THE SECOND SESSION contains four papers. Although the author of the last one is not here, I have been asked to summarize it with the others.

I will touch briefly on the three papers already presented and then comment on Mr. Zettel's "Summary Review of Major Metropolitan Transportation in the United States." It is interesting to have heard seven papers describing some of the needs and problems of the metropolitan areas, then to find out from this review what is actually being done in the way of solving the urban transportation problem.

For Dr. Shryock to condense the 1960 Census into 20 minutes must have been quite difficult. However, there are a few highlights that are significant. The first is that in 1960, 63 percent of the population of the United States lived in urbanized areas. That figure shows the location of the problem.

The next significant fact is that the population of the central cities increased 10.8 percent, but their suburban populations increased 48.5 percent.

A more important statistic, based on the 1950 area, is that the central city increased only 1.5 percent and in one section of the United States there was actually a decline in the population in the area that was called central city in 1950. Thus, the area now outside the central cities represents two-thirds of the total population growth. This highlights the problem confronting us in the decades ahead if the trend continues.

This is one of the reasons why the work of the Bureau of the Census is important. From now on we will have regular reports from which trends can be established and which will be helpful to future planners in determining the real significance of this population growth.

It has been mentioned that one in five Americans changed his address every year. Consequently, the trip patterns of these one in five Americans have changed in some way. In any event, it is apparent that flexibility in transportation must be provided if these people are to be served as they will want to be served.

So Dr. Shryock's conclusions—not only his own, but also his references to others in the last part of his paper—are the indication that the SMSA's will continue to grow rapidly. He sees much more circumferential travel as one of the problems we must face in the future. He, again, anticipates longer work trips and decentralization.

We all had a general idea these things were going on, but it is certainly helpful to all of us. The Bureau of the Census and others doing this work should be commended for making this type of information available to the people who have the responsibility of planning.

The paper by Wynn and Levinson really takes over from Dr. Shryock's paper, even though it preceded it on this program. Their chart shows that the larger cities not only have larger population, but also greater density of population. They conclude that density is a variable to consider in looking at the over-all transportation problem.

Another graph shows that car ownership is less as transit increases. What is needed is quantification of some of the things we already know. The information presented here is going to be helpful to all planners.

It is also found that rapid transit is most successful when population density is high. Furthermore, it was noted that the transportation requirements of the future probably can be classified in three ways: travel between areas of low density, travel between high and low density areas, and service between high density areas. Obviously, in the first case we must look to the automobile and in the others to public transportation.

The problem of public transportation will be within the areas of high density and the areas of low density. That is where flexibility is bound to be required.

These two papers complement one another. It is difficult to summarize them but
both have contributed knowledge that can be found only by study of these papers.

Mrs. Smock has presented an intriguing paper. In the first place, it reports a demonstration project financed by HHFA. I do not know whether this is discouraging or not. It sounded as though it must have been a little discouraging to the transit company. It did have 8.7 percent increase on Sunday and only 1.6 percent during the weekdays when perhaps it is more important.

She cited some conditions that made us understand why it was not more: a short period of trial and perhaps people would have shifted more readily had they known the change in service was available more than a few weeks. She did mention the transit company did continue on Sunday but the riders began to drop off. There may have been some effect of novelty in there. Again, those facts are important, particularly to HHFA and the transit industry generally, and all concerned with transportation.

To those concerned with research, the other—the comparison of the two and the investigation of the why of some of the facts that she found—is far more important than the actual change in ridership: to find out not only what people did, but why. Among the figures presented, only 6 percent of the increase represented new riders but over one-third of the new riders were people who merely shifted from one busline to another.

The principal criticism people had of bus service beforehand was the frequency. They did not respond to greater frequency by taking advantage of it.

Personnel in the Bureau of Public Roads are now engaged in reviewing and testing in a couple of areas a modal shift in connection with the national transportation studies just reported for Washington. One of the factors in that equation is, of course, time. Statistically, the shift appears sensitive to changes in time. If increase in frequency means buses running at shorter intervals, then the waiting time must be less and the time of travel must also decrease. I wonder whether the factor of time, the sensitivity, would be observed if it were tested in the case described in Detroit.

Also, we should look extremely carefully at the new experiment just under way in Washington in which there is to be considerable increase in service and reduction in fares. Mrs. Smock found, at least from the responses to the queries, that fare was not an important item, and went on to cite reasons why people are becoming more automobile oriented—their increasing ability to own cars and increasing affluence and the lack of another available form of transportation.

I got the impression from Mrs. Smock that with this increasing affluence and the spread of the urban area, with the flexibility of transportation now needed, with the mobility of employment, capital, etc., which is now possible, no amount of manipulation of fares or service is likely to change the increased orientation to the automobile. This is a conclusion I draw from her report. At least it will take a great amount of manipulation to cause any real change.

This work I hope is only the beginning in examining why people live as they do and why they do these things. The "why" is the key and not the "what" of transportation. We will look forward to the final report. It will be a significant contribution to knowledge.

Mr. Zettel's paper describes a very important job that has been done. The job was done as a result of a concurrent resolution in the Legislature of California to develop a prospectus for a Bay Area transportation study. In preparation for that, Zettel, Carll, and others whom he lists reviewed in great detail the work now being done in what he calls the major metropolitan area study. His report gives an idea of how nearly we are now approaching the study that the speakers who have preceded have said that we need.

They reviewed studies in 12 of the 16 metropolitan areas—those are the areas that Zettel describes—the major areas where studies are being made. They have examined and compared the various aspects ranging through organization, the financing and design of study, and finally the study methods.

The report examines the philosophy, the approach being used in the conduct of the different studies and how their analysis is carried on. They find differences, of course. One basic one is whether and to what extent transportation merely depends on land use or whether it can influence it to any substantial degree.

This study finds there are differences in exact views as to ways that transportation
can influence land use. The people making these studies are uncertain. Thus, in the design of studies they are having to make accommodations for that so study can be carried on regardless of what the findings are.

They find that the differences result in quite a different approach in analysis. He lists different methods of analysis of land use. Without attempting to define these terms here, his point seems to be that depending on the assumption of philosophy a different modal is used.

Another difference they find is assignment trips. Here they find a variety of mathematical modals used in each of the studies and draw comparisons as to the conclusions from the application of those modals. Through all the studies there are threads of similarity, much greater similarity than difference, enough to cause the authors to define what they call a major transportation study. The following are some excerpts from his report:

For purposes of this report, a major transport study was considered to be one having at least these characteristics:

1. It involves more than one, and preferably all, means of local transport.
2. It deals in some degree with the principal phases of a comprehensive planning process, which include (a) an analysis of population expansion, economic growth, and land use in the study area; (b) a systematic description and prediction of traffic flows; and (c) the development and evaluation of a plan for a comprehensive transport system.
3. It uses basic "building blocks", such as several hundred or more geographic zones within the region, that are finely drawn and make necessary extensive data collection and processing by electronic methods.
4. It is financed by a study budget sufficient to support the collection, analysis, and evaluation of large quantities of data.
5. It has a broad base of "community interest", with city and county governments and various federal, state, and local agencies represented on the supervisory committees.

The Objective of the Study

Objectives of metropolitan transportation studies as found in review of recent undertakings are described in detail . . . [elsewhere in the] report. But a fair generalization might be that the basic objective is to provide comprehensive and continuing guidance to the development of transportation facilities which will meet the standards and goals of the community for which they are provided. Many of the earlier studies, and even a few of the present, claim no more than provision of information as their basic objective.

The more ambitious metropolitan transportation studies of the present set forth the development of an area-wide, comprehensive transportation plan as the primary objective. But from the outset a continuing study and planning process is envisioned. It is recognized that a plan is never "final"; hence provision is made for its continuing surveillance, refinement, and amendment.

Given the basic approach but always recognizing that flexibility is desirable, the procedural steps of the transportation study may be outlined as follows:

1. Prepare inventories for the study area of population, land use, employment, economic activity, transportation facilities and traffic patterns on a systematic basis; provide means for keeping the inventories up to date.
2. Study trends and determine relationships from which may be developed reasonable and consistent forecasts of economic activity,
population, population distribution, land use requirements, spatial arrangements, and transportation demands.

3. Prepare and evaluate alternative projections of land use and associated transportation development for the study area, together with descriptions of economic, social, political, and environmental consequences of each.

4. Submit the possible alternatives to policy leaders and the general public for discussion to achieve broad agreement upon a desirable and attainable generalized plan of land use and transportation development.

5. Refine and test the transportation plan, estimate costs for stages of development, subject plan to economic evaluation, propose division of responsibilities among agencies for implementation; recommend priorities and methods of financing.

6. Propose methods and structure for continuing collection and analysis of data, and for review, refinement and amendment of the plan.

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The authors urge that the technique be used with caution, observing that the assignment process upon which it depends still yields only approximate results, and pointing out other imperfections in the economic analysis (among them, "the arbitrary designation of time value"). Some of the other studies express the intention of formulating similar methods for economic evaluation. This raises a question, however: in view of the advanced state of analysis in traffic survey techniques, why has not more been done in the vital field of evaluation? The problem of the commuter peak-hour demand dominates all other urban transport affairs, and the problem is recognized to be overwhelmingly economic in nature. Yet, little evidence is to be found, even in the Chicago report, that the peak-hour issue has received attention in keeping with its urgency.

Perhaps the primary answer is that evaluation is the final major step in the planning process, and the efforts of the study group have been absorbed in preceding phases. Another reason is that evaluation cannot be treated scientifically in the same way as prediction. Forecasting models can be stated in terms of trends and probability distributions. Normative models, to be cast into the scientific mold, require behavioral values which can be optimized, as maximums or minimums. To frame such models is a far more complex task. Besides, realistic evaluation of transport proposals must include a generous quantity of non-scientific, "institutional" considerations.

There is no fear nor do the authors imply that the study staffs that have brought this such high-degree of sophistication will not carry through with implementation of their findings. This summary of the Zettel report seems to point the way toward answering many of these questions.

In conclusion, though we plan for 10, 15, 25 years ahead, the projects being built today in the field of urban transportation are going to be with us far beyond the period being planned for. We plan for 20 years but are building for 50 or 100 years. The things we are building will outlive many other items in the city scene that concern us very greatly. Yet the adequacy of these facilities will be judged in the years ahead not by this generation but by the generation that follows. And if we can accept as credible the forecasts, they will be viewed by a generation of people with an affluence that is hard to comprehend at this time.

We have only to look backward 20 or 30 years to see whether at that time we could have accurately projected thinking into the future to see the great difficulties of 20 or 40 years ahead. The effectiveness of planning is going to be judged under those conditions.
Discussion

Frank W. Herring (The Port of New York Authority).—I would like to ask a question of Mrs. Smock. As I remember, there was a 13 percent rise during the rush hours. Would a program of that kind have seemed more profitable than presentation of the program of the sort that you described?

I have one more question. You made an extremely interesting comparison of 1953 and 1962. Are there any data available to permit evaluation of how CBD employment itself may have changed during that period?

Smock. —To answer your first question, these increases were concentrated. There was a 13 percent increase during the rush hours on the expresses, not on the local ones.

I do feel the service change could be concentrated and still obtain the increase in patronage, not necessarily only in peak hours, but the second increase was on Sunday—we have not examined that thoroughly enough to know when those increases occurred. But we do feel that some of this increase could be obtained with a more concentrated service.

As to the second question, we are going to examine more thoroughly the 1953–62 data to find out exactly what changes are due to population changes, include changes in the population as well as what changes accrue to travel behavior changes. Some of it is the same people changing habit. We are going to try to find out about both.

Robert B. Mitchell (University of Pennsylvania, Philadelphia).—Were the speeds of the buses and the relative speeds of the automobiles compared over the same routes?

Seymour E. Bergsman (Department of Streets and Traffic, Detroit).—The one point I did find out was that the increase in number of coaches on the streets would have an effect so far as the general traffic was concerned. This includes private cars as well as coaches. There was no change before or after.

Edmond L. Kanwit (Bureau of Public Roads).—It is clear from the data Dr. Shryock presented that in the original area there was almost no change in population, and therefore, in density of the central city. Most of the population studies have probably tremendous emphasis on the shift to the suburbs. My question is that I understand there have also been very important and dynamic changes, not of total population, but shifts within the center cities. I wonder if Dr. Levinson has any comments with respect to these?

Levinson. —In cities where the areas remain the same, a slight decrease is experienced in the densities. In cities like Milwaukee, where they annex a great amount of land, the density went from approximately 1,200 people per square mile in 1950 to approximately 1,800 people per square mile in 1960.

The concept of the centralization in cities is not new. Again referring to Chicago, a great many of the square miles of the city lost people from 1950 to 1960, with a gain in the peripheral or the outlying parts of the city. But going back to the census of 1900 you find some "lost" people between 1910 and 1900 and so on.

What this has done in terms of transportation is twofold. It has attracted large masses of people closer to job opportunities on the perimeter and therefore destroyed their central attraction to the downtown, for coming downtown—an average increase in length of trip.

In terms of rapid transit patronage, the heaviest patronage in Boston and Philadelphia and Chicago is not within the first three or four miles of downtown, but it is in the intermediate or outer rim of five or ten miles of the central area. In some cases they have almost had to abandon the coverage. It has been a redistribution of trips.

Robert T. Howe (University of Cincinnati).—Mr. Holmes in reporting on Mr. Zettel's paper said this was in preparation for a comprehensive transportation study of the San Francisco Bay area. The possibility would seem to exist that the Bay Area will be
making an extensive transportation study at the same time a new rapid transit system is under construction. If so, is this really good planning?

Holmes.—To refer to Zettel again, it is not good planning, but I do not know that necessarily should be viewed in any spirit of criticism because perhaps the opportunity to do good planning has not existed. Now perhaps the conditions do exist for what would be called comprehensive planning.

I mentioned there were 12 of the 16 metropolitan areas of over a million population that qualify as major studies. Zettel said there are four areas where regional plans are not in preparation. In these places various transportation studies have been completed. San Francisco has the most elaborate but none of them qualify as major studies done in scope.

M. L. Manheim (Department of Civil Engineering, MIT; Joint Center for Urban Study for MIT and Harvard).—In both papers this morning and in Mr. Holmes' mention of Zettel's comments this afternoon, I detected a feeling that actually we cannot predict very precisely what is going to happen in any city. We probably need to evaluate alternative transport systems. We can probably make the prediction that we could identify what some of the most likely patterns of development may be but cannot identify precisely which one we will have. In particular as we move further into the future the variance in the prediction increases quite substantially. And yet Mr. Holmes mentioned also the facilities now being built will last for a period of time.

What we ought to be looking for are kinds of facilities that could be built which would pay for themselves in as short a useful life as is consistent with our ability to make accurate predictions into the future. Of course this is ideal and would not always be applicable in every case.

Holmes.—I think we can amortize an expressway in a very short time. For instance, they figured they could pay for the Schuylkill Expressway in six years. It is half-paid for but it will still be there. We are not going to take it away in six years.

How important is the question of amortization. In my comments I was referring to its actual presence as a feature of the city. It will still be there whether paid for or not.

I would say it is making a profit. Of course it will still be there. We are not going to tear up the Schuylkill Expressway. It is more permanent than things that we build in cities and amortize over a 40- to 50-year period.

Davis.—With respect to that, when I was discussing the matter of long-range planning with some of the people in a big electrical company in California it was recognized that enough power for these metropolitan areas requires starting 10, 15, or 25 years ahead of time. It means vast arrangements for estimates, at least where there is hydroelectric power, the problem of acquisition of water rights, the plans for developing very large dams, etc., down to the time when the power is to be delivered to consumers.

One can reasonably expect there will be a certain magnitude in population trends. They do not know exactly where this power is to be delivered but would not it be foolish to be unprepared? You should not gamble on your organization's not doing well. To supply this power as these areas grow, they begin to get into statistics as to where they should go—this active planning may begin six or eight or ten years ahead of time. They still do not know detailed locations of industry in a particular area or city.

Then perhaps for four or five years ahead they begin to see some of the major outlines of growth. Then as the particular subtracts begin to develop they can see where subdistribution stations are going to be. Anytime you make long-range planning you should not be frustrated by the fact there are going to be some gimmicks.

The point is that we are accumulating some of the tools by which we can do a somewhat better job in the years ahead to prevent random actions so that twenty years from now we will not be in a position where we cannot compete with the rest of the world.

Wagner.—Hopefully by sometime in 1964—maybe by the end of this year—we will be coming to conclusions with respect to alternatives and we will put the final ink on plans
that will represent the conclusions of the Penn-Jersey transportation study. The actual concrete in the ground, the building of facilities, will be guided very definitely, possibly for the next five years, by reason of these decisions.

We expect a continuing organization to be in operation that will constantly keep up to date, be making new explorations, be coming to new conclusions so the decisions that may look good in 1963, as we get to 1970 or 1980 may need a new look. This is how it should be.

R. D. Bond (Ford Motor Company).—I would like to ask Mr. Levinson a question: Because of the population density factor and the trend toward decentralization of large central cities, is it possible to estimate transportation demands for the major central cities now and say it would not change too much in the next five years within the central cities regardless of modal split?

Levinson. —You can always estimate the demand. The question is to what degree of precision and with what tolerance. There are certain patterns of travel that are probably almost static in many streets. Some of the movement to and from the central area probably is pretty much the same today as several years ago.

Bond. —What I was thinking, say 1963, if you had been estimating the current transportation demands for a large city in a metropolitan area that has a million or more population and with a population density factor you have now and if you assume those density factors would not be increasing, would trip generation trends 15 years from now in such a large city be substantially more or maybe slightly more? In other words, 5 percent or 10 percent more?

Levinson. —To answer precisely I would like to have an O-D study of the city. We do know the trip per rider increase because of the greater car ownership. At the same time we know a consistent pattern decrease in transit riders. The greatest impact has been in the acquisition of the first car and the second car. I think that in many areas changes have not been profound in certain regional movements and these areas I think could pretty well be established.

Clifford D. Rassweiler (Johns-Manville).—To make a philosophical remark, I am always impressed that the discussion proceeds along the lines of assuming that there is something going to happen in population distribution twenty years from now, that we should try to predict what that is and provide transportation for it.

I wonder if there is not a little different approach? I wonder if there is not another point—the nature of that distribution twenty years from now which is going to depend on what we do in the next ten years. Some planning might be directed to what distribution of population around the great urban center would give the people the most satisfactory living and then start planning on transportation so as to lead the population in the kind of distribution which is best for it.

Wagner. —I am very glad you said that; that was what my opening statement said in general. I was once a little fearful that I might have fallen into the hands of these planned economists who try to rule our lives for us and all that sort of thing.

Now, I do not feel we should allow things just to drift. I think we need leadership to attain the kind of urban community we really want. It is not one man's job, the planner's job, it is the job of the elected officials, the civic organizations that represent the citizenry, as well as business leadership—a combined partnership that will help achieve the kind of area that will function, make all of our living more pleasant and enriched.

This is a real challenge to us in the future. The report of Philadelphia's commission with respect to the future of its downtown is an effort along that direction. I have great confidence we are going to attain it; only through this kind of effort can be really keep those values from being badly affected by transportation. If we let things drift, transportation will come of one kind or another. But it may hurt a lot if we do not study and plan and combine work at the leadership level.