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RECENT MATERIAL FROM THE U.S.S.R.
ON SETTLEMENT SYSTEMS
AND URBAN GROWTH

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WP-74-40

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RECENT MATERIAL FROM THE U.S.S.R. ON SETTLEMENT SYSTEMS AND URBAN GROWTH

Comparative assessment of the state of the art of national settlement strategies and urban policies, together with their theoretical and methodological underpinnings is one of the early objectives of IIASA's Urban and Regional Systems project.

Recent literature was requested and received from a number of Soviet institutions. The following contains abstracts of specific articles and an appendix listing tables of contents translated by O.V. Kudinov, with the editorial assistance of K. McCusker.

I. Fundamental Marxist-Leninist Population Theory

"Population Science: Its Methodological Principles"
(D.J. Valentey and Y.N. Kosirev, 1966)

The question posed by these authors concerns the urgency of creating a new body of science that will deal with population problems. Although their response is affirmative, they suggest that it will take some time before the methodologies from various branches of science can be arranged for this purpose.

Both authors realize the need for a comprehensive demographic study and admit its inherently complex and interdisciplinary character. However, each maintains

his own point of view on the subject of investigative methods for population studies.

Dr. Valentey suggests that the new science study the living and working conditions of the population at various stages of human development. Dr. Kosirev prefers a more general scheme: to study the overall activity--activity rather than conditions--and social relationships, cooperation, within communities. The authors are convinced of the importance of presenting different approaches for subsequent work.

Then follows a critique of the biological approach to population theory whereby in the pursuit of population control, national traditions and social conditions are disregarded. In this connection they refer to papers delivered by sociologists, economists, and demographers at various conferences on population problems. (International Congress on Population Problems, Rome, 1954, Vienna, 1959, Belgrade, 1965; Session of the American Biological Institute, University of Maryland, 1966.)

* * *

"Critique of Bourgeois Population Theories and Their Methodological Principles" (B.V. Smulevitch, 1966)

In this work the author points out some of the fallacies of the bourgeois approach to demography. Its basic methodology yields valuable results regarding the relation of population data (birth rate, fertility, mortality) to certain socio-economic factors. But the author is concerned with the general invalidity of its

conceptual assumptions and hence theoretical conclusions. He emphasizes that its theoretical approach to population problems treats social and biological phenomena inconclusively.

On the other hand, Marxist population theory stresses the determination of reproductive patterns by living conditions. The assumption is that population and reproduction dynamics are direct results of social factors.

The author finds fault with the Western approach that includes Malthusianist theories (population growth as a factor of poverty, unemployment, and wars) demographic variations of "welfare state" and "universal industrial society" concepts of A. Sauvy, the reproduction dynamics hypotheses of Spencer, Perl, and Gini.

II. Theory and Methods for a Geographical Perspective on Human Ecology

"An Ecological Evaluation of the Location of Large Cities."
(Z.V. Maximova and P.A. Frumkin, 1974)

This article suggests a strong relationship between environmental conditions and the location of cities of more than a hundred thousand inhabitants. The authors point out that 89 percent of the world's largest cities are located in the Northern Hemisphere, with the Southern Hemisphere containing the remaining 11 percent. (See Tables 1 and 2.)

The greater urbanization, and higher level of rural-urban migration in recent decades, in the Northern

PERCENT OF NATIONAL POPULATION
INHABITING CITIES \geq 100,000

COUNTRY	PER CENT	COUNTRY	PER CENT
AFGHANISTAN	4.4	JAPAN	48.2
ANGOLA	5.2	JORDAN	20.3
ARGENTINIA	38.7	LEBANON	20.6
AUSTRIA	31.3	MALAYSIA	8.2
BURMA	3.7	MALI	3.7
BOLIVIA	16.8	MOROCCO	19.7
BRAZIL	28.1	MEXICO	23.6
CAMERUN	5.2	NETHERLANDS	29.9
CHINA	8.9	NICARAGUA	14.9
EL SALVADOR	9.6	NIGERIA	8.7
ETHIOPIA	3.6	POLAND	22.4
FRANCE	18.2	SWEDEN	20.6
F.R.G.	29.5	U.A.R.	26.3
GHANA	13.9	U.K.	40.3
GREECE	12.2	USSR	31.2
INDIA	9.4	YUGOSLAVIA	11.4
ITALY	27.9	ZAIRE	9.5

TABLE 1

WORLD CITIES OF OVER 100,000

LATITUDE ALTITUDE	NORTHERN HEMISPHERE										SOUTHERN HEMISPHERE								TOTAL					
	69-65°	64-60°	59-55°	54-50°	49-45°	44-40°	39-35°	34-30°	29-25°	24-20°	19-15°	14-10°	09-05°	04-00°	00-04°	05-09°	10-14°	15-19°		20-24°	25-29°	30-34°	35-39°	40-44°
in meters																								
0 - 200	2	10	57	185	109	124	152	147	55	61	22	36	31	9	15	23	5	2	12	7	28	7	3	1102
201 - 500	—	—	8	40	44	52	33	23	21	8	5	11	18	4	2	—	1	2	—	1	1	—	—	274
501 - 1000	—	—	—	6	9	21	15	14	3	8	7	7	1	4	—	5	—	7	19	4	3	1	—	134
1001 - 1500	—	—	—	1	1	5	9	3	5	1	1	1	4	3	—	—	4	4	2	4	—	—	—	48
1501 - 2000	—	—	—	—	—	1	5	6	2	6	2	1	1	1	1	—	—	—	—	7	—	—	—	33
2001 - 2500	—	—	—	—	—	—	1	—	—	—	3	—	1	—	—	—	—	—	—	—	—	—	—	5
over 2500	—	—	—	—	—	—	—	—	—	—	1	—	—	1	1	—	1	3	—	—	—	—	—	7
TOTAL	2	10	65	232	163	203	215	193	86	84	41	56	56	22	19	28	11	18	33	23	32	8	3	1603

TABLE 2

Hemisphere can be attributed to various factors. The fact that a large percentage of the population of developed countries resides in large cities, (viz. United Kingdom, Austria, the Netherlands and the Federal Republic of Germany), while less than 10 percent in developing countries live in cities of more than a hundred thousand, suggests that level of economic development certainly affects urban population growth. Besides containing a far larger area of Earth's habitable land, a complex of natural conditions make the Northern Hemisphere more suitable to human activity and comfort.

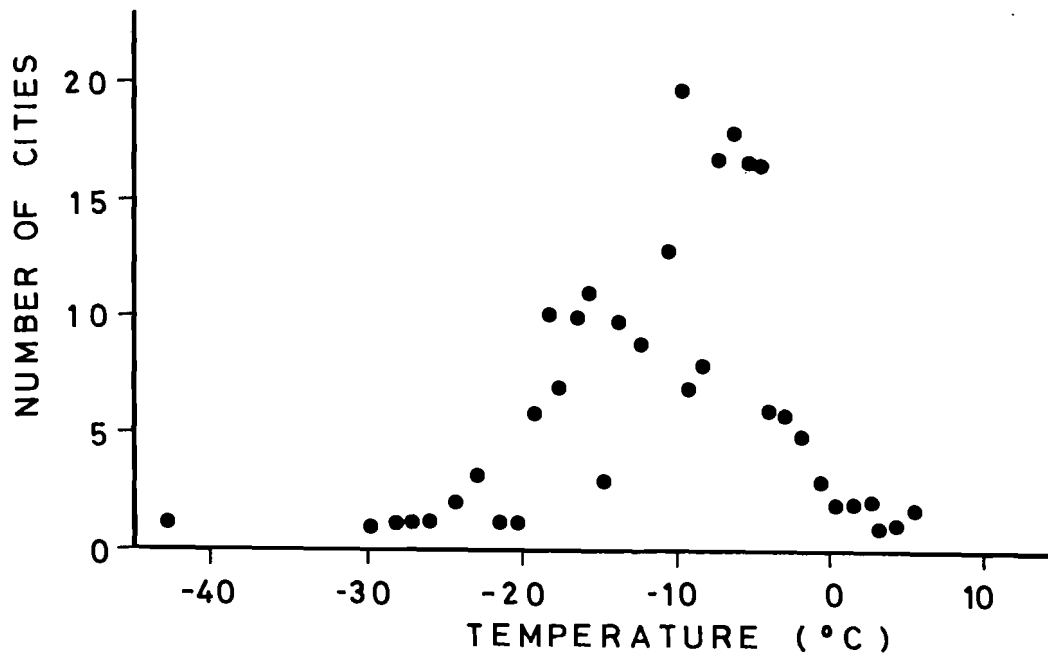
Lower expenditures on infrastructure construction for one, determine the inverse relationship between altitude and urban area; two-thirds of world cities are located in plains and lowlands. (See Table 2.)

The influence of average monthly temperature on the location of Soviet cities was studied for the extreme months of the year. In 80 percent (176 out of 221) of the cases average monthly temperature is no lower than -15°C . and in 71 percent the highest temperatures range between 17.5 and 23.5 C. (See Table 3.)

Although the authors concede the difficulty of finding statistically significant evidence linking urban population growth and air temperature, there is obviously a connection between the two.

PLOT OF SOVIET CITIES ACCORDING TO SEASONAL TEMPERATURES

a.) COLD MONTHS



b.) WARM MONTHS

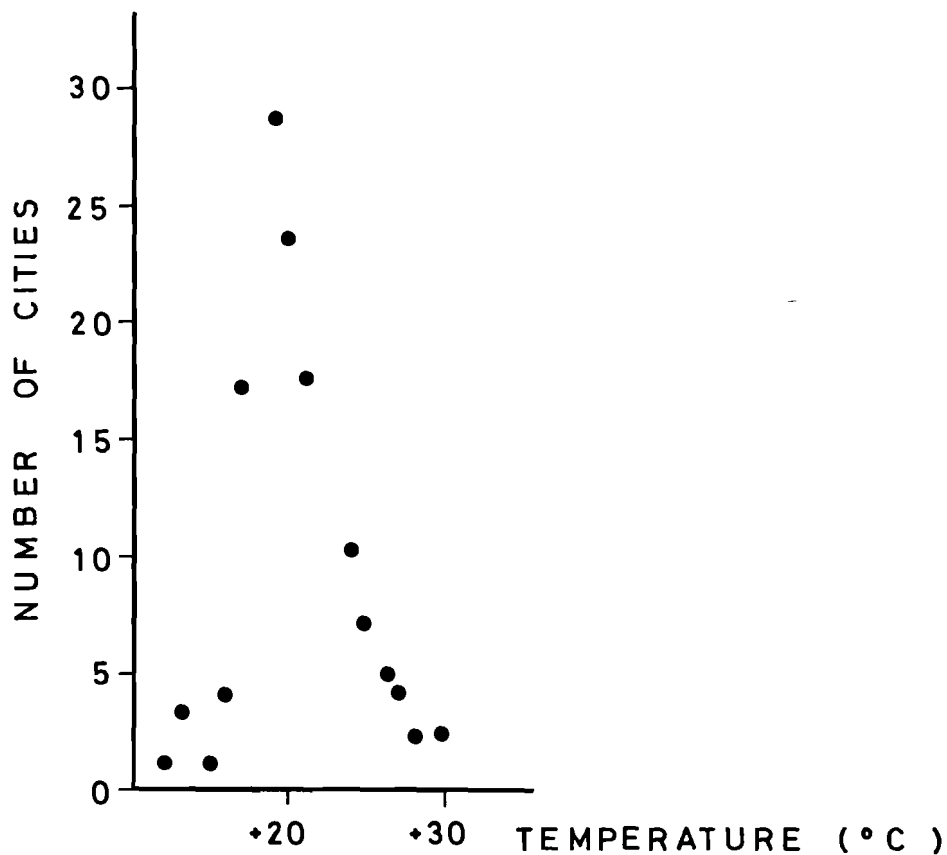


TABLE 3

III. Regional Planning and Population Distribution Problems

"General Scheme of Productive Forces Distribution as a Basis for Comprehensive Regional Planning Projects." (A.E. Probst, 1973)

As a prerequisite for regional planning, this major document posits ways and means to raise labor productivity on the basis of a rational distribution of productive forces. The general scheme takes into account all the resources available within each economic region of the individual Union Republics and suggests their development potential.

The scheme for the distribution of productive forces gives impact to the demographic aspects, age, and sex distribution of labor. Future migration processes, e.g. the settlement of scarcely populated areas, constitutes a vital factor in forecasting regional levels of labor quality and a balanced population distribution.

Suggested improvements in the location pattern of public production include the latest technology. Potential extraction of natural resources, measured by technological and economic indicators, suggest regional development priorities.

The author emphasizes that regional projects must dovetail with the overall plan. Additional data needed for comprehensive regional projects must come from the individual republics. Demographic and labor analyses require further elaboration.

"Optimization problems in Regional Planning Projects on the Basis of a Combination of Traditional and New Methods." (E.N. Pertsik, 1973)

The author states the need for improvement in mathematical techniques in the modelling of regional planning projects. He then goes on to discuss a hypothetical model for a comprehensive regional planning project. This would consist of several consecutive stages within the principal model and three sub-models.

The preparatory stages include the determination of objectives, 2) an acquaintance with the available information of the region and knowledge regarding the role of the region in relation to the entire system, 3) a feasibility study of the region, and 4) the delineation of the main problems, and the choice of institutions that will guide the project. Research, analysis, interpretation, evaluation, and actualization follow.

The sub-models are 1) an optimization model of administrative area, 2) an intersectoral regional planning model, and 3) an industrial cluster model.

Dr. Pertsik posits the following strategy for siting areas of development:

- 1) a preliminary analysis of present construction, architecture, and engineering factors, thus allowing for initial evaluation of all building sites,
- 2) the selection of a site using traditional point estimation evaluation methods, and

- 3) the programming and analysis of variables for optimal siting.

Dichotomies necessarily exist, the author notes, between short-term economic planning and long-range objectives of comprehensive regional planning.

Future directions in the economic application of mathematical modelling to regional plans should include:

1. A precise definition of goals, as well as applicability at different stages and in different areas, in the formulation of regional economic models.
2. A closer view of feedback relationships between territorial production complexes, urban or industrial districts, and the prospective regional plan.
3. Delineation of parameters and factor analyses at different levels of regional planning. This should include criteria to estimate such "elusive" factors as social and environmental conditions.
4. The testing of the model for its applicability to design problems, i.e. its reality.

* * *

"Ways and Means for Controlling Development of Tashkent Zone" (M.G. Zifanovskaia, Y.P. Puretsky, 1973)

The first part of the article is devoted to a general description of the planning situation of the system of settlements that make up the Tashkent conurbation.

Methods to control the development of the Tashkent area (see Figures 1, 2, and 3), include stimulation development of alternative regions in Uzbekistan order to avoid the overcrowding of the Tashkent area, and forming a planning strategy for the conurbation by evaluating land use and function.

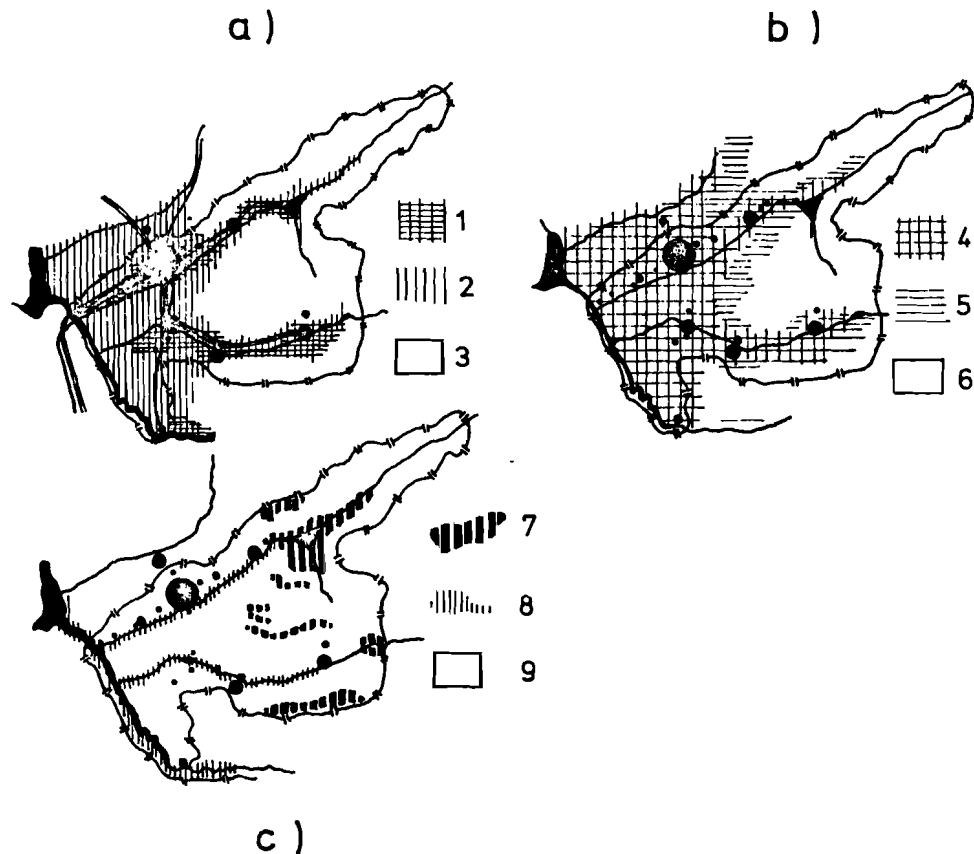
IV. Computer-aided Design in Town Planning

"Methods of Determination of Trade Zones Within Settlement Systems" (N.G. Nagiev, 1973)

In his article, the author analyses the present condition of cultural and welfare facilities in the Azerbaijan Republic, with an emphasis on the trade network of the Kirovabad conurbation. Along with the collection of statistics from planning data and field studies, questionnaires were used to elicit information.

Processing of questionnaires was done with the help of the computer "Minsk-22" and the information was used in a matrix of intersettlement trade networks. The matrix allows the processing of relevant information on computers.

COMPLEX EVALUATION OF THE TERRITORY



a) - FOR TOWN PLANNING

b) - FOR AGRICULTURE

c) - FOR RECREATIONAL PURPOSES

1 - THE MOST SUITABLE FOR TOWN PLANNING DEPENDING TO
NATURAL AND PHYSICAL PLANNING FACTORS

2 - SUITABLE FOR TOWN PLANNING ONLY DEPENDING TO NATURAL FACTORS

3 - NOT SUITABLE FOR TOWN PLANNING

4 - SUITABLE FOR ARTIFICIAL IRRIGATION

5 - SUITABLE FOR AGRICULTURE AND HORTICULTURE

6 - NOT SUITABLE FOR AGRICULTURE

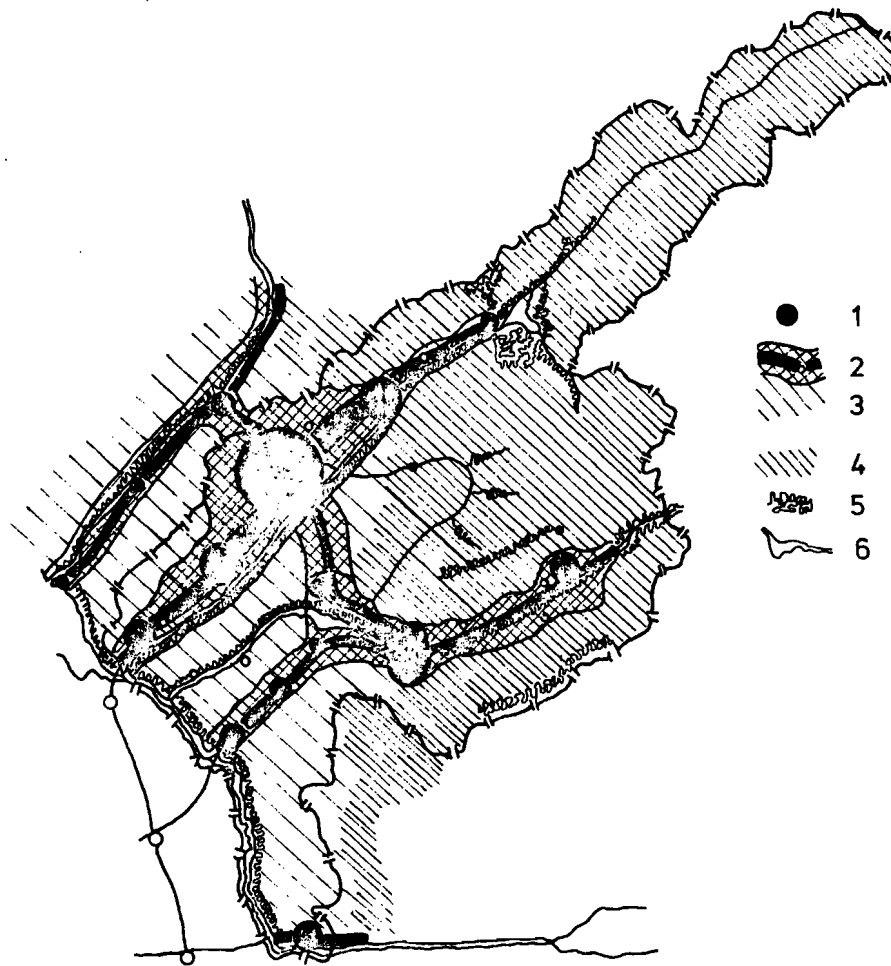
7 - THE MOST SUITABLE FOR RECREATION ZONES

8 - SUITABLE FOR RECREATION ZONES AFTER PURIFICATION OF
RIVER WATER

9 - NOT SUITABLE FOR RECREATION ZONES

FIGURE 1

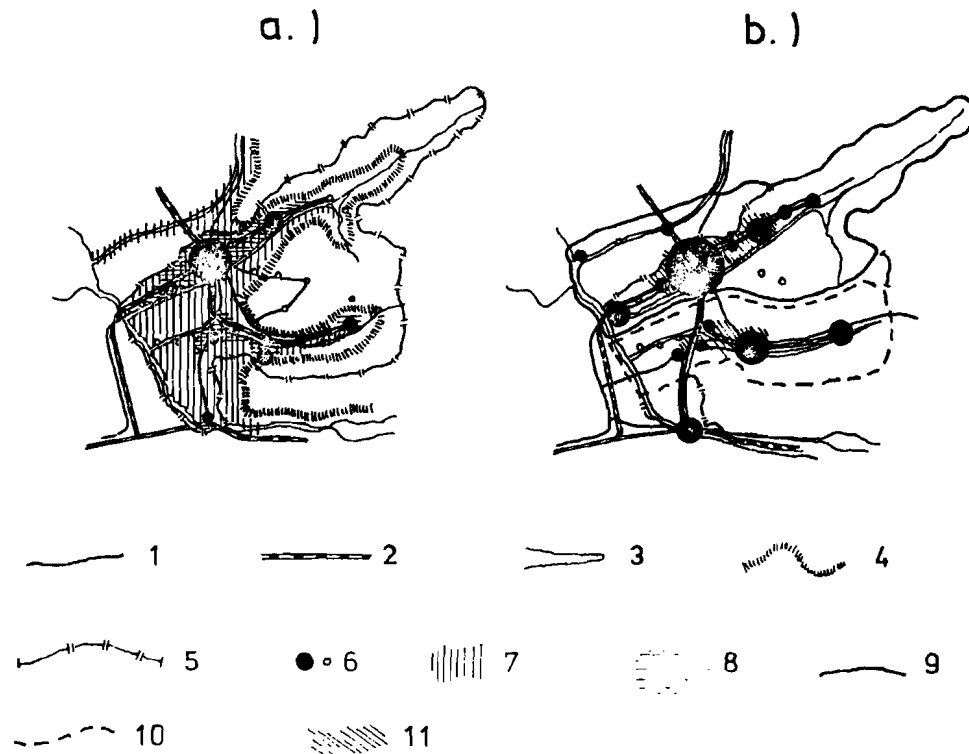
FUNCTIONAL ZONING OF THE TERRITORY



- 1 - CENTRES
- 2 - PLANNING AXES
- 3 - ZONES OF ARTIFICIAL IRRIGATION SYSTEMS WITH
BAN ON CONSTRUCTION
- 4 - FOOTHILLS AND MOUNTAIN ZONES OF HORTICULTURE,
AGRICULTURE AND FORESTS
- 5 - PUBLIC RECREATION ZONES
- 6 - RIVERS AND RESERVOIRS

FIGURE 2

POPULATION DISTRIBUTION SYSTEMS IN THE TASHKENT AREA



a.) - PRESENT DISTRIBUTION OF POPULATION

b.) - PLANNED DISTRIBUTION

- 1 - AUTOROADS
- 2 - RAILWAYS
- 3 - RIVERS AND RESERVOIRS
- 4 - BORDER OF FOOTHILLS AND MOUNTAIN ZONES
- 5 - THE BOUNDARY OF THE AREA
- 6 - SETTLEMENTS
- 7 - THE AREA UNDER ARTIFICIAL IRRIGATION
- 8 - URBANIZED ZONE
- 9 - THE BOUNDARY OF TASHKENT AND ENVIRONS
- 10 - THE BORDER OF THE ANGREN - ALMALITE AREA
- 11 - THE CENTRAL ZONES OF THE SYSTEMS

FIGURE 3

V. Application of Mathematical Methods and Computers in the Solution of Town Planning Problems.

"Model for Optimization of the planning structure of a city" (A.I. Zakhov, 1971)

Initial information for the model is the existing situation regarding the representation of all potentially suitable sites or territories for future construction. All additional information can be obtained through the relevant planning institutions. This information would consist of knowledge regarding industrial and other enterprises that must be located in a city at certain stages of its development or construction. Each enterprise or group of enterprises, as well as residential areas, central districts, and recreational zones, are considered as main elements of a city.

The author stresses that with the help of this model many important planning problems might be solved. It allows for an optimal structure on the basis of an analysis of sites available for new construction and their evaluation from the point of view of the optimization of travelling time between home and place of work, the consideration of the stages involved in erecting new industrial enterprises and residential areas, and the estimation of the number of demolished dwellings, their replacement, and the construction of new enterprises.

* * *

"Mathematical Method for Modelling the Dynamics of Urban Population Distributions" (V.V. Livshits, 1971)

This method of dynamical modelling of urban populations is based on the following propositions:

1. The study of population distribution as a dynamic system of individual processes.
2. The use of differential equations to describe the processes as they develop over time.
3. A quantitative understanding of "comfort" (discomfort) measures indicated by a parameter determining the rate and direction of demographic processes.

Thus, modelling intra-urban migration becomes feasible.

VI. Problems of Modern Urbanization

"Economic Problems of Urban Settlement Pattern Development" (A.G. Vishnersky, 1972)

A growing share of the total urban population locates in large cities which then receive the concentration of economic activity. These cities are viewed from two angles; that of efficient production processes as well as with regard to conditions for human development.

Considerable expenditures are needed for the development of large cities, costs increasing with size. Economic resources must be channelled to meet the expenditure demands of growing cities.

The author emphasizes the need for controlling the spread of large cities, suggesting that further consideration of the economic potential of the society will improve settlement patterns.

* * *

"Transport Influence upon the Spatial Development of Cities and Urban Agglomerations" (G.A. Golds)

Along with a background survey of urban growth, the influence of transportation on the spatial development of urban areas is named by studying the organization of persons into traffic lines. Quantitative correlations between urban land, journey-to-work links and speeds of transportation modes are determined. Stabilizing average transportation time will allow for analysis of time-budget aspects as well as socio-demographic composition of the population. The rate of organization processes is outlined and a description of the changes in the distribution of population densities around working places and in relation to the urban center is given.

APPENDIX

I. FUNDAMENTAL MARXIST-LENINIST POPULATION THEORY

(All-Union Symposium, Moscow, 24-26 November 1966)

Preface

Papers submitted to symposium participants
for discussion.

Valentey, D.I., and Y.N. Rosirev (Moscow)
"Population Science and its Methodological
Principles".

Esupov, N.S. (Frunze)
"About Social Society Legislation on
Population".

Smulevitch, B.Y. (Moscow)
"Criticism of Bourgeois Population Theories
and its Methodological Principles".

Plenary Meeting, November 24.

Section for Theory and Methodology of Studying
Population.

Plenary Meeting, November 26.

Final Reports.

Report on Section Discussions.

Summary Report on Papers Received by the Organizational
Committee.

Symposium Materials.

*Moskovsky Gosudarstvenny Universitet, "Voprosy Marksistsko-Leninskoy teoryy narodonaselenia," Vsesousny Simposium v Moskve, 24-26 noiabria 1966, Moskva, 1969.

APPENDIX

II. Theory and Methods for a Geographical Perspective on Human Ecology* (Institute of Geography of the USSR Academy of Sciences, Moscow, 1974)

Preface:

This collection contains papers presented for discussion to the Organizing Committee of the seminar on "Theory and Methodology for Geographical Research on Human Ecology".

The Organizing Committee has found it expedient to include in the agenda of the seminar various papers with different points of view on the above mentioned problems. The O.C. is hopeful that early publication will offer possibilities for a more fruitful seminar.

Contents:

- I "Realization of Human Ecology Exploration in Connection with the Study of Human Environment".

.....

- II "Methodology of Human Ecology: Geographical Exploration".

Medvedkov, Y.V.,

"Models of Human Ecology in Geography".

* Institut Geographyy ANSSSR, "Teoria i Metodika Geograficheskikh Issledovaniy Ekologiy Cheloveka," Moskva, 1974.

Lipets, Y.G., and N.N. Tchijov
"Modelling the Dynamics of Interactions
Between Nature and Society".

Frumkin, P.A.
"Exploration Aspects of Human Ecology in
Mountain Territories".

Kovalksy, V.V.
"Chemical Environments, Health and Diseases".

Prokhorov, B.B.
"Territorial-Ecological Aspects in the
Study of Health Levels".

Maximova, L.V., and P.A. Frumkin
"An Evaluation of the Location of Large Cities
in Terms of Human Ecology".

Sarajayskaya, L.U.
"Maps in the Study of Human Eco-systems".

III "Notions and Criteria Regarding Man's Adaptation
to the Human Environment".

.....

APPENDIX

III. GENERAL METHODOLOGY FOR THE ELABORATION OF A GENERAL
SCHEME OF PRODUCTIVE FORCES DISTRIBUTION OF THE USSR
FOR THE PERIOD 1971 - 1980* (Gosplan, Moscow, 1966)

Preface

Short programme of the general scheme of
productive forces distribution of the USSR.

Fundamental methodological theories:

- (a) General Principles and Elaboration of a
general scheme.
- (b) Schemes of Development and Siting of
Main Branches of National Economy.
- (c) Schemes of Development and Territorial
Productive Forces Distribution of Union
Republics and Large Economic Regions of
the USSR.
- (d) Interregional Economic Problems.

Annexes.

*Sovet po isucheniu proizvoditel'nik sil pri Gosplane
SSSR, "Obshchaya metodika razrabotki generalnoi shemi
prazmescheniya proizvoditel'nik sil SSR na 1971-1980,
Moskva, 1966.

APPENDIX

IV. REGIONAL PLANNING AND POPULATION DISTRIBUTION
PROBLEMS* (Town Planning Institute Kiev, 1973)

Ivanitsky, A.P.

"Architectural Problems in Comprehensive
Regional Planning Projects".

Naymark, N.I.

"Some Proposals on Improvement of Architectural-
Planning Management of Territory".

Shulenin, Y.P.

"Principles and Methodology of Architectural-
Planning Management of Industrial District
Territory".

Vergunov, G.P.

"Architectural-landscape Evaluation of
Territory in Comprehensive Regional
Planning Projects".

Probst, A.E.

"General Scheme of Productive Forces Distribution
as a Basis for Comprehensive Regional
Planning Projects".

Pertsik, E.N.

"Optimization Problems in Regional Planning
Projects on the basis of a Combination of
Traditional and New Methods".

Nudelman, V.I.

"Experience in Elaboration of Long-term
Prognoses in Regional Planning Schemes".

Vladimirov, V.V.

"Pattern for Administrative Regional Planning
Project".

Vologoy, O.B., Ivanova, L.M., and S.P. Yandola

"Evaluation of Natural Environment in Regional
Planning Projects".

* "Voprosy Raionnoy Planirovki i Rasselenia," "V pomoshch
proektorovshchiku-gradostroitelu," Kiev, 1973.

Beliyaev, V.B.

"Solution of Engineering Management of
Territory in the Scheme of Regional
Planning Project of Asov Seaboard".

Feigina, E.Y.

"Experience in Working out of Schemes of
Regional Planning Schemes for Tumen Administrative
Area and Some Features of Population Distribution
in Newly Developing Regions".

Vilner, M.Y., Vladimirov, V.V., Makeeva, V.V., and L.L.
Shurina

"Tambov Administrative Area Comprehensive
Regional Planning Project".

"Ways and Means for Controlling Over
Development of Tashkent Zone".

"Some Characteristic Features of Population
Distribution in the Far North".

APPENDIX

V. COMPUTER AIDED TOWN PLANNING DESIGN* (Central Research and Development Institute for Town Planning, Moscow, 1973)

Livshits, V.V., and A.P. Romm

"Hierarchical Principles for Building an Operational Block of Computer Aided Town Planning Designs".

Zubkov, G.N.

"A Method of Evaluation of Avenue System in the Process of Shaping its Structural Scheme".

Zakhov, A.I.

"The Implementation of Marxian Theory in Modelling Intra-urban Movement of Inhabitants".

Livshits, V.V.

"A Mathematical Model of Random Choice and its Application to Problems of Transportation to Place of Work".

Kostagorova, E.P.

"The Use of Sociological Data and Computers in Design".

Klimenkova, N.B.

"The Application of Modelling in Town Planning Design".

Rebain, T.Y.

"The Determination of Boundaries of Zones of Influence".

Rossina, S.G.

"A Model for the Spatial Organization of Recreational Zones".

Nagier, N.G.

"A Method of Determining Trade Zones Within Settlement Systems".

* Tsentralny nauchno-issledovatel'skiy i proektny institut po gradostroytel'stvu, "Avtomatizatsiya protsessov gradostroytel'nogo proektirovaniya," sbornik trudov, Moskva, 1973.

APPENDIX

VI. APPLICATION OF MATHEMATICAL METHODS IN TOWN PLANNING*

(See V., CRDITP, Moscow, 1972)

Tarembian, A.M., and E.Y. Kipper

"Economic Evaluation of Lands for Purposes
of Town Planning".

Bubes, E.Y., and M.M. Kamenskaya

"Use of Economic-Mathematical Modelling in
the Reconstruction of Old Residential Districts".

Talkovksy, V.G.

"A Quantitative Evaluation of Aesthetics in
Town Planning".

Kirsner, Y.S.

"About the Choice of Means of Public Transportation
in the City".

Kovalenko, I.Y., Onikiynko, V.V. and V.A., Popovkin

"Principles of Demographic Prognosis With the
Help of Mathematical Methods and Computers".

*Tsentralny nauchno-issledovatel'skiy i proektny institut
po gradostroitelstvu, "Primenenie matematicheskikh metodov
v gradostroitelstve, vipusk 8, 1972, Moskva.

APPENDIX

VII. APPLICATION OF MATHEMATICAL METHODS AND COMPUTERS IN
THE SOLUTION OF TOWN PLANNING PROBLEMS* (CRDITP,
Moscow, 1971)

Zakhov, A.I.

"A Model for the Optimization of the Planned
Structure of a City".

Aben, H.R.

"An Economic Evaluation of Urban Territory".

Govorenkola, T.M.

"The Shape of Urban Territories".

Romm, A.P.

"Geometrical Methods for the Solution of
Configurational Tasks".

Lubkov, T.U.

"The Orientation of Major City Streets".

Avdot'in, L.N.

"The Methodological Aspect of Town Planning
Prognoses".

Rossina, S.G.

"Experiences from Studying the Demands on
Tourist Services".

Livshits, V.V.

"A Mathematical Method for Modelling
Dynamic Urban Population Distribution".

Alexander, R.E.

"The Distribution of the Workers' Families
Near the Job Location".

*Tsentralny nauchno-issledovatel'skiy i proektny institut
po gradostroytel'stvu, "Primeneniye matematicheskikh
metodov i vichislitel'noy tekhniki v gradostroytel'nik za-
dachah," sbornik trudov, Moskva, 1971.

Dobrer, B.I.

"Analysis of Labour and its Relationship to
an Interconnected System of Settlements".

Golts, G.A.

"The Self-organization Factor of Public
Transport in the Course of Urban Development".

Kagan, M.I.

"Statistical Analysis of Transportation
Movement of Inhabitants".

13 - 16, "Modelling Inhabitants Movements and
Public Transport".

APPENDIX

VIII. MATHEMATICAL METHODS IN TOWN PLANNING* (Town Planning Institute, Kiev, 1969)

Avdot'in, L.N.

"Perspectives on the Application of Structural-Systems Methodology in Town Planning Research and Design".

Aben, H.R.

"Mathematical Model for Demographic Optimization of Apartments".

Bondarenko, B.I.

"Calculation of Set of Dwellings in New Developments in Accordance with Demographic Requirements".

Kayary, Y.I.

"Method for Priority Determination of New Developments".

Smoliar, T.M., and V.P. Morozov

"Analysis of Planning Structure Schemes of New Towns".

Vand, L.E.

"New Methods of Project Evaluation".

Sheshtocas, V.V.

"Building Models for the Distribution of Inhabitants using Existing Data on Labour Relationships".

Golts, G.A.

"Some Problems of Mathematical Modelling for Movement of Inhabitants".

Romm, A.P.

"Utilization of Quantitative Methods in Designing Walking Paths in Neighbourhoods".

Furen, V.M.

"Transformation of a System of Streets with Maximum Traffic Capacity".

Bakharev, D.V.

"Using Computers in Estimation of Insulation".

* Nauchno tematicheskiiy sbornik, "V pomoshch proektirovshchiku-gradostroitelu," "Matematicheskie metodi v gradostroitelstve, Kiev, 1969.

Demianovsky, V.C., and F.M. Listengurt
"Correlational Dependence Between City Size
and Annual Natural Increase of its Inhabitants".

APPENDIX

IX. INSTITUTE OF CONTROL PROBLEMS COLLECTION OF RESEARCH
NO. 2* (Moscow, 1972)

Mamikonov, A.G., Tsvirkun, A.D., and V.R. Akinfiev
"Optimal Control Over Resources While Creating An
Automatic System of Control (ASC)".

Mamikonov, A.G., Kulba, V.V., and A.D. Tsvirkun
"Systems Methods for Improving the Quality
of the Functioning of Complicated Controlling
Systems".

Mamikonov, A.G., Piskunov, A.N., and A.D. Tsvirkun
"Optimal Control Over Information Systems".

Mamikonov, A.G., Kulba V.V., and A.D. Tsvirkun
"The Control Over the Creation of ASC".

Kosiachenko, C.A., Kulba V.V., and A.D. Tsvirkun
"An Analysis of Strategies for Processing
Masses of Information on Computers".

*Institut problem upravlenia, Analis i proektirovanie
ACU, sbornik trudov, vipusk 2, Moskva, 1972.

APPENDIX

- X. PROBLEMS OF MODERN URBANIZATION* (Edited by Yu. L. Pivovarov, National Committee of the Soviet Geographers, Statistika, Moscow, 1972.)

Preface: J.P. Gerasimov

GENERAL PROBLEMS OF URBANIZATION

Pivovarov, Yu. L.

"Modern Urbanization: Its Nature Factors and Specific Features of Studies".

Yanitsky, O.N.

"Social Aspects of Urbanization During Scientific and Technological Revolution".

Vischnevsky, A.G.

"Economic Problems of Urban Settlement Patterns Development".

Akhiezer, A.S., and A.V. Kochetkov

"Urbanization and Intensification of Production in the USSR".

Strongina, M.L.

"Correlation Between Urbanization and Distribution of Production by Economic Regions in the USSR".

DEMOGRAPHIC AND ETHNIC ASPECTS OF URBANIZATION

Volkov, A.G.

"Urbanization Influence Upon Demographic Processes in the USSR".

Perevedentsev, V.I.

"Urbanization and Migration of Population in the USSR".

Kozlov, V.I.

"Ethnic Features of the Urban Population Formation in the USSR".

* "Sovremenii problemi urbanizatsii", Statistika, Moskva, 1972.

METHODS FOR THE STUDIES OF URBANIZATION

Golt , G.A.

"Transport Influence Upon the Spatial Development of Cities and Urban Agglomerations".

Zorin, I.V., and I.V. Kantsebovskaya

"Some Methods for the Urbanization Level Measurement".

Lipets, Y.G., and N.N. Chizhov

"Statistical Methods for the Studies in the Potential of Urban Settlement Field".

Soviet Literature on Urbanization (1966 - 1970).