making. For the time being, the mills which have marketed steel combined with porcelain, lead, tin, and copper are reluctant to accept scrap except in the form of uncontaminated iron. The search for markets, marketing techniques, and processes to facilitate marketing, therefore, is another broad category of investigations to be pursued.

P. H. McGauhey of the University of California at Berkeley, Harold P. Jensen of the Chicago and Suburban Refuse Disposal Association, and Jack Schaeffer of the Northeastern Illinois Metropolitan Planning Commission emphasized still another nontechnical direction of investigation: the social, psychological, and political aspects of solid waste management. They posed such questions as: By what means can city officials, with an annual turnover of 20 percent, pick up essential technical knowledge from city engineers? (Schaeffer said that he had yet to meet a city official who knew the difference between a sanitary landfill and an open dump.) What should be criteria for a solid waste management district, and how should it be fragmented? How can public acceptance of the necessities of waste management be improved? When there are many independent local governments within a metropolitan area, what steps can persuade them to share in an areawide plan for waste management? What data, laws, and tax systems are best suited to the purposes of waste management? (Schaeffer said that northeastern Illinois is unique in having a survey of sites suitable, if not exactly available, for landfill, and that only two States have laws prohibiting open dumps.)

As a technique for stabilizing organic wastes, notably the large accumulations at packing plants, dairies, and feeding pens for cattle, swine, and poultry, the conference expressed considerable optimism about composting. The major reservation is that there appears at present to be no satisfactory market for compost as a fertilizer, since it is less favored than chemical fertilizers and is relatively bulky. Its pos-



sibilities in a soil conservation program and in specialized gardening, with emphasis on its capacity for retaining moisture, were advanced by two conferees from abroad: Dr. W. A. G. Weststrate, Amsterdam, The Netherlands, and Dr. Cord Tietjen, Braunschweig-Volkenrode, Germany. The Honorable John Lesinski, Congressman from Illinois, spoke with fervor in behalf of composting at an evening session of the conference.

Some investigators contemplate a process which will cycle cattle wastes into ponds where they will be consumed by algal growths which may be harvested for the feeding of cattle.

Frank Stead, California Department of Public Health, told the conference that necessity has obliterated three prominent myths in waste management. First, the myth that waste may be discharged indefinitely to the land, air, and water. All are showing signs of abuse. Second, the myth that waste is to be treated only at the point of consumption. He likened this

to a policy of limiting protection against radiation to the place of exposure. Third, the myth that the city may apply its police power without limit to avoid disaster. Despite the damaging biological effects of atmospheric pollution, he noted, most of the Los Angeles population depends for transportation on machines that pollute the air. In a situation like this, police power is helpless.

In conclusion, the conferees agreed that research in solid waste management calls for joint enterprise by various disciplines, many diverse agencies of government and industry, and several combinations of governmental jurisdictions. Dr. Ross E. McKinney, University of Kansas, Lawrence, chairman of the conference, exhorted university representatives at the meeting to shoulder the responsibility of developing suitable studies.

Proceedings of the conference will soon be available from the American Public Works Association. Information on research grants is

offered in the last item of the bibliography below.—MR

BIBLIOGRAPHY

U.S. Public Health Service: Refuse collection and disposal; An annotated bibliography, 1960-61. PHS Bibliography Series No. 4, Supp. E, PHS Publication No. 91. U.S. Government Printing Office, Washington, D.C., 1963.

American Public Works Association: Municipal refuse disposal. Public Administration Service, Chicago, 1961.

American Public Works Association: Municipal refuse disposal. Research Foundation Project No. 104. Public Administration Service, Chicago, 1961.

U.S. Public Health Service: Research grants in environmental health in the Public Health Service. PHS Publication No. 870. U.S. Government Printing Office, Washington, D.C., 1961.

Conference Calendar

March 2-5, 1964: U.S.-Mexico Border Public Health Association, Monterey, Calif.

March 3, 1964: World Health Assembly, Geneva, Switzerland.

March 18-21, 1964: American Orthopsychiatric Association, Chicago. Information: Dr. Marion Langer, 1790 Broadway, New York, N.Y.

April 2-3, 1964: Southwestern Conference on Diseases in Nature Transmissible to Man, Texas State Department of Health auditorium, Austin, Tex. Dr. J. V. Irons, Director of Laboratories, State Department of Health, Austin, Tex.

April 7, 1964: National Social Welfare Assembly (spring meeting), New York, N.Y.

April 8-10, 1964: National Council on Alcoholism, New York, N.Y.

April 9-11, 1964: American Association for Cancer Research, Chicago.

April 10-11, 1964: American Academy of Political and Social Science, Philadelphia.

April 12-17, 1964: Federation of American Societies for Experimental Biology, Chicago.

April 14-16, 1964: American Industrial Health Conference, Pittsburgh, Pa.

April 14-18, 1964: American College Health Association, Denver, Colo.

April 15-18, 1964: American Society for Public Administration, New York, N.Y.

May 1-2, 1964: Environmental Health, American Medical Association, Chicago. Dr. James H. Sterner, Chairman, Committee on Environmental Health, American Medical Association, 535 North Dearborn Street, Chicago.

May 1-4, 1964: American Mosquito Control Association, Chicago.

May 11-14, 1964: National Geriatrics Society, Toronto, Canada.

May 18-20, 1964: American National Red Cross, New York, N.Y.

May 23-27, 1964: Institute of Food Technologists, Washington, D.C.

May 24-27, 1964: National Tuberculosis Association, New York, N.Y. James F. Hammarsten, M.D., American Thoracic Society, 1790 Broadway, New York, N.Y.

May 24-29, 1964: National Conference on Social Welfare (annual forum), Los Angeles.

May 25-28, 1964: Conference of State Sanitary Engineers, Washington, D.C.

May 26-28, 1964: Joint Computer Conference (spring meeting), Washington, D.C.

May (tentative) 1964: International Congress of Legal and Social Medicine, Paris, France.

June 1-4, 1964: Canadian Public Health Association, Moncton, Canada.

June 1-5, 1964: Medical Library Association, San Francisco.

June 7-11, 1964: Air Pollution Control Association, Houston, Tex.

June 18-19, 1964: American Rheumatism Association, San Francisco.

June 18-20, 1964: Society for Pediatric Research, Seattle, Wash.

June 21-25, 1964: American Medical Association (annual meeting), San Francisco.

June 21-25, 1964: Association of Food and Drug Officials of the U.S., Denver, Colo.

June 1964: Inter-American Congress of Sanitary Engineering, Bogotá, Colombia.

June 1964: International League Against Trachoma, Vienna, Austria.

To be eligible for publication, announcements of meetings should be forwarded to Public Health Reports 6 months in advance.