The Urban Scene

The Accessible City. WILFRED OWEN with the assistance of Inai Bradfield. Brookings Institution, Washington, D.C., 1972. x, 150 pp., illus. $6.50.

In 1956 Wilfred Owen, in his pioneering study *The Metropolitan Transportation Problem*, wrote, "Neither economic analysis nor transportation history suggests a return to public transportation on a scale that would be decisive." He called for improved planning of highways and the integration of highway planning into community planning, saying, "Only a total network of controlled access expressways and parking facilities can provide a skeleton that will support the giant metropolis of the future."

Those words were written at the start of the massive federal interstate highway program. Sixteen years later, in *The Accessible City*, Owen returns to the urban scene with a significantly different theme: Rational planning of urban transportation systems that rely heavily on automotive transportation will not be sufficient to solve the "metropolitan transportation problem." The time has come to restrain the private automobile. "If we opt for unplanned cities and unbridled use of cars, the traffic jam will be absolute and the environment intolerable."

Owen's message is communicated in his typical hard, fast, telegraphic style of writing. The reader is treated to a breathless tour of the world's traffic jams and new transit systems in the first 50 pages of text. Statistics abound, and one is left with the feeling that one has just attended a slide show where the operator changed the pictures a bit too fast.

The subject then changes, though not the pace of the writing. The ultimate cure for the transportation problem lies in the planning of new and the rebuilding of old cities in ways that reduce the need for trips or provide for better harmony between transportation facilities and land use. Another trip around the world reveals instances of spectacular new cities or land developments where people have rediscovered the art of walking.

Finally, Owen offers a $60 billion plan which would simultaneously improve the urban transportation systems of the United States and the environment. One-third of the money would go to public transportation systems and the remainder to improvements in streets and parking.

Owen is at his best when his evangelical prose highlights some critical misconceptions: "The traffic jam, we discover, is present even where automobiles are absent. . . . Cities with the most public transit can suffer the worst congestion. . . . Making it easier to move often adds to the causes of crowding. . . . Congestion is not necessarily eliminated by rapid transit" (Owen unintentionally documents this last truth with a photograph showing the opening day of Boston's new Quincy line, when free rides were given).

But the book has some disconcerting weaknesses. There is little discussion of the important forces that have motivated urbanites to flee the central cities. One looks in vain in the index for the words "drugs," "crime," or "schools." There is a beautiful photograph of a section of Philadelphia titled "restored for living." What is not treated is the painfully slow process of rebuilding Philadelphia or the graffiti plague that infests the inner city.

People and politics are likewise neglected. Owen emphasizes the ends, not the means, in his exhortation. For example, he notes, "If these programs of the Department of Transportation and the Department of Housing and Urban Development were combined, together they could supply all the ingredients for large-scale redevelopment and new city building: transportation, land acquisition, housing, community facilities, and economic development, together with center city slum clearance and renewal." True in theory, but what of the realities? Responsibility for urban mass transportation was once in the Department of Housing and Urban Development. It was transferred to the Department of Transportation. Now there is pressure to put it back into Housing and Urban Development. Will formal organizational changes plus $60 billion do the job? Owen's answer, implicitly affirmative, is perhaps simplistic. What is needed is a more precise statement of political strategies designed to combat the myriad economic, ideological, and sociological forces that inhibit the rebuilding of our cities.

In 1956, Owen called for high-quality public transportation supported by pricing that would make high standards possible. In 1972, he supports free public transportation on the grounds that improved transit patronage would reduce street congestion and parking problems. But there is evidence that the demand for public transportation is more responsive to service than to price. Nor does Owen explain why the affluent suburbanite working in the central business district should receive free transportation as a reward for fleeing the central city. Finally, one wishes that he had given more attention to the ultimate solution to the urban transportation problem—telecommunications replacing trips.

In summary, Owen's latest book provides an excellent overview of the urban transportation problem for the layman, but transportation specialists and other professionals may find it less satisfactory.

LEWIS M. SCHNEIDER
Temple, Barker and Sloane, Inc., Wellesley Hills, Massachusetts

An Energy Source

Tidal Power. Proceedings of a conference, Halifax, Nova Scotia, May 1970. T. J. GRAY and O. K. GASHUS, Eds. Plenum, New York, 1972. x, 630 pp., illus. $28.

Tides have been used as a small-scale source of energy in coastal regions for several hundred years. The only commercial use of tidal motion in the generation of electricity at the present time is on the estuary of the Rance River near Saint-Malo, France. This station, completed in 1966, contains 24 turbine units located in a barrier separating the inland tidal basin from the sea. The turbine is designed to generate power with flow from the basin to the sea or from the sea to the basin. The power output, rated for a peak power production of 240 megawatts, is variable and must be integrated into a large power grid for efficient utilization. The description of the Rance station is one of the 25 papers from these published proceedings of an International Conference on the Utilization of Tidal Power.

As a result of the "energy crisis" and concern with environmental effects of thermal power plants, the possibility of utilizing the ocean's tidal power is again being considered. As would be expected from the location of the conference, many of the papers are concerned with the tidal power potential of the Bay of Fundy. The keynote paper, by F. L. Lawton, reviews the history of tidal power projects in the Bay of Fundy and the engineering aspects of various types of tidal power generation. The emphasis is on all-Canadian schemes as opposed

to the international or Passamaquoddy project first proposed by Dexter P. Cooper in 1919. A second paper by the same author reviews the economics of tidal power including the possibility of combining tidal power production with a pumped-storage scheme.

The objective of the paper entitled "Mathematical model of tidal regimes in the Bay of Fundy" is to provide a quantitative evaluation of the effects of several power schemes on tidal ranges throughout the bay. The paper is largely a qualitative description of a two-dimensional tidal model which includes Coriolis effects. None of the governing equations are given and there are no references to the details of this model or to any previous mathematical models for tidal motion in the Bay of Fundy.

Several papers are concerned with other potential tidal power sites: an experimental station on the White Sea near Murmansk in the U.S.S.R., Cook Inlet in Alaska, and San José Gulf in Argentina. A number of short papers discuss engineering aspects of hypothetical tidal power schemes, turbine design, and corrosion properties of ferrous and nonferrous metals and concrete.

A well-documented, one-dimensional tidal model for the Bristol Channel is given. The objective is to calculate the head difference across a proposed barrage in this estuary. Another British contribution is a mathematical model for predicting the effect of tidal barriers on sedimentation in estuaries. The last paper discusses some of the environmental aspects of tidal power production.

DONALD HARLEMAN
Department of Civil Engineering, Massachusetts Institute of Technology, Cambridge

Water

Water and Aqueous Solutions. Structure, Thermodynamics, and Transport Processes. R. A. HORNE, Ed. Wiley-Interscience, New York, 1972. x, 838 pp., illus. $37.50.

Few of the properties of liquid water and aqueous solutions have been satisfactorily explained at the molecular level. There are two major reasons for this. First, liquids are more complicated than solids with their periodicity and gases with their randomness. The radial distribution function of water reveals that it possesses some structure, but details of this structure and how it fills space are unknown. Second, hydrogen bonding is not well understood; but it dominates the properties of water and its solutions. In view of these difficulties, what might be expected from this book?

There are 19 chapters, most of which are reviews of various topics more or less related to the book's title. The choice of topics is puzzling. Three chapters are devoted to ice but none to solid hydrates or aqueous clathrates. Four chapters are devoted to liquid water, including a whole chapter on its viscosity. There are no chapters on the quantum chemistry of water or on water vapor. Ten chapters are devoted to aqueous solutions. The inclusion of chapters on seawater and biological fluids, to remind the reader that these are aqueous electrolyte solutions, was unnecessary. The chapters devoted to nonaqueous electrolyte solutions and fused salts are inappropriate for the book.

There are two excellent chapters. Ben-Naim and Stillinger's chapter on a statistical mechanical theory of water is a prelude to the molecular dynamics study of liquid water by Rahman and Stillinger (*J. Chem. Phys.* **55**, 3336 [1971]). In the molecular dynamics study, the motion of 216 rigid water molecules under the influence of a carefully chosen intermolecular potential was simulated in a computer. The positions and orientations of the molecules were recorded as a function of time; thus, transport and thermodynamic properties could be calculated for the set of molecules and observations could be made on structure in the set. What is observed with molecular dynamics depends on several things, including the intermolecular potential. In their chapter, Ben-Naim and Stillinger discuss the choice of a suitable potential function, the properties of the function used by Rahman and Stillinger, and how such a function might be used to study water with the methods of statistical mechanics that have been used to study simpler fluids. In another chapter, on dilute aqueous solutions of nonpolar solutes, Ben-Naim examines the statistical mechanics of such solutions, scrutinizes the thermodynamics of mixture models used to explain the anomalous behavior of water toward these solutes, and suggests some new approaches to understanding this anomalous behavior which is central to the concept of hydrophobic interactions.

The chapters by Ben-Naim and Stillinger, in which the authors present ideas on how to move beyond present clichés used in the study of aqueous systems, are the most interesting of the book. Argument over whether liquid water is a continuum or a mixture and use of nebulous terms like "structure-making" and "structure-breaking" to describe solutes in water are unlikely to lead to any advances in our understanding of water and its solutions. Unfortunately much of this book, like much of the work reported on aqueous systems, is couched in such terminology. There is little in the book to satisfy any expectations.

W. J. SCANLON
Department of Chemistry, University of California, Los Angeles

Cancer Models

Plant Tumor Research. A. C. BRAUN, Ed. Karger, Basel, 1972 (U.S. distributor, Phiebig, White Plains, N.Y.). x, 236 pp., illus. $17.40. Progress in Experimental Tumor Research.

It is an axiom of research that one should pick simple systems to work out models for the solutions of complex problems. Almost every field of biology related to cancer research can trace its origin, or much of its early development, to work done on plants: The tobacco mosaic disease was among the first shown to have a viral etiology, and this virus was the first to have its chemical identity established. Hooke was looking at plant material when he coined the term "cell"; Mendel worked out the basic laws of genetics on the garden pea; Sumner crystallized the first enzyme from beans; and Braun showed almost two decades ago that the cancer state is reversible in tobacco plants. It is ironic that work on plant cancer is conducted by only a handful of investigators around the world, who have difficulty attracting either young recruits or grant support.

The new volume *Plant Tumor Research*, edited by the dean of plant cancer research, Armin C. Braun, is therefore a most welcome addition to the series Progress in Experimental Tumor Research. This volume devotes most of its space to the crown gall system, but there are in addition two excellent reviews on genetic tumors and on the wound tumor virus system, written by the senior investigators in these two areas, H. H. Smith and L. M. Black. The problematical topic of