IMPROVEMENTS AND INNOVATIONS IN URBAN GOODS MOVEMENT

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Our purpose is to share with you some of the thoughts that emerged from a recent meeting on urban goods movement sponsored by the Organisation for International Co-operation and Development.

The OECD is an intergovernmental body having as members 22 of the leading industrial nations of the world. Its primary objectives are to promote a high rate of economic growth, financial stability, and expansion of world trade among its member countries and to assess the implications of growth for economic, social, environmental, and technological policies. The OECD's interest in transportation stems from the realization that transportation activities, accounting as they do for some 20 percent of the Gross National Product, are bound to have a major influence on economic development and investment decisions of industrialized nations. Because most of the growth is taking place in high-denstiy population areas, it follows that OECD has focused its attention particularly on the problems of urban transportation. The activities of OECD in transportation are conducted under the aegis of the Consultative Group on Transportation Research, a group of high-level officials who meet periodically for consultations, policy discussions, and exchange of experience on problems of common interest.

Among the Consultative Group's activities are the so-called "policy assessments"—discussions in which a subject of major interest from the investment policy or planning viewpoint is explored in as much depth as can be achieved by careful preparation and intensive discussions lasting up to 2 working days. Emphasis is placed on innovative ideas, techniques, and policies that have been already put to test and that can thus be evaluated on the basis of practical experience. These assessments are designed to provide senior officials a convenient means of keeping abreast of new developments around the world, and of assessing the effectiveness of their own policies and programs in comparison with those of other governments. In this way, the Consultative Group has examined and reported on urban bus policy, new approaches to transport in major activity centers, policies concerned with the improvement of airport access, and policies for urban transport of goods.

The assessment on urban goods movement covered the following 3 major topics: the problem of urban goods movement, near-term transportation improvements, and long-range transportation improvements. The discussion on the urban goods-movement problem, to which approximately half of the OECD meeting was devoted, will not be reported here in detail because we consider this redundant to the other presentations at this meeting. We will limit ourselves only to a set of general observations—just enough to place our discussion on technical innovations into perspective.

SALIENT FEATURES OF THE GOODS-MOVEMENT PHENOMENA

The discussion on the urban goods movement produced the following insights into the current situation and future trends:

1. Urban movement of goods can be divided into 2 types of flows: (a) the flow of commodities into and out of a circumscribed urban region, sometimes referred to as a "cordon area," and (b) the circulation or redistribution of the goods within the

circumscribed urban region. The flow of goods into and out of a cordon area is characterized by bulk shipments of a single commodity utilizing large capacity transportation systems. These transportation systems comprise every mode from truck to pipeline, although the former predominates. In contrast, the recirculation of goods within the region is characterized by relatively small shipments, utilizing trucks almost exclusively.

2. The requirement each of these 2 categories of urban goods movement imposes on the urban environment is quite different. Flows into and out of the urban area, because of the large capacity of the vehicle used, require special loading and unloading facilities to receive and disaggregate the shipments. When such facilities are absent, the processing time for goods becomes excessive, imposing penalties in productivity. Although the shipment of goods within the urban region can advantageously utilize such special loading and unloading facilities, their absence is less debilitating to the efficient processing of goods. On the other hand, the wide dispersal of retail outlets and goods users requires a far greater number of delivery vehicles for handling the smaller shipments than for bringing the commodities to the cordon area. This brings with it such social costs as traffic congestion, pollution, and noise.

3. The consumption of commodities within the urban area seems to lend itself to large-scale statistical analysis and forecasting. Some of the OECD presentations have shown that the relative ranking of goods consumption is similar over a wide range of communities in different countries. For a cordon area, the amount of each type of commodity that flows into it can be estimated with considerable precision. In contrast, the time and space in which these goods are consumed within the urban areas are subject to many variables and defy accurate prediction. What this means is that large capacity goods movements into and out of an urban area can be anticipated with considerably higher confidence than the movements associated with the redistribution of those goods within the area. The inability to anticipate microdemands, coupled with the inability of the current distribution techniques to respond quickly to the individual user demands, means that adequate inventories and space to contain them must be maintained.

4. The movement of goods into an urban area and out of the urban area is accomplished by many modes. Each mode specializes in the movement of specific commodities over distances peculiar to that mode. Ships and railroads tend to move bulk cargo in very large quantities over very long distances because they are specifically designed to handle these movements economically. Trucks move smaller bulk commodity shipments from widely dispersed areas into the urban region. Aircraft shipments are economical over relatively long distances and for small volume commodities whose delivery time is critical. Pipelines move bulk liquids over medium distances where the use is fairly continuous.

5. Distribution of commodities within the urban area is predominantly by truck because only they can provide the needed flexibility to serve widely dispersed outlets for those commodities. Small 4-tired delivery vehicles predominate but move only a small percentage of the total tonnage (1, 2). The proliferation of small trucks is a response to the wide dispersal of consignees within the urban area. The underutilization of the capacity of these trucks causes congestion and unnecessary transportation expense.

The remainder of this paper will be devoted to a presentation of various suggestions for improving the distribution of commodities within the urban area. No further reference will be made to the inflow of goods into the cordon area. Improvements in the transport of commodities within urban areas may take 2 forms: (a) near-term improvements utilizing current facilities and conventional technologies for moving goods, and (b) long-term improvements requiring replacement, adaptation, or conversion of existing facilities, or applying technology that is not currently used for goods transport.

NEAR-TERM IMPROVEMENTS: MANAGEMENT SCHEMES

Two courses of action have been advanced for achieving short-term improvements in the flow of commodities within the urban area. The first involves better management of the goods transportation resources within the urban area. The second involves

facility improvements for loading and unloading the goods at warehouses and at retail distribution outlets.

The management schemes attempt to sort out the goods-distribution activity from other urban activities with which they interfere. The schemes can be divided into those that attempt to reduce the interference by spatial separation and those that do so by temporal separation.

Evening Deliveries

Examples of temporal separation between goods distribution and other urban activities were mentioned by many representatives at the OECD technology assessment. All of the schemes mentioned involved rescheduling the delivery of goods to evening hours, taking advantage of reduced urban traffic density. Goods are delivered to shops within the urban area in the late evening hours. The consignees of the goods either have to remain open to receive the goods when they arrive, or they have to make special arrangements to have the goods stored in specially secured containers.

A large-scale experiment of this type was tried during the period of January to June 1968 in London (3). Known as "Operation Moondrop," the experiment involved evening delivery of goods to 95 individual stores and 6 warehouses. London was divided into 4 delivery zones corresponding to 4 geographic quadrants. Each delivery zone was supplied on one day of the week, starting with Monday and running through Thursday. On the day when the store could expect a delivery it was required to remain open an additional 4 hours from 6:00 p.m. to 10:00 p.m. A clearinghouse accepted orders for deliveries and routed these requests to the individual distributors who then took care of them on the next scheduled delivery day.

The experiment was beset by a number of difficulties that kept it from being adopted as a permanent scheme. One difficulty was the low quantity of goods that were handled at any one shipment. Even accounting for the fact that some deliveries continued to be received during the day and that 1 of the 4 major suppliers was unable to participate in the experiment, the volume of goods moved was too small and the distances between stops were too long. As a consequence, the nighttime delivery costs to the supplier were more than one-third higher than the costs of daytime deliveries. The only way to overcome the high delivery costs would have been a wider participation by more shops, but this did not occur. On the contrary, by the sixth week of operation, 14 percent of the smaller shops in the more outlying regions of the supply area had withdrawn from the experiment, further aggravating the economics of the scheme. By the end of 2 months, it became evident that, if the scheme were to be expanded and therefore made more economical, it would have to show some economic success, which of course was prevented by the eroding patronage.

There were other operational problems that beset the experiment and that contributed to its ineffectiveness. The absence of scheduled deliveries to individual shops caused queuing at many delivery stops and delays in loading and unloading. Because the distances between shops were long, drivers preferred to wait and accept the delay rather than to reschedule themselves to another store. Although individual delivery delays averaged only between 5 and 10 minutes per call, their cumulative effect was apparently high. A major contribution to the increased delivery costs was the cost of paying staff overtime for the extra 4 hours during which the shop remained open to accept deliveries. Besides the overtime cost, the inconvenience of having to be there was too great a burden for many store managers.

Management schemes that are based on rescheduling delivery of goods or reducing the interference between the environment and goods delivery currently fail because of the high costs that they present both to the owner of the transportation system and to the consignee. The cost burdens stem from the size of the shipment and the current dispersal of the origins of those shipments. One of the studies presented at the OECD meeting (1) confirmed that in the Tri-State region single shipments are pitifully small and that there is a long procession of trucks that drop little loads off at individual stores. Similar conclusions were drawn by representatives from Germany and France. Simple rescheduling of this mass of trucks will not improve congestion or the economics of goods delivery.

Consolidated Deliveries and Transshipment Centers

Several of the speakers at the OECD meeting proposed that small shipments be aggregated into larger shipments. A grocery store receiving dairy products, canned goods, and bread in separate shipments would receive instead one delivery that contained all those items. This system was reported to be under investigation by the Tri-State Transportation Commission, which has developed a computer model for analyzing the shipment consolidation scheme (1). The model has developed a drastically altered pickup and delivery route pattern in which a single truck would service all the small shipment needs of a particular delivery zone. Supporting the new loading pattern would be a system of sorting terminals, each of which would serve one cluster of delivery consignments. The model estimated an overall cost savings of some 12 percent and an improvement in social costs from reduced air pollution and congestion. The total waiting time at the curb was reduced by approximately 50 percent and the running time was reduced by 90 percent.

Although the model showed that most of the cost savings were needed to operate the much more complex terminal functions, the importance of the conclusions was to point out radically new ways for rearranging activities in the urban environment. By sorting out freight in specialized structures and off the street, the operation can be done at all hours under conditions that are specially suited to such activity. These improvements could all be attained without affecting the current working hours of either the shipper or the individual receiving the consignments. In addition, it offers an opportunity for introducing into the urban freight system such innovations as automated billing and collecting, real-time shipment control, and other efficiency-raising improvements. Except for the addition of the transshipment facility, all of this can be achieved within the current technology.

In a limited form, such transshipment stations have recently gone into operation at both Orly and Le Bourget airports. The 2 transshipment stations are serviced by rail and air transport systems, but the proportion of the commodity traffic serving Paris is below what has been expected for these transshipment centers. There is some evidence that the 2 transshipment centers are not optimally located. The routes leading from them into Paris are increasingly used by private automobiles traveling between Paris and the airports.

Transshipment centers have also been studied for several large cities in Belgium such as Brussels and Antwerp. In Brussels, which has superhighways traversing right through the center of the city, the location of transshipment terminals with the center city has been envisaged.

The use of transshipment centers is consonant with the growing trend toward consolidation of retail outlets in urban areas. It is capable of improving distribution costs and reducing congestion by eliminating the need for many delivery vehicles. It will never eliminate all of the congestion and, unless it is coupled with off-hours delivery and its attendant diseconomies, it cannot bridge the loading and unloading difficulties. The latter are intimately associated with the amount of space that is available for docking in urban areas.

An improvement that, when combined with the transshipment center concept, could further reduce congestion and loading and unloading times is the construction of special loading and unloading docks as integral parts of buildings. The Canadian Trucking Association (2) reported to the OECD meeting that one of the more serious impediments to the efficient distribution within the CBD is the absence of proper facilities for accepting goods. Research sponsored by them into the characteristics of truck stops around the city center of Toronto revealed that the number of deliveries was highest for office buildings and consisted largely of office supplies and related requirements of office workers. In the city of Toronto there was a high correlation between floor space and the number of stops a truck made at a building. In most instances these buildings were found to have insufficient space dedicated to loading and unloading merchandise. Facilities that are needed consist of space exclusively dedicated to goods loading and unloading and designed to fit the loading geometrics of the delivery trucks servicing those buildings.

Conclusion

No matter how it is done, there is a certain volume of goods that must be distributed among a given number of retail outlets within a given urban area. As long as road transportation is used, the space required to move this volume of goods will always interfere with the space needed for other vehicles. Therefore, the management schemes discussed at the OECD meeting, although offering some dramatic and comparatively immediate improvements in the efficient flow of goods within an urban area, ultimately offer only limited respite from current problems of high distribution costs and congestion. Many of the participants at the meeting expressed the fear that these short-term gains will be erased by the increasing volume of goods that will have to be moved to satisfy the higher consumption patterns and the expansion of urban population and densities in the years to come.

LONG-RANGE IMPROVEMENTS

Two kinds of long-range improvements in urban goods movement were discussed at the OECD meeting. The first kind involves adapting existing transportation facilities in urban areas to the transport of commodities as well as of passengers. The second kind of innovation involves supplementing (or, in the long run, replacing) existing goods-movement facilities with new systems that do not interfere with current surface modes of transportation.

Use of Public Transit

Use of public transit systems for goods delivery within urban areas has been proposed on many occasions. By and large, urban planners reject this as a solution to the goods-movement problem. Their objections are many and varied and not always consistent. Some are skeptical about the volume of commodities that would be made available for transportation by public transit; others think that freight demands would impose an intolerable burden on the already overloaded passenger facilities. Others still fear that the dispersion of origins and destinations would make such a distribution system operationally impractical. Another caveat often raised is that the additional physical facilities needed for adapting transit system technology to goods movement would be prohibitively expensive, especially in areas where such public transportation systems already exist. Finally, the critics express uncertainty over practicality of using public transit systems for such diverse purposes and express the fear that the already low level of service enjoyed by today's patrons of transit systems will be further eroded.

All of these objections are valid and cannot be rejected. But, neither should the potentiality of certain benefits be dismissed right out of hand. Currently, transit systems operate far below capacity for between 50 and 75 percent of the time. It seems only reasonable that alternative ways of using this excess off-peak capacity to raise revenue should help improve transit system productivity in a major way. The movement of freight does offer such additional revenue. Whether the costs of the additional facilities needed would offset the amount of revenue that would be derived from freight movement is a question that has to our knowledge never been answered in a thoroughly analytical fashion. However, it is conceivable that operating revenues from commodity shipment could even rise to a level where better amenities and higher level of service for public transit patrons could be extended.

Most importantly, the distribution of goods via public transportation systems could have a significant effect on alleviating traffic congestion and its externalities in urban areas. The number of trucks could be reduced not only by diverting commodities to the underground but also, in cities that do not have a subway network, by utilizing excess capacity of surface public transport.

Clearly, the pros and cons will never be sorted out until a thorough systematic series of studies is undertaken from which operational and economic answers are progressively derived.

Pipelines

Another system proposed at the OECD meeting entails a network of concrete pipelines that would run underground and connect goods distribution depots with large consignees within the urban area (4). In essence, such a system would not be too dissimilar from the concrete sewer pipes that traverse cities today, except that these pipes would be used for goods distribution. The concrete pipelines would be about 6½ ft in diameter.

Two concepts have been considered in Canada for using concrete pipelines for the movement of freight. One concept envisions freight being shipped in standard containers moved through the pipeline on powered, wheeled conveyors. A second concept envisions handling noncontainerized freight in "banded" consignments running on powered rollers or a bolt conveyor.

Preliminary studies of the concepts indicate that with the containerized freight distribution concept a Canadian city of 500,000 population consuming approximately 25,000 tons of commodities per day could be served by a system that is capable of moving 600 containers per peak hour. The containerized system proposed appears capable of achieving this throughput and doing so with acceptable headways, practical acceleration and deceleration profiles, and velocities of 3 to 5 mph. The "banded" system has a similar throughput capacity. Either concept is well within the state of today's technology.

The elimination of goods-distribution equipment and facilities from surface streets removes the interference that goods distribution currently causes with other traffic. The reduction in social costs is also inherent in the 2 concepts. It remains to be shown whether the economics of the system will justify its consideration and whether its reliability can compete with the current goods-distribution system.

Etarea: An Unconventional Goods-Distribution System

A proposal for an entirely new goods-distribution system was studied and proposed for a new town, Etarea in Czechoslovakia (5). The new town of Etarea was a theoretical design exercise conducted by a planning team at the Prague Institute of Architectural Design who was assisted by specialists, architects, and engineers from other Czechoslovakian research and design institutes.

The new town of Etarea was designed for a site south of Prague and was intended to serve as a study to test new systems to raise the quality of urban life. Etarea was designed as an urban unit for approximately 135,000 inhabitants located 10 miles south of Prague to which it is connected by a fast and frequent rapid transit system. The general plan of Etarea is based on 13 housing districts, each having its own town center and each having a residential district of approximately 10,000 population of which 5,000 were planned to live in the town center. The town center and 10 of the district centers are linked by branches of a rail rapid transit system connecting Etarea to the center of Prague.

A pneumatic-tube, household goods-distribution system is intended to be 1 of 4 shopping methods available to the inhabitants of Etarea. The pneumatic system consists of 19 delivery pipelines and the same number of return pipelines. Each of these pipelines supplies 100 flats. The deliveries within a pipeline can follow at 20-second intervals so that for 100 flats 180 deliveries per hour can be made in containers capable of delivering a weight of 4 kg.

The shipments transported through the pneumatic tube originate from 1 of 2 district distribution centers. The items in this center are referenced in a catalog, a copy of which is available in every flat serviced by that distribution center. A householder would be able to use this system to avail himself of some 600 different types of basic everyday commodities and by means of the pipeline, obtain delivery within 3 to 12 minutes after placing the order. Included among these commodities would be groceries, prepared and semiprepared foodstuffs, nonprescription medicines, cosmetic items, newspapers, magazines, and postal deliveries.

Supporting the pneumatic tube system are trucks and other forms of surface transportation that connect the district centers. In addition, the 13 district centers and the center are linked by an underground system of automatically controlled, electric

battery-operated trolleys running in underground tubes 2 meters in diameter. This delivery system supplies 2 distribution centers in each district center, one for foodstuffs and medicines, another for manufactured items, newspapers, tobacco, and the like. The automatic delivery of mail is carried out from this second center.

Although the goods-distribution system for the town of Etarea seems illusory, the technology on which it was designed exists. It was brought out at the OECD meeting that an automated warehouse for delivering groceries has been constructed in San Diego, California. This warehouse features automatic recording and processing of orders from subscribing customers who order groceries from a catalog via telephone. A computer controls the filling of the order and the routing and scheduling of delivery vehicles. The warehouse is equipped with conveyors and other automated materials-handling systems, which assists the handlers in compiling the order. Actual delivery is made by conventional delivery trucks.

Automatic System for Solid Waste Disposal

Another radical system described at the OECD meeting has progressed beyond the conceptual stage and is, in fact, in commercial operation. A. P. Contralsug in Sweden has developed an automatic system for collecting solid waste and transporting it to points where it can be disposed (6). By the manufacturer's own description, the system can be compared to a giant vacuum cleaner. Each flat has an individual refuse chute. Each chute is connected by a vertical tube to a large, curved section of tube that contains a hydraulically operated valve and connects the chute to the waste delivery pipe. Three or four times per day, or as programmed, the valve opens automatically, the refuse in the tube falls by gravity into the horizontal delivery tube and is sucked up at a speed of 20 meters per second into a silo. At the end of 20 seconds the valve closes and the next one is opened. For a system that services 4,000 flats, the whole program of emptying the chutes is completed in approximately 1 hour.

The system, as described here, is in production and the first one was installed in a section of the town of Sunbyberg. It has been working for 3 years and serves 1,200 flats. In 1970, 2,000 more flats will be connected to it and, by 1974, another 2,000 flats will be added to the system. The system is very flexible and can cope with expansions in the amount of waste as well as in number of subscribers. For individual, one-family houses, a collecting unit may be used that serves several houses.

The installation of the system in Sweden has shown that it costs approximately 1 percent of the total cost of the flat to install this system, that is, approximately $400 or the equivalent to $4 per square meter. On developer, who was interested in applying the automated waste disposal system to 1,100 garden apartments, found that the system would pay for itself after the third year of operation. These calculations were based on a 6 percent annual escalation in the costs of conventional waste handling.

The system will be introduced in the Swedish new town of Jarva and in the new Disneyland now under development near Orlando, Florida. It is also going to be installed in England in the county of Westminster in London. Plans are under way in Germany to install the system in Munich in time for the 1972 Olympic Games, and similar interest is being expressed for an installation in Grenoble, France.

CONCLUSION

In November 1967, a panel of distinguished transportation experts met in OECD to assess future needs and directions for research in urban transportation. Let me quote an excerpt from the Panel's report (7):

> Although the Panel tried to take a comprehensive view of research requirements in urban transportation, it left out one very important aspect from detailed consideration: that of urban freight transportation. The absence of specific recommendations on this point should not be construed as implying that the Panel believed this subject to be adequately dealt with already. Quite the contrary, the problem of urban distribution of goods remains largely unexplored, and the Panel's inability to treat this matter in detail can be taken as tacit evidence of the lack of an informed body of knowledge on the subject. Yet, the movement of goods in cities is so closely related to the move-

ment of people, that a study of urban transportation requirements which neglects to take freight into account can be quite misleading. This is why a systematic inquiry into the problems of urban freight transportation is, in the Panel's opinion, a very urgent necessity.

The Panel went on to suggest that more research is needed particularly on trip generation characteristics of various land uses, on modal allocation of freight demand, on more efficient operating procedures and use of existing facilities (e.g., improved scheduling of deliveries, consolidation of loads, and use of the underground during night hours), and on substitute freight transport technologies, notably pipeline movement in containers.

This conference marked an auspicious beginning of such an inquiry. The question that remains is whether we possess the ingenuity and the will to apply the improved understanding that will inevitably arise from these efforts to the solution of the real-life problem of goods movement in our cities. The challenge is only partly technological. As the OECD assessment clearly brought out, virtually all of the foreseeable improvements in goods transport are within the existing state of the art. The key problem resides rather in the large uncertainties surrounding the introduction of major changes in the existing goods-movement system: uncertainties concerning the feasibility of inserting an unconventional system into the city fabric, of integrating it with the existing city-wide transportation network, and of operating it as an economically viable service. In this respect, however, the challenge of improving goods movement is no different from the challenge of improving people movement. Both require institutional means and government incentives for testing and evaluating innovative schemes and for creating a market for new systems and technology. Perhaps what is needed most, therefore, is greater flexibility in the administration of the existing federal demonstration grants and financial assistance to urban public transportation systems to permit their use to demonstrate improvements in goods as well as passenger transportation systems and technology, and for the planning and implementation of integrated passenger-freight urban transportation facilities and equipment.

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James Nelson

Why does one have to consider, if one does, the London experiment a failure because it raised the cost? The problem of most of our urgent transport problems is to internalize externalities, and this is going to raise the cost. Why can we not face this?

Orski

I am quite sympathetic with that argument. I called it a failure on practical grounds; namely, the shopkeepers were unwilling to continue the scheme on a personal basis. There was no attempt made to legislate or enforce this scheme. One might conceive of institutionalizing this kind of system, either by creating the necessary economic incentives or disincentives. However, the way the experiment was set up in London, it was an entirely voluntary, nonincentive scheme. Because it did not work out, it did not elicit the shopkeepers' support. There was no other conclusion to be drawn, but that it was a failure in that sense of the word.

Bruce Goeller

With respect to the problems of innovation, it is important to distinguish the different instruments one has available for encouraging innovation and their different impacts. For example, if one uses legislative standards one may get compatible, similar kinds of modernization. If one uses accelerated tax write-offs, one may promote very highly individual kinds of responses to the same problem. So it is important to look at the differential effects of the different instruments available and pick the best one.

With respect to freight-passenger vehicle combination, it is important to make the distinction between the integrated vehicle, the vehicle that may simultaneously carry passenger and freight traffic, and the convertible vehicle. An example would be the European articulated bus, which is basically a tractor on which one can put either a freight trailer or a passenger trailer. The convertible systems and the integrated systems have entirely different problems with respect to how costs are shared among the different users. It is easier for convertible systems.

There is also the question of labor problems. If one is dealing with both freight and passenger traffic on the same vehicle, would there be justificational disputes among the unions or what?

Orski

I recognize all these arguments, and my plea was really for a systematic, dispassionate analysis of the problem and not necessarily for the adoption of such a scheme as a solution to urban goods-movement problems. I might say that even a small incremental improvement like designing buses to enable shoppers to carry packages in a more convenient way would be a contribution to solving the problem.

J. Douglas Carroll

Will you distinguish between your recommendation for analysis and for experiment? I am not sure which you stress.

Orski

To me, analysis and experiment are really intimately tied together. It seems to me that we must get away from theoretical analysis into the field of experimentation. Unless some city or public body is innovative and imaginative enough to be willing to try out such a scheme, I think no amount of theoretical analysis will convince the politicians and the decision-makers that this is indeed feasible. I guess my ultimate plea is for an urban goods transportation demonstration program.

Donald M. Hill

An analysis was made by Rouse and Company in connection with a new town, Columbia, which is being built midway between Baltimore and Washington. The analysis was done with an Urban Mass Transportation Administration technical grant. The conclusions are that it is feasible to develop a system that will move both people and goods on a completely reserved right-of-way within the complex of the town. The kinds of vehicle systems they are thinking of are comparable to a dial-a-bus concept where one dials for the service. A replaceable cab could be used either for people or for goods, depending on the delivery requirement. The experiment is proposed, and at this point requires action. As far as I know, the developer and his partner, Connecticut General, do want to proceed with it.

Dale L. Anderson

I do not want to leave this London experiment on a sour note of failure. I would like to point out that the American food chains for over 20 years have successfully used a night-drop trailer system in which one trailerload of goods is dropped and another one loaded with by-products is picked up. They have also successfully used the key room, which is a trailer room locked essentially from 2 sides. A perishable product is dropped into it in the middle of the night and locked in place. In the morning the store opens the other door and brings the goods out. Many chains have done this for many years and do not consider it an experiment anymore.

John Clayton

For many years flowers have been delivered just by dropping them on the sidewalk in front of the florist establishment. I am not certain but I think to some extent they are still delivered in the same fashion.