AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523
BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY
Batch 72

1. SUBJECT CLASSIFICATION

A. PRIMARY
Serials Y-DP00-0000-0000

B. SECONDARY
Development and economics--Transportation

2. TITLE AND SUBTITLE
Transport research program; progress report,June-Dec.,1963

3. AUTHOR(S)
(101) Brookings Institution,Washington,D.C.

4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1963	25p.	ARC

7. REFERENCE ORGANIZATION NAME AND ADDRESS
Brookings

8. SUPPLEMENTARY NOTES *(Sponsoring Organization, Publishers, Availability)*
(Research summary)

9. ABSTRACT

10. CONTROL NUMBER	11. PRICE OF DOCUMENT
PN-RAB-741	
12. DESCRIPTORS	**13. PROJECT NUMBER**
Transportation	
	14. CONTRACT NUMBER Repas-5 Res.
	15. TYPE OF DOCUMENT

AID 590-1 (4-74)

Repro - 5 Rec.
Brookings
PN-RAB-741

TRANSPORT RESEARCH PROGRAM

Progress Report

June 12, 1963 - December 12, 1963

The Brookings Institution
Washington, D. C.
December 12, 1963

Table of Contents

The Brookings Institution
Economic Studies Division

TRANSPORT RESEARCH PROGRAM

Review of Progress

The Transport Research Program, financed by a grant from the Agency for International Development, is designed to explore the relationship of transport to economic development. The program was funded for a three-year period ending June 30, 1965, and is now at the halfway mark in the research effort.

Three research reports are in the final editorial review stage. These include a book, tentatively entitled, Strategy for Mobility, by Wilfred Owen of the Senior Staff, who is directing the program; a monograph, "Maintenance Costs as a Function of Capital Investment in Highways," by Mathew J. Betz of Arizona State University; and a research report, "The Atlantic Highway in Guatemala," by Martin S. Klein. Klein's report is the first of seven case studies of transport investment in Latin America.

A preliminary draft of a fourth work, Transportation and Economic Development: Introductory Theory, is nearing completion. These essays were presented originally at the Harvard Transport Seminar in the spring of 1963.

Six research projects are currently being conducted by Brookings staff members and three projects are being pursued under university subcontracts. In addition, four new projects were approved by the Advisory Committee during the past six months.

An important indicator(?) element of the success of the research effort is the extent to which it is related to the real problems of A.I.D., other lending agencies, and to the developing countries. Intensive efforts have been made to develop this relationship with U. S. and international agencies in Washington and the field.

Project Activity Report

A. Research at the Brookings Institution

1. Transport Investment Criteria for Developing Countries.
Tillo E. Kuhn

This study seeks to improve the methodology at present in use by government officials, consultants and aid personnel for investment decisions. The final product of the research will emphasize workable field techniques.

a. "State of the Art" of Pre-Investment Surveys. Practically all significant transport investments made by U.S. A.I.D., the World Bank, and other organizations active in this field, are preceded by detailed engineering and economic studies of the project proposals. The resulting documents, variously known as "feasibility studies," "pre-investment surveys," or "benefit-cost analyses," purport to provide authoritative guidance for final decisions. They represent the direct link between technical-economic analysis and decision or action. Improvements of these efforts, therefore, are of key importance to development programs.

A survey format was developed which makes possible systematic reviews of the documents under headings such as basic assumptions of the study, demand analysis, forecasting procedures, engineering cost estimates, benefit estimates, investment criteria, implementation of recommendations.

To date about 25 survey reports, most of them carried out by consultants on behalf of international agencies, have been evaluated or are in the process of being evaluated. Geographically, 10 of these deal with projects in Africa, 8 in Asia, 7 in Latin America. Highway studies predominate, but air and rail studies are also included. Two or three reports attempt to survey entire transport systems.

b. Ad Hoc Assistance to U.S. A.I.D. At special request, and under the terms of the Brookings Transportation Research Contract, ad hoc assistance was rendered to the Agency relating to three current projects in Asia and Africa. This involved advice on study prospectuses, development of the appropriate methodological framework, and work sessions with A.I.D. officials and with the consultants about to go out to the developing countries. As a beneficial side result, this gave the Brookings team exposure to practical problems which have to be faced in the field and by the administering agency.

c. Drafting of the U.S. A.I.D. Manual. Under the terms of the Foreign Assistance Act of 1961, "the economic and technical soundness of the activity to be financed" by A.I.D. loans and grants must be established. A manual of the Agency provides guidance on how to establish, prior to decisions, the soundness of capital projects. At special request of the

Agency, the Brookings team will redraft the portions of the existing manual dealing with the transportation sector. This work will commence as soon as the other research phases, described above, are sufficiently advanced.

A meeting was held in October at Brookings, attended by 21 A.I.D. representatives, to acquaint key officials of the Agency and potential users with this project.

d. Conference on Pre-Investment Surveys. Plans are underway for a spring 1964 conference on pre-investment surveys, using the A.I.D. manual revision as a background for discussion. Attending will be representatives of aid-giving organizations, aid recipients, and those engaged in the conduct of feasibility studies.

2. Case Studies on Latin American Transport Investments
George W. Wilson and Charles J. Stokes

This series of case studies is designed to illustrate the development impact of transport investments under different economic, political, and physical conditions.

The individual cases include:

The Atlantic Highway, Martin S. Klein, United Research Incorporated, Cambridge, Massachusetts. The highway from Guatemala City eastward to the Caribbean at Puerto Barrios in Guatemala, provides the only highway link from Mexico to Panama between the Atlantic and Pacific coasts. Built to parallel the American-owned International Railways of Central America, one of its purposes was to break a monopoly. Financed by U. S. A.I.D. (or predecessor agencies) as well as by IBRD, the highway is an early example of development investment and in its analysis, it has been possible to examine in some detail the relation between the decision to build, the expected outcomes and the current economic situation along the route of the highway as well as in Guatemala and Central America. The draft report is now at the final editorial review stage.

The Cochabamba-Santa Cruz Highway, Barbara R. Berman, Brandeis University. This, the only paved highway in Bolivia, connects Cochabamba at the edge of the Altiplano with the tropical region in the eastern portion of the nation. The choice facing Bolivia with respect to the proper development path involved possible investments in mines, in irrigation for the Altiplano and its agriculture, as well as the opening up of new regions at lower elevations. This highway follows one of the alternative routes into the virgin territory. It is, then, in the light of the Bolivian development strategy that the impact of this substantial investment is assessed. A first draft is now being written.

The Tejerias-Valencia Expressway, Charles J. Stokes, University of Bridgeport. Venezuela in the postwar period has been undergoing a very rapid transformation. The impact of heavy export surpluses from oil has been to cause expansion at a frantic pace in the capital, Caracas, as well as in the Lake Maracaibo region. Although, obviously, the first heavy transport investments were in pipelines and shipping, the secondary wave of transport investment has led to the building of an excellent highway system. This expressway leading west from Caracas opened for industrial development a region traditionally outstanding for its entrepreneurial ability, thus permitting both a deconcentration of economic development at the capital and a more even spreading of the results of this development. An attempt is made to assess the benefits arising from this investment against the background of its high costs

and the alternatives which had been available when the decision to build was made. At issue is the role of transport investment in encouraging spillover effect. A first draft is now being written.

The Atlantic Railway, Joseph R. Hartley, University of Indiana, and William P. McGreevey, Massachusetts Institute of Technology. Completed in 1961, this railway links the Caribbean coast with the Gran Sabana region of Bogota as well as with Medellin and Cali along the Cauca River. It thus provides the first integrating transport facility in a nation characterized by localized development. Though it is not entirely in use as yet, it has been possible to assess the impact of the rail line upon the depressed Atlantic region as well as upon the general competitive positions of Bogota, Cali, and Medellin. An examination has been made of the rate structure, of alternative routes and of alternative transport investments. A first draft is now being written.

Air Cargo Movements in Colombia, Roger C. Van Tassel, Clark University. The rapid growth of air cargo movements in the immediate postwar had a differential impact upon the development of the several industrial regions of Colombia. This case study examines that impact and considers the role of air transport as a stage in the expansion of transport facilities. A first draft is now in process of revision.

The Pacific Coast Highway, John F. McCamant, University of Washington (Seattle). This case study in Nicaragua examines a nation in very rapid growth and seeks to determine what was the role of this transport facility which serves the region west from the capital city, Managua, as well as the nation's Pacific Coast ports. Starting from a much lower economic base than Guatemala, Nicaragua is moving ahead at the fastest growth rate in Central America and one of the fastest in all America. The contrast between development along this IBRD-financed highway and little if any change in Guatemala along the Atlantic Highway is instructive. The field work on the case is now in process.

The Litoral Highway, Leon V. Hirsch, United Research Incorporated. This study of the Pacific coastal highway in El Salvador will emphasize developments in the structure and functioning of marketing institutions following the building of the highway, which opened up new agricultural land and provides road transport linkage to Guatemala and Honduras. Field work on the case will get underway in early January.

3. Transport and Soviet Development
Holland Hunter and Alan J. Abouchar

This study is an attempt to analyze the results of Soviet emphasis on minimizing transport investment during the 1930's. The analysis is based on the use of existing figures of Soviet regional production of 1927-28, 1933, and 1937.

The official Soviet production goals will be taken as given, and the analysis will try to determine whether a different mix of regional investments (and thus different transport investments) could have produced a higher output of all goods and services. In order to make workable models of Soviet regional production, a number of simplifying assumptions must be made, but it is hoped that the results of the calculations will be realistic enough to allow comparisons with actual production.

The results of this project will contribute to the analysis of the general problem of optimizing the amount and the timing of transport investments in a developing economy.

4. Structure and Requirements of the Transport Network of Syria
Nuhad J. Kanaan

The study will analyze the structure of the transport network of the forty-two districts of Syria. It seeks to determine the transport demands of each of the districts on the basis of population distribution, agricultural productivity, physical characteristics, and movements of export, import and transit goods. It will also relate the present structure to transport demands and indicate where imbalance exists between transport supply and potential transport demand.

The field work for this project was completed during the summer and early fall. The analytical portion is currently underway and a manuscript is in preparation.

5. Government Controls on Transport.
Edwin T. Haefele

The purpose of this study is to examine the economic effects of various governmental policies in the transport area. At present attention is being focused on Central and East Africa and on pricing policies of existing railways.

One such case deals with the pricing policies of both government-owned and private railways which serve the copper-mining areas of N. Rhodesia and the Katanga province of the Congo. Four rail lines serve the area and each has excess capacity. The central question under examination is two-fold: What is a rational rate policy from each country's standpoint? What is rational from a regional viewpoint? These questions are thrown into sharp relief by the present proposal for a fifth rail line into the area.

The second case is an examination of the economic effects of a long standing rate policy in the Congo for agricultural products. Under this policy the transport rate fluctuates in response to world price changes for the commodity, giving, in effect, a system of income stabilization for agricultural producers.

Field work in London and Brussels has been completed and a visit to Africa is scheduled for the spring of 1964.

6. Other Research Activities at Brookings.

The project on Transport Implications of Latin American Economic Integration is scheduled to get underway in February 1964 when Robert Brown joins the staff.

Additional case study work will be undertaken beginning in January under the direction of George Wilson.

Gary Fromm is presently editing a series of essays produced for the Harvard Transport Seminar. The papers include: "Introduction: The Nature of the Transportation and Economic Development Investment Decision," Gary Fromm, Brookings; "The Objectives of Transportation in Economic Development," Hans Heymann, Rand Corporation; "The Economic Characteristics of the Transportation Industries," Richard B. Heflebower, Northwestern University; "Transportation and Technological Change," Wilfred Owen, Brookings; "Optimal Transportation Investment and the Dynamic Growth Process," Louis Lefeber, M.I.T.; "Transportation in the Economic Development Process: The Case of the Soviet Union," Holland Hunter, Haverford College; "Economic Policy for Regional Development: An Efficiency Approach," Mitchell Harwitz, Northwestern University; "Criteria for Designing the Transport Sector in an Economic Development Plan," John Kaufmann, AID; "Economic Evaluation of Transport Projects in Underdeveloped Countries: Theory and Application," Hans Adler, IBRD; "Pricing and Relative Rates for Transport Services: Normative Prescriptions for Underdeveloped Countries," James R. Nelson, Amherst College; "Financing Transport Investment in Underdeveloped Countries," Robert Sadove, IBRD; "Transportation Planning and the Railroad Decision: The Case of Chile," Robert T. Brown, University of Chile.

B. Research at Other Institutions.

1. Evaluation of Administrative Recommendations in Transport Made by Granting/Lending Agencies
John Lindeman, Syracuse University

The purpose of this project is to analyze the expert recommendations made by study groups (or individual experts) in connection with the administration of transportation in underdeveloped countries. The project was activated on June 2, 1963; however, some preliminary work was done prior to that date.

The first necessary step was to gather data with respect to such expert recommendations. Such published data have now been assembled for some 30 countries. These published reports are now being abstracted and cross-referenced for later comparative analysis. It is considered essential that an analysis of a number of unpublished reports should be made before final conclusions are reached.

Steps have been taken to coordinate research on this project with research on related projects, particularly the Brookings Staff Project on Transport Investment Criteria for Developing Countries, in order to minimize duplication of effort and to maximize mutual reinforcement of the projects.

Two special studies have already been commissioned for intensive study of this problem in a single country or region. One of these is in Colombia; it is being undertaken by the Escuela de Administracion y Fianazas at Medellin under the personal direction of Dr. Alberto Misa, Director of the Escuela. The second will deal with transportation administration and organization in the East African countries of Tanganyika, Kenya, and Uganda; Dr. Peter Gould, Professor of Geography at Pennsylvania State University is in charge of this. It is anticipated that four more such studies will be commissioned. Negotiations are now underway to make appropriate arrangements for Ceylon and Pakistan.

2. Harvard Transport Research Program
John R. Meyer, Harvard University
Martin Wohl, Brookings Institution

The Graduate Seminar which is being conducted as part of this program is continuing into its third month. The prime objectives are to define the role of transportation in economic development, and to prescribe the framework for transportation decision-making in underdeveloped countries. The seminar commenced with a review and presentation of pricing principles, including discussions of the general theory of second best, peak-load pricing, and marginal-cost pricing. Following this, attention was devoted to capital budget theory and to the principal techniques for economic evaluation (rate of return, benefit-cost ratios, and net present value). The discussion was then extended to consideration of benefit measurements, including, of course, the topic of consumer surplus, along with some notation of the interrelationships between benefit, price, and capital investment.

Given an economic framework within which various transport systems can be evaluated, attention then proceeded to a description of physical characteristics of transport technology, of the interrelationship between physical system components and between system design and operation. Particular emphasis is being placed on a detailing of the specific capacity and performance capabilities and technical requirements for various combinations of vehicles, types of right of way, power plants, control and guidance mechanisms, and the economic trade-offs between different choices in these matters.

The seminar program is to provide both students and staff with the requisite skills to undertake independent research, either on specific underdeveloped country transport situations, or, preferably, on appropriate conceptual topics. Topics already chosen and being investigated include: Urban Industrial Locational Pattern Trade-Offs; Specification and Engineering Design and Operating Standards for Urban Transportation Technologies in Underdeveloped Countries; Regional Locational Implications for Transportation (in India).

A brief search and review is also being made of the transportation planning and programming studies conducted in many underdeveloped countries.

3. Case Studies on African City-Hinterland Development

Leon N. Moses and Mitchell Harwitz, Northwestern University

The rapid rate of urbanization accompanying economic growth has been a striking feature of economic development in Africa. In order to better understand the nature and causes of this urbanization and its attendant problems, a case study of Accra, Ghana and its hinterland has been undertaken. In particular, we are concerned with the effects and potential effects of transportation investment on development in Ghana.

The work thus far has largely been divided into individual projects. Continuing seminar discussions have served to coordinate the work and also as a locus for presentations by visitors. This report will outline some of the specific projects being carried out by the staff.

A. Migration and Education

This project began an attempt to find the effects of migration to Accra on social overhead costs. It had been suggested that these costs were considerably higher in the city and not adequately accounted for in private (or for that matter in social) investment plans.

Using census figures and available wage data, an estimate of the private profitability of educational investment is being constructed. Social profitability will be estimated using government budget and expenditure data. Unemployment rates appear to be high among the educated and are of clear importance in this calculation.

A detailed statistical study of migration and settlement in Accra has provided measures of isolation, relative education, and unemployment levels for different migrant tribes.

B. Descriptive Material on the Transportation System.

A description of the historical and current state of the Ghanaian transportation system has been prepared. Particular reference is made to the connections between development in agricultural exports and extensions of the transport network. A bibliography has been prepared to accompany the historical notes.

C. Cocoa and the Cocoa Marketing Board

Cocoa has long been the primary export product of Ghana. Ghana produces about one-half of the world's supply of cocoa. The importance of the crop makes it imperative that it be studied in connection with any development analysis. Its importance as an export is particularly relevant since

to date almost all building materials and machinery have had to be imported. Accordingly, an industrial organization study of the world cocoa market has been completed. A study of the internal collection network for cocoa is underway.

D. Role of the Agricultural Hinterland in Economic Development

The initial phase of this study was devoted to assembling the statistical data needed to provide an adequate picture of the agricultural hinterland of Accra. Examination of commodity-flow data revealed that the entire agricultural economy of Ghana must be considered part of the hinterland of Accra. As a result, the second stage of the study consisted of attempts to gather statistical material on (a) the internal economic structure and level of economic activity of supplying regions; and (b) the volume and value of commodity movements between hinterland regions and Accra. A major difficulty has been that regional data on agricultural outputs are available only for 1950. Regional income data have not been published so far as we are aware. Presently, attempts are being made to devise measurable surrogates for the desired data. A second major emphasis lies on the development of models of the agriculture sector that seem more applicable than those now available in the development literature.

E. Cost of Social Overhead Capital and the Effects of its Construction: Volta River - Tema

The construction of the Volta River project and the concomitant development of Tema as a harbor and city are expected to provide data on the cost of social overhead facilities. This will provide measures of the difference between private and social costs of labor. Also, it may be possible to derive some information on the relation of this expenditure to the magnitude and profitability of certain investments in the private sector.

F. Urbanization and Demand

Material provided by budget studies has allowed the calculation of expenditure elasticities of demand for eight categories of final goods. These will be used in computing the effects of urbanization on demand.

G. Theoretical Analyses of Transportation Costs and Internal and External Trade.

Several staff members are engaged in the construction of several relatively simple models designed to show the qualitative effects on the internal equilibrium of the agricultural sector of various changes in the costs of transportation. Also envisioned are more complex models designed to consider the effects of these changes on labor movements.

New Projects

The following new projects have been approved by the Advisory Committee and submitted to the Executive Committee of Brookings:

1. Financing of Transport in Underdeveloped Countries
   Sam Weiner, Brookings Institution

This research is designed to furnish the background for a conference on transport finance to be held in the fall of 1964. The nature of the inquiry is to determine how underdeveloped countries can finance needed transport networks, and so do with the most desirable effects from the standpoint of development. Consequently, the focus will be on two central issues: (1) What financing arrangements can most efficiently provide the transport necessary for development? (2) What effect will the financing of transportation have on the general level of economic development?

For a variety of reasons, the prices charged for transport may not cover the total cost of the service. Where a deficit arises, two other sources of support for the transport sector must be examined: (1) General tax sources, public and private; and (2) various categories of foreign finance. The transport sector must compete with other sectors of the economy for a share of these funds. A simple growth model may be developed to give us at least an indication of the magnitude of the impact that could be expected from the allocation of these financial resources, given some predetermined level of self support for the transport sector.

Data will be obtained largely from survey reports made by IBRD, A.I.D., and the United Nations. Some field work may also be necessary. Countries to be included are Brazil, Bolivia, Mexico, Puerto Rico, Venezuela, Nigeria, Iran, Pakistan, The Philippines, Ghana, The Union of South Africa, Turkey, Israel, Tunisia, Greece, Peru, Afghanistan, Colombia, Spain. These examples were selected to reflect the diversity of institutions, resource configurations, and methods of economic planning.

2. Programming for Transportation in Economic Development
Clell G. Harral, Brookings Institution

This study will investigate problems of planning for transportation improvements in developing countries. Planning for economic development involves the allocation to optimal use of each available scarce resource. The investment problem which the economic planner must consider in the transport sector, as in all other producing sectors, involves two parts -- the inter-sectoral allocation of limited funds between transport and other sectors, and the intra-sectoral allocation of transport funds among the alternative transport media.

A logical tool for such analysis is the framework of inter-industry analysis developed in recent years. It is hoped that inter-industry, inter-regional programming models may afford assistance in both aspects of the investment problem, through a case-by-case application and also through generalized conclusions with broader application. The initial phase of the study will be a survey of the use of formal programming models in current transportation research and development planning. This review should suggest fruitful avenues of exploration, plausible techniques and analytical structures. The emphasis of the study will be on the development of techniques for actual application, which means that the proposals must meet the dual criteria of being useful in solving relevant problems and usable in the sense of posing reasonable demands on time, personnel, and cost for their application.

It will be one of the main tasks of the project to examine the assumptions made and to judge their realism by assessing the restrictions they place on the usefulness of the model. The data problem will be one of the prime elements of this part of the project. Specification of the data requirements of the model and comparison and reconciliation of these with the data likely to be available will be of central importance.

A case study or studies of sufficient scale and depth will serve to demonstrate the application of the methods developed, indicating the range and scope of their usefulness and the problems involved. One possibility for such a study is Nigeria. The data for this country are somewhat better than those for other countries, including an overall economic plan and independent studies of the transport system.

3. Case Studies of Highway Improvement in Malaya
William Hughes, University of Malaya

This project augments the case study program in Latin America by providing evaluations of the developmental impact of four highways in Malaya. Experience to date indicates that case studies are a fruitful approach to a better understanding of the relation between transport investments and their economic impact. It is desirable that the seven Latin American studies now nearing completion be supplemented to provide a wider range of experience. In addition, there is promising potential in using the resources of a local university abroad as a means of conducting field operations.

Objectives of the four case studies are as follows: (a) To determine changes in economic and social development which have taken place as a result of recent highway developments in Malaya; (b) to determine the primary and secondary benefits which have resulted, or are likely to result, from the costs incurred, and (c) to seek guides for criteria to be used in judging the desirability of highway programs as an aid to economic development.

Methods of research will include sample surveys by questionnaires designed after preliminary discussions with officials in the areas of the projects and with State and Federal officials. Economics students at the University of Malaya will complete the questionnaires through field investigations. Other valuable material exists in the form of detailed description of projects prepared by district and state officials. The proposed projects were selected on the basis of this information.

Roads included in the study are Song Sang to Jerantut (30 miles of narrow track converted to latterite surface); Dong to Ulu (20 miles converted from jungle track to latterite surface); Kuala Dungun to Bukit Besi (21 miles of track converted to a latterite road); and a new highway from Hutan to Sabak (4 1/2 miles); plus a section from Sabak to Tanjong (40 miles) which has been improved from latterite to hardtop.

Among the major areas of inquiry will be:

a. Cost reductions achieved because of the new or improved highways, including reduction in transport cost, retail and wholesale price reductions, changes in inventory and storage costs, and reductions in spoilage.

b. Income benefits arising from new or improved highways, including increased receipts of growers, land areas under cultivation, improvements to land through reclamation and irrigation, and establishment of new industries.

c. Other impacts to be included are the effect on employment, labor mobility, school attendance, quality of education, and changes in social and cultural activities.

4. Transport Technology
Martin Wohl

One of the key transportation problems for the less developed countries is to determine the economic usefulness of the various technologies to provide the transport facilities which are essential for development. Much is heard about the "new" technologies in transportation, but there has been little systematic effort to evaluate the practicability for possible use in the developing countries. The purpose of this project is to provide a basis for determining the selection of technologies which are appropriate to the tasks to be performed, the resources available, and the peculiar environments that will be encountered.

The initial step in this project will be to classify the various technological possibilities for moving freight and passengers, both existing and potential, and to specify in at least a general way the conditions under which alternative methods are most feasible. To do this it will be necessary to know the ways in which cost and performance are affected by the physical environment as well as the effects of various economic, social, and political factors on the usefulness of particular technologies.

Since it will be possible to develop the cost, demand, and investment functions only for limited situations, it may be most useful to study two hypothetical "developing country" cases: (1) A predominantly rural population with high population density; almost exclusively an agricultural economy; and low tropical plain topography, dominated by river systems; and (2) low population density, and high urban concentrations with a range of geography consisting of highlands, plains, and lowlands. These cases would serve much the same purpose as the "simulated river basin" model did in the Harvard Water Resources Seminar.

This research will make use of advanced analytical techniques for the analysis. Simulation models, for example, will be used to examine the consequences of various economic, demographic, or geographic factors, and, more importantly, the technological possibilities. With regard to the latter, the full range of old and new technological possibilities will be investigated. For example, it may be more effective in underdeveloped countries to turn to transport devices of lesser performance capability or lesser sophisticated design than is now being used in more advanced countries — that is, to move back a generation as well as forward. The systems to be examined will include wider use of air cargo and containerized-integrated road-rail systems, which are receiving intensive study by the Army. Hydrofoils, ground effect machines, and other recent innovations will also be included in the analysis.

Meetings with A.I.D. and Other Agencies

Latin American Case Studies

As a part of planning the case studies, meetings were held with the following:

Atlantico Railway, Colombia: Vincent Hogg, Arthur Wubnig, IBRD; Robert B. Keating, AID; John Sheahan, Williams College; Richard Weisskoff, Student.

Atlantic Highway, Guatemala: Raymond C. Brisach, HRSD, Lloyd Barber, ROCAP, Hyde Buller, Program Coordination, Manuel Caballo, Program Planning, Grover Kincaid, Guatemala Desk, Robert B. Keating, AID.

Tejerias-Valencia Highway, Venezuela: Fitzhugh McRee, Engineer, Ralph Workinger, Venezuela Desk, Robert B. Keating, AID; Paul Richers, OAS.

Possible Argentina Case Study: J. Nepple, Argentina Desk, Joel Sterns, Latin American Development Planning, AID.

Air Cargo, Colombia: Charles N. Johnson, Colombia Desk, Robert Keating, AID; Paul Richers, OAS; William E. Knight, Department of State, Office of Aviation Affairs.

Cochabamba-Santa Cruz Highway, Bolivia: Fitzhugh McRee, Engineer, Stafford Mouski, Bolivia Desk, AID.

Possible Brazil Case Study: Raymond C. Brisach, S. J. Gionfriddo, Robert B. Keating, AID; R. H. Crave, Department of State, Office of Brazilian Affairs.

Litoral Highway, El Salvador: Arthur H. Furnia, Office of Central America and Panama Affairs, Richard Herr, Office of Central America and Panama Affairs, Raymond C. Brisach, HRSD, AID.

Possible Ecuador Case Study: D. B. Johnson, Capital Development, Robert B. Keating, AID.

Transport Investment Criteria

Meetings have been held with the following persons as a part of getting general guidance and specific information on past studies:

International Bank for Reconstruction and Development: Hendrik van Helden, Hans Adler, Michael Sapir, Samuel Lipkowitz, Arthur Wubnig,

George Baldwin, Dragoslav Avramovic, John H. Adler, Kenneth Iverson, K. S. Gizbert, E. K. Hawkins, G. Main, J. A. McCunniff, Herman van der Tak, David Holland, Robert Sadove.

Inter-American Development Bank: Lincoln Sandelin, Robert Sharood.

Agency for International Development: J. Bach, AFE/CDF, Joel Bergsman, PC/PAD, H. M. Bixby, NESA, Lloyd Black, AFE/DP, Raymond C. Brisach, HRSD, Philip Golden, AA/DFPE, Lucius M. Hale, ENGR, Robert B. Keating, HRSD, John G. Lightfoot, AFE/CDF/ENGR, Voyce Mack, NESA/Planning, Thomas Olmsted, FE/DP, William F. Small, FE/BTR, Henry P. Waegelein, NESA/TECH, Arthur A. Wichmann, FE/DP, J. Ashby Williams, Jr., FE/ENGR, Stephen Christmas, Richard Fishman, I.A. Heyman, A. Strout.

Other Agencies: L. Barker, B. Witzig, Army Corps of Engineers; C. N. Aldrich, H. Dean Fravel, Jr., Bureau of Public Roads; W. Welk, Export-Import Bank.

Assistance to AID on Specific Projects

In providing assistance to A.I.D. on country problems, meetings were held with the following people:

Sudan: John B. Stabler, E. D. Conroy, Stephen Klein, AID; Nathan Associates: Franz Wolfe, Donald Brown, Edward Unger; J. A. McCunniff, D. Davis, Frank Lowenstein, IBRD; J. Lewis, Charles Marble, Bureau of Public Roads; Thomas Hardy, Federal Maritime Administration.

Burma: James Fowler, William E. Small, Fred T. Rogers, Donald P. Barnes, Louis A. Cohen, AID; Edward Espenshade, Northwestern University; Leonard Fischman, Economic Consultant; M. Hla, IBRD.

Tanganyika: Miss Carson, AID; Battelle Institute: K. P. Rahbany, W. L. Fishel.

Nigeria: Charles Nelson, Barry Galvin, AID.

Central America: Jack U. Mowll, Transportation Consultants, Inc., AID.

Turkish-Iranian Railway: Ralph Rechel, Economic Consultant, AID.

Miscellaneous

In addition, a number of general exploratory meetings were held. Participants included:

AID

Clay Ballinger, Capital Development and Finance for Africa-Europe
Raymond C. Brisach, HRSD
John Canning, Africa-Far East Desk
Lloyd Black, Development Planning Bureau for Africa
Robert Black, Western Africa Affairs
Robert B. Keating, HRSD
Edward Marks, Central Africa Affairs
Philip Golden
Peter J. Davies
S. H. Chafkin, Checchi Associates

Other

Seymour Rubin, U.S. Delegate to OECD
Paul Hoffman, UN Special Fund
Clinton Rehling, UN Special Fund
Marcel Schwob, UN Special Fund
Theodore Holmes, Bureau of Public Roads
Rex Whitten, Bureau of Public Roads
Ben Chinitz, Consultant to Area Redevelopment Agency
Frank Loye, Federal Aviation Agency
Col. Hovsepian, Army Corps of Engineers

Overseas Meetings

In conjunction with his trip to Bangkok, Mr. Owen also held the following meetings:

September 23-27

Meetings in Bangkok on transport problems in ECAFE region with AID, ECAFE, and others. Included were discussions with Dr. Prasad, Director of the Asian Institute for Economic Development; Hylke Halbertsma, Deputy Director for Transport, ECAFE; Alan Walters, University of Birmingham, England; Professor Kobe, Waseda University; H.D. Fong, Kitamura.

October 11

Air Marshal Tawee and associates, concerning the community aid program being carried out by the Mobile Development Units of the Thai Government.

October 12

Meeting with Professor John Hugh Jones, SEATO, and Wisit Kasiraksa re case studies of Friendship and East-West Highways.

October 18

Meeting with Harvard Advisory Group, Dacca, East Pakistan, on transport aspects of Third Five-Year Plan. Leon Mears, Les Burgess, James Hendry, Edward Cooper, Richard Patten. Also Vander Oord and Jan Koopman, United Nations Advisors.

October 21

Meetings with AID, Dacca, East Pakistan, concerning proposed international study of transport requirements. George Garow, Provincial Director and Ted Owens, Program Director, AID; Leon Mears and Edward Cooper, Harvard Advisory Group.

October 23

Meeting in New Delhi on transport aspects of Indian Fourth Five-Year Plan. Tarlok Singh, member of the Planning Commission; K. L. Luthra, Director of Transport Division.

October 24

Meetings in New Delhi on Indian transport problems with Douglas Ensminger and Mort Grossman, Ford Foundation; Dr. P. S. Lokanathan and Messrs. Saggar and Narayanaswamy, Council on Applied Economic Research; Dale Hekeis, Indian Coal Study.

October 25

Meeting with John Fobes, Deputy Director of AID, New Delhi.

October 28

Meetings in Karachi with Pakistan Planning Commission and Harvard Advisory Group concerning transport work of the Planning Commission. E. A. Kahn, Deputy Director of Transport and Communications Section; Wouter Tims and Asbjörn Bergan, Harvard; Professor M. N. Huda, member of the Planning Commission; Tom Power, UN; Hansen, Ford Foundation.

October 30

Meeting with AID, Karachi concerning transport program in Pakistan, AID Director Donald McDonald; Maurice Williams, Deputy; Herbert Rees, Assistant Director for Development Planning; William Hayes, Assistant Director for Capital Projects.

October 31

Economic Commission for Africa, Peter Okondo, Director of Transport and Communications.

November 1

William Wilde, Jr., Director, AID, Nairobi.

November 7

Raymond Goldsmith, Deputy Director, Development Center, OECD, Paris.

Staff and Committee Membership

Senior Staff

Wilfred Owen
Edwin T. Haefele
Gary Fromm
Charles J. Stokes
Tillo E. Kuhn
*Robert T. Brown
Martin Wohl
*George W. Wilson

Research Associates

Mathew J. Betz (summer 1963)
Clell G. Harral
Samuel Weiner

Consultant

Grace W. Finne

Research Assistants

Alan J. Abouchar
Inai Bradfield
Eleanor B. Steinberg
James Craig (summer 1963)
Antonio Casas
Nuhad J. Kanaan

Administrative Assistant

Edna Lusher

Secretaries

Joan Canzanelli
Marion N. Anderson
Florence S. Williams

Associated Staff

Holland Hunter
Haverford College
Syracuse University
John Lindeman
Irving Swerdlow
Harvard University
John R. Meyer
Benjamin Cohen
Leon M. Cole
Armando Lago
Charles B. Warden, Jr.
Richard Weisskoff
Northwestern University
Leon Moses
Mitchell Harwitz
Ralph Beals
R. W. Clower
Andrew J. Gold
Michael Greenwood
Hyman Joseph
David Kaufman
Mildred Levy
Dennis C. McElrath
Carmen Menezes
Ray Ruffin, Jr.
Barbara R. Berman
Brandeis University
John F. McCamant
University of Washington
Martin S. Klein
United Research, Inc.
William P. McGreevey
Mass. Inst. of Tech.
Leon V. Hirsch
United Research, Inc.
Roger C. Van Tassel
Clark University
Joseph R. Hartley
Indiana University

* Scheduled to join staff after January 1, 1964

Advisory Committee

Carl F. Christ	The Johns Hopkins University
Holland Hunter	Haverford College
Louis Lefeber	Massachusetts Institute of Technology
Edward S. Mason	Harvard University
Harvey S. Perloff	Resources for the Future, Inc. (on leave Organization of American States, Committee of Nine)
Lloyd G. Reynolds	Yale University
Robert Sadove	International Bank for Reconstruction and Development
(ex officio)	
David Tilson	Agency for International Development
Joseph Weyl	Agency for International Development
Robert B. Keating	Agency for International Development