THE IMPACT OF SYSTEMS ANALYSIS ON URBAN PLANNING: THE WEST GERMAN EXPERIENCE

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INTRODUCTION /1/

What makes the experience of one particular country relevant for others? If in that country everything is the same as elsewhere, that is hardly noteworthy. If, however, everything is different, other countries have no way of relating such exotic information to their own experience. The author of a national report, therefore, must focus on the narrow field of *variety* in *similarity*, i.e. on the differences in otherwise similar processes that suggest new explanations or alternative conclusions.

In this case, the similarities are quickly listed. In West Germany, like in other Western countries, systems analysis methods in urban planning /2/ had a euphoric pioneer period, a period of criticism and decline, and a period of stagnation. In particular, the development echoed that in the United States with considerable, but reducing time lag.

This information alone is not very interesting. However, there are some peculiarities in the professional and intellectual debates accompanying this process in West Germany which may offer some additional insight into the causal structure of similar processes in other countries as well.

The peculiarities are related to the political development in the Federal Republic and, more generally, to the intellectual and philosophical traditions of Germany. In the controversy pro and contra systems analysis methods in urban planning much evidence can be found of the old controversy between *rationalism* and *antirational* ideologies characteristic for German intellectual and cultural history. In this larger controversy in Germany the antirational position always was powerful. Periods of enlightenment were always brief, and the reaction following them was always thorough and long-lasting.

Here, the controversy focusses on the role of rationality in public policy making and planning. Democratic planning has to reconcile two conflicting objectives: to efficiently process complex decision situations and still maintain and develop democratic norms and procedures. If they are in conflict, which is more important?

In this paper, I will review four variations of this controversy which all are in some sense related to the application of systems analysis methods in urban planning: the controversy between *comprehensiveness* and *incrementalism* in the urban planning practice; the controversy about urban planning as a *science* or as an *art*; the controversy between *social cybernetics* and *political economy* in planning theory (a German specialty); and the controversy on *technocracy* vs. *advocacy* in political science.

All these controversies had a common theme. They challenged the traditional "engineering" kind of rationality which had discredited itself by its recklessness and insensibility towards human values and natural resources in the name of economic growth and technological "progress". In that sense the controversies were part of and contributed to the general process of reevaluation and reformulation of societal goals going on during the last decade which also deeply influenced the style of public policy making and planning. Today in West Germany it has become much more difficult to carry out controversial large-scale technical projects affecting the natural environment or existing neighbourhoods without taking account of the reactions of a watchful and critical public.

And yet, in all the controversies, inextricably intermingled with their progressive intention and effect, there was a common regressive tendency to reject science and technology altogether as tools for improving the human condition. I hope to demonstrate this in the paper in order to support my hypothesis that the present aversion against systems analysis methods in urban planning is part of a broader anti-rational tendency in society. If this hypothesis is only partly correct, it is clear that improving the methods in their own terms, though desirable, will probably have not much effect on their diffusion into the planning practice. Instead, it seems to be much more effective to concentrate on questions of transfer, acceptance, relevance, conflict, and human values.

Unfortunately, systems analysis methods have so far been undiscriminatingly associated with being technocratic, conservative, and anti-democratic. I will argue that there is nothing inherent in these meth-

ods that would justify such classification. The point I want to make is that the potential of such methods to support and enlarge citizen involvement in urban planning has in the past been ignored and should be an area of prime concern to everyone working in the field in the future.

THE FACTS

In this first chapter I will give an account of the few successes and many failures of the application of systems analysis methods in urban planning in West Germany. In order to avoid unnecessary detail I will keep this review as brief as possible /3/.

Arrival (1968-1971)

Systems analysis methods were introduced to West Germany in the early sixties mainly in economics and engineering. In the mid-sixties the first computer-based transportation studies demonstrated that it was possible to successfully apply these methods to spatial planning problems. By 1967 or 1968 word had spread around among urban planners that the new methods might be the badly needed tools to cope with the increasing complexity of urban planning problems.

Urban planners in Germany in those days were architects. Unlike in the United States or in Great Britain, in Germany there was no undergraduate planning education until independent planning departments were established at the universities of Dortmund in 1968 and Berlin in 1970. At that time the inadequateness of the planning education offered at architectural schools with its design orientation and its bias for physical planning had become obvious (Albers, 1963; 1966).

In Dortmund a completely new beginning was made. An interdisciplinary department of *Raumplanung* (spatial planning) was founded which was to integrate all levels of spatial planning from the local to the national scale. The faculty was recruited from economics, law, sociology, various engineering disciplines, and mathematics. One of the major subjects of the new curriculum was *systems analysis*, later called *systems theory and systems engineering*. There was a broad consensus among students and the young faculty that fundamental changes of society were needed and

that planning was a key instrument to bring them about. The new systems techniques were associated with being progressive, rational, and objective, as opposed to the backwardness, irrationality, and subjectivity of the traditional professional practice. In brief, the systems approach was understood as a piece of enlightenment.

This view was strongly endorsed by the Federal government. In 1969, the *Städtebaubericht* (Urban Planning Report) expressly called for the development of "models which allow insights into the dynamic changes of spatial behaviour of people" /4/ and concluded:

> "This implies that mathematical techniques for analysis and forecasting as well as the techniques of electronic data processing are of prime importance for urban planning. The same applies to the simulation of human behaviour relevant to spatial processes. Also the mathematical optimization techniques which originated from operations research as well as the entire field of systems research and decision theory should be utilized for urban planning" (BMBau, 1969).

Economists and engineers as well as architect-planners took the message for granted and worked their way through *A Model of Metropolis* and back issues of the *AIP Journal* or specialized in linear programming, cost-benefit analysis, critical path analysis, or the like. Some fashionable practicing architect-planners sought alliances with the new experts for fear to be left behind by the new trend. The architectural planning schools hastily put up courses in computer programming, mathematical statistics, and various systems techniques usually with the help of lecturers from outside of the existing faculty.

Even research money became available. Two large research projects were launched with funds of the Federal Housing Ministry to develop comprehensive urban simulation models.

The first of these models was the POLIS urban simulation model developed by a group of researchers at Battelle-Frankfurt (Battelle, 1973a). POLIS had all the vices of its American predecessors: it was large, difficult to calibrate, and costly to operate. But it had a sound modular structure, offered a multitude of policy options, and produced convincing results. Besides, it was one of the first of its kind to

accomplish feedback between transportation and land use. POLIS was implemented for the city of Cologne (Wegener, Meise, 1971) and briefly afterwards for the city of Vienna (Battelle, 1973b).

The second model was SIARSSY, a joint product of the universities of Mannheim, Erlangen, Munich, and Stuttgart (Popp, 1974). SIARSSY was originally based on ORL-MOD, a Lowry adaptation developed at the ETH Zurich (Stradal, Sorgo, 1971), but the authors soon started to make it recursive and augment it by transportation, infrastructure, ecology, and budget submodels. The housing and service employment allocation parts of the model were calibrated for several West German cities.

Another source of funding became the EDP promotion programs of the Federal Ministry of Research and Technology. They constituted a major share of the budget of DATUM, a government-funded research organization developing computer-aided planning methods for local, state, and federal planning authorities. In a first large project DATUM collaborated with the City of Cologne and a German computer manufacturer, Siemens, on the design and development of a local planning information system. The resulting system named KODAS contained program modules for data manipulation, aggregation, statistical analysis, diagrams, and maps, as well as a package for population analysis and projection (DATUM *et al.*, 1974). In addition, DATUM began to develop or adapt from other sources a variety of computer programs for processing spatial data, such as location-allocation programs (cf. DATUM, 1977).

Besides these activities supported by the Federal government, many cities set out on their own to implement computerized data bases and programs for analyzing and displaying data. One outstanding example was the work of the *Stadtentwicklungsreferat* (Department of Urban Development) of Munich. Founded during the preparations for the 1972 Olympic Games, its staff of about 40 professionals quickly won reputation for high-level and yet pragmatic development and application of computer-assisted planning tools. As the only planning department in this country it operated its own computer and developed its own interactive data management and analysis system called KOMPAS (Blum, 1973).

Decline (1972-1975)

This period of enthusiasm lasted only four or five years. It started at a time when in the United States the use of systems analysis techniques for public policy making and planning was already severely criticized. When the first news about the high costs and general failure of ambitious information system and modelling projects arrived in this country (Fehl, 1971), and translations of critical articles (Alonso, 1968; Hoos, 1968; Churchman, 1968; Hoos, 1970) were published in the *Stadtbauwelt*, the opinion-making journal of architect-planners, this had a disastrous effect on city administrators and funding agencies. The *Requiem for Large-Scale Models* by Lee (1973) did the rest to prevent any more funds to flow into such research.

Moreover, many of the painful experiences reported from the United States were repeated here. Almost without exception, all modelling projects took longer than expected and had to cut back their objectives, and eventually the results appeared not as useful as the proponents had promised and the clients had hoped. However, it is also fair to say that given the limited amount of funding and the brief time span available these projects did not have a real chance to be successful.

Anyhow, everybody involved was disappointed. The Housing Ministry quite abruptly stopped funding research dealing with systems methodologies, the architectural schools reduced their courses in such techniques back to the barest minimum, and the ill-considered marriages between architect-planners and systems people were quickly divorced. The KGSt, the influential advisory institute on rationalization in local government, recommended to its member cities extreme caution with respect to the use of computers in planning (KGSt, 1975) and dismissed its advisory committee on automation in local planning. The cities gratefully accepted the verdict and cut back their plans for planning information systems down to the most routine data manipulation and report generating functions.

Of the small number of urban planners who had seriously got involved in systems analysis techniques many gave up and returned to a "normal" career in the planning administration. Others turned to related fields where quantitative analysis and modelling continued to be an accepted

practice, such as transportation or energy planning. A third, even smaller group retreated to those few universities where it was still possible to find a niche for a sort of research nobody seemed to be asking for.

Stagnation (1976-)

In fact, between about 1975 and today only small progress in the adoption of systems analysis methods to urban planning has been made.

Work on the comprehensive urban models was stopped almost altogether. The POLIS model was applied two more times, to the cities of Karlsruhe (Ruppert, Krieger, 1976) and again Cologne (Ruppert, Würdemann, 1979), but as in the earlier applications none of the cities decided to adopt the model for its planning on a regular basis. In the case of the SIARSSY model the ambitious extensions of the model were never completed (Popp, 1977).

The work of DATUM was gradually shifted to the regional, state, and national planning levels. There have been some DATUM projects relevant to urban planning, in particular the GEOCODE project concerned with generating and maintaining spatial reference files (v. Klitzing, 1978), and the PENTA project dealing with demographic techniques based on the computerized population register (Blum *et al.*, 1977). However, in these projects the main clients of DATUM were the surveying or statistical offices and not the urban planning departments.

Also, there have been some notable contributions to the field by private consultants. Perhaps the most interesting example is the work of Volwahsen with its skillful blending of systems analysis methods and traditional techniques (Volwahsen *et al.*, 1975; Volwahsen, Heide, 1978). But this kind of work has not found any followers, be it because Volwahsen never fully disclosed the methods he used, be it because the quality of his work rested too much on his particular talents. Another example is a series of housing market simulation models developed by private research institutions for five metropolitan areas with funds provided by the Housing Ministry (Stahl, 1980). But with one exception, these models, if they became operational at all, disappeared without leaving any traces in the planning practice of the client cities.

The one exception is connected with the Stadtentwicklungsreferat of Munich. This department has continued work on its KOMPAS planning information system (Franke, 1978) and developed or adopted a number of computerized planning tools, such as a model of intraurban migration, one of the housing market simulation models referred to above, an employment projection model, and a system of models for allocating public facilities (Schußmann, 1978).

Nevertheless, in the whole, the diffusion of systems analysis techniques in the planning practice of the *average* municipal planning department has been negligible. Although in 1977 about 60 cities claimed to operate some kind of computerized information system (Kooperationsausschuß, 1978), according to the KGSt "only a minimal share of the capacity of municipal computers is used for planning purposes" (Ostermann, 1977). Moreover, the majority of these applications are concerned with data retrieval, sorting, selection, and aggregation, and with the production of tables, diagrams, and maps. Data analysis techniques are largely confined to basic statistics. Only in a few cities programs are available for transportation network analysis and accessibility calculations. Except population projections, practically no forecasting techniques are applied. The demographic models, however, are in general developed and operated by the statistical offices. In the urban planning departments, again with the exception of Munich, virtually no models are in use or development.

This description was confirmed by a survey conducted in 1976 by Hoberg (1978) in 42 urban planning departments. Hoberg investigated the use of various methods for allocating public and private facilities. He found that only in about 15 percent of all reported applications methods which might be called systems analysis methods, such as cost-benefit analysis, location-allocation techniques, optimization or simulation models, were employed.

These findings are well in line with surveys which try to evaluate the utility of various skills and fields of knowledge for the professional practice of planners. In a 1975 study (Kunzmann *et al.*, 1975) planners of all planning levels were asked to rate skills and fields of knowledge in terms of relevance on a six-point scale. *Systems theory and*

systems engineering scored an average of 1.0 compared with, for instance, 3.3 for economics and 2.7 for law. In a similar study of 1979 addressed only to urban planners this figure dropped to 0.8 (Mengden, 1979). A third study in 1980 addressed only alumni of the department of Raumplanung of the University of Dortmund, i.e. a sample of the small minority of West German planners who already in their academic education have been exposed to systems analysis methods (Nonnenmacher, Schwörer, 1980). Of the respondents 25 percent indicated that *systems analysis* was very important for their work, however, this high proportion was only due to the fact that *statistics* was included under that heading. Only six percent believed that *systems models* were very important, while two thirds believed that models were of no importance whatsoever.

THE CAUSES

At first sight these facts seem to speak a clear language: The efforts to establish systems analysis techniques in urban planning have failed and probably were misconceived from the beginning.

But that story is too simple. There are other ways of telling it, and each reveals different aspects of what has happened, just as different witnesses give different accounts of an observed event. In the following sections I will present some of these different aspects.

Urban Planning Practice: From Growth to Stagnation

At first an attempt will be made to relate the rise and decline of systems analysis methods to the political and economic framework of urban planning. Have there been major economic or social changes or changes in settlement policy, planning legislation or organization?

In West Germany, like in other countries, the agglomeration process has over the last thirty years resulted in the rapid growth of a few major urbanized regions. In recent years, however, the agglomeration process seems to have changed its pattern. Most large cities experience a decline of population, while communities at the periphery of urban regions continue to grow at a fast rate. The consequences of

this exodus from the urban centers--loss of tax income, monofunctionality of the city center, increasing spatial segregation of age and income groups, and urban sprawl at the periphery--make this a serious problem for many cities.

At the same time the power of local government to control spatial development has narrowed. On the one hand more and more local planning decisions are directly or indirectly determined by state and Federal policy due to a tightening network of government subsidies in virtually every field of local policy making and planning. On the other hand city governments get under increasing pressure by citizen groups outside of the traditional power structure of industry, commerce, and the political parties. These groups, usually focussed on a particular neighbourhood issue, began to organize themselves in great numbers in the late sixties and today have informally established themselves in the local decision making process as an extremely effective stumbling stone for all kinds of planning actions of the administration.

These changes were accompanied by global economic, demographic, and cultural developments which in similar form could be found in most Western countries during the seventies. They included the energy crisis of the early seventies and its reverberations through the economic and monetary systems, the new cycle of economic, i.e. sectoral and technological, change connected with the breakthrough of microprocessors, the painful expansions and contractions of the educational, employment, and pension systems caused by the dramatic drop of birth rates during the sixties and, last but not least, secular changes of cultural traditions and values.

This cultural revolution was only remotely related to the student protest movement of the late sixties which deeply affected the intellectual scene as well as government and administration, but was hardly realized by the broad public. But now a general feeling pervaded all groups of society that something had gone wrong, that economic growth and prosperity for everybody had been paid for with destruction of the land, waste of natural resources, and pollution of the environment. The ambiguity of progress became evident: progress towards what, for whom? In particular younger people felt alienated by the world of

their parents. Many turned to alternative, subcultural forms of living and working in urban or rural cooperatives. Artisan work, pre-industrial crafts, and traditional ways of farming were rediscovered, a new, more subtle relation to nature was sought. However, it was also experimented with new, energy preserving technologies. A broad ecological movement developed and demonstrated through spectacular antinuclear or conservationist actions and even a few successes in local and state elections its potential power.

It is worth noting that all this happened in a relatively affluent and politically stable country, in which to see signs of a crisis would simply mean to ignore the facts. During the seventies the Federal Republic had a stable and fairly liberal government, a comparably low level of social tension and an exceptionally cooperative relationship between unions and industry. It is true that the economy was slowing down, but it continued to grow at an average rate of three percent per year, and so did household incomes. Indeed, there was some inflation primarily caused by rising energy costs, but it never exceeded six percent, and fuel and gasoline prices were among the lowest in Western Europe. There was unemployment, but it has settled down at under four percent lately. There was, indeed, a housing shortage, but nevertheless between 1950 and 1975 housing floor space per capita approximately doubled. There have been, of course, serious environmental problems, but it is also true that the pollution of most large rivers has effectively been reduced and that the sky over the Ruhr region is cleaner today than ever before in the last century.

Nevertheless, the factual and atmospheric changes had their effect on urban policy making and planning. The sixties were the time of massive housing construction, mostly in huge new housing areas at the fringe of the urban region. Local road networks were overlaid with urban motorways, and extensive underground systems blueprinted. The perspective of urban planning was long-range and growth-oriented. Most large cities established new administrative units for *Stadtentwicklungsplanung* (urban development planning) which with their strategic orientation were the ideal clients for the new systems analysis methods and models just then entering the scene.

But with the turn of the tide of the agglomeration process, the interest in strategic planning faltered, and so did the interest in the methods and models. Now the revitalization of old neighbourhoods became the most urgent problem. The 1972 urban renewal and development act (*Städtebauförderungsgesetz*) marked this breaking point with regulations for renewal as well as for suburbanization programs. In addition, for the first time it institutionalized some degree of citizen partizipation in local planning. In the following years the scale and time horizon of local policy making and planning were consistently lowered. *Stadtteilentwicklungsplanung* (urban district development planning) was a catchword for a few years, but today the focus is on *Stadtreparatur* (town repair), i.e. on micro scale efforts to rehabilitate individual blocks or buildings.

With each reduction in scale and comprehensiveness the need for sophisticated analysis or forecasting methods was reduced. That was not only a question of scale and time (i.e. the strategic vs. incrementalist dichotomy), but also one of clientele. The more the planner works only for a small and homogenous section of the urban population, the less comprehensive analyses are desired which are likely to reveal conflicts with the interests of other groups or of the community at large. In this sense, systems analysis methods are not only useless for urban planning, but are in fact counterproductive as they tend to impede the bargaining process. That is the situation today.

Urban Planning as a Discipline: Science or Art?

Next I turn to urban planning as a profession and discipline assuming that the acceptance of a new technology like systems analysis methods depends much on the training, attitudes, and intellectual traditions of its potential users. And indeed, there is ample evidence that the aversion of architect-planners to innovation and change in their professional practice contributed much to the early decline of systems analysis methods in urban planning in West Germany. In this case the controversy pro and contra such methods took the form of the old debate on *science* vs. *art* in urban planning. To understand this discussion we must look back into the 19th century where it started.

Stadtplanung (urban planning) is a relatively new word in German. The more traditional term is *Städtebau* (town building) which indicates that it originally was a building discipline concerned with physical aspects of urban planning. Like in other countries, in Germany urban planning originated from two disciplines: architecture and civil engineering. For many centuries the domain of the architect as the creator of urban form was unchallenged. With the technical and industrial revolution of the early 19th century the construction of bridges, railways and roads, canals, water and sewerage systems required skills architects did not have. At this time a first division of labour took place: While the architect remained responsible for the physical appearance, i.e. the aesthetics of urban form, the civil engineer took responsibility for the less visible: urban structure.

In 1861 James Hobrecht, a civil engineer, prepared the first development plan for Berlin in which fire regulations, hygienic and transportation considerations played a dominant role. In 1876 R. Baumeister published his book on town development in which he treated urban planning strictly in engineering terms. In the following years most German states developed building codes and zoning regulations and laid them down in planning laws. Many countries looked to Germany as having the most advanced planning system of the time: "In Germany town planning has become a science just like the construction of machines", the Metropolitan Plan Commission of Boston admiringly wrote in a report of the year 1912 (Stübben, 1924).

The reaction of the architects against the predominance of the engineers in urban planning was formulated by C. Sitte (1889). He laid the foundations to what was known as *Stadtbaukunst* (art of town building), a sort of urban design which, like the French Beaux-Art tradition, was almost totally preoccupied with the aesthetics of buildings and public spaces. In this tradition Ludwig Hoffmann, the chief architect of Berlin, declared (Stübben, 1924):

> "The art of town planning, like every other art, has no laws nor rules. It is based on experience, sentiment, reflection, and taste."

This artistic tradition was totally insensitive to the emerging *social* problems connected with the rapid urban growth of that time. In 1914, in Berlin nearly 600,000 persons lived in overcrowded dwellings with more than four persons per room (Hegemann, 1930). Consequently, housing became the dominant urban problem after the war. A new generation of architect-planners like Ernst May and Martin Wagner, or Walter Gropius and Hannes Meyer of the *Bauhaus* attacked the Beaux-Art tradition under the sign of functionalism and modern technology. Motivated by radical economic and societal reform ideas, the architect-planners of the *Neues Bauen* (new building movement) created some of the most outstanding examples of mass worker housing ever produced in this country.

This brief period of *rationalist* urban planning ended in 1933. Most of the proponents of *Neues Bauen* were denounced as communists and lost their jobs or had to leave the country. However, the new government soon recognized the usefulness of rigorously centralized spatial planning. For this the most advanced scientific planning methods were to be applied, after they had been purged from the "dominance of the rationalist, causal-mechanistic principle" of the "rational-liberal science" (Meyer, 1936). How perfectly this was achieved, is illustrated by the sad case of Walter Christaller, one of the fathers of central place theory (1933), who himself helped to apply his "system" to the occupied territories of Poland under these auspices:

> "The final domination of the *Generalgouvernement* will be based on the key positions of a regular network of central places. The central place in the *Generalgouvernement*, centre and leader of its region and focus of German culture, power, and economy, will contain all elements required for the immediate expression of German dominance" (Schepers, 1942).

Three years later, most central places in and around Germany were ruined. Of the 10.5 million dwellings existing in West Germany before the war, five million were destroyed or severely damaged. In addition, 10 million refugees came into the country from the East and brought the housing shortage up to 5 million (Power, 1976). Consequently, the reconstruction period was largely devoted to rebuilding the housing stock. The notion of planning had become deeply discredited by the

abuse of centralized authority by the Nazis. So up to the sixties about 10 million dwellings were put into place by architects and architect-planners with almost no planning controls in effect.

The second half of the sixties seemed to change everything. With the Social Democrats entering the government in 1966, planning lost its bad image. There was a broad consensus among architectural students, architect-planners, and the public that it was possible by better planning to arrive at a better urban environment. At the same time, the concept of urban planning was rapidly expanded to include not only physical, but also economic, social, educational, ecological, and various other kinds of planning. Economists, social scientists, geographers, and many other disciplines became aware of the city as a study object. The planning department at Dortmund University was established as the first undergraduate planning school, others followed. *Raumplanung* seemed to establish itself as a new integrative, interdisciplinary science (cf. AG.Kop, 1972).

But this period of euphoria was soon over. Somehow the interdisciplinarity of *Raumplanung* lost its appeal. Even at Dortmund the disciplines slowly retreated into their traditional specialized fields. More important, however, was the fact that the planning practice never really accepted the scientist-planner. Only for a brief period the new techniques for analysis and forecasting seemed to point to a scientization of the field (Rautenstrauch, 1974). In the reality of the planning department, however, the rapid expansion of responsibilities of urban planning and the need to respond to a multitude of different poblems under time pressure made it impossible for the architect-planners to develop a new professional identity. Instead, they felt that they were being disqualified, and that their field of work was gradually disintegrating (Siebel, 1975).

The natural reaction to this experience was to defend, or rather to revitalize, the old universalist position. A new discussion about the "generalist" vs. the "specialist" planner arose which ended clearly in favour of the "generalist" demonstrating that in the daily work of the average planning department there is no room for scientific analysis beyond the most routine (Albers, 1979).

And this is not likely to change soon, as today the leading positions in the planning administration are still held and probably will be held in the future by architect-planners. Under the pressure of the architectural lobby, higher careers in the planning administration continue to be reserved to candidates who "have demonstrated their ability to apply their knowledge methodically by several design projects and a final thesis in urban or regional planning of mainly conceptual character" (BMBau, 1978), i.e. practically only to architects. In the light of this tendency, it is not surprising that for the BDA, the major architects' association, the Dortmund planning education is "a deplorable misdevelopment which should be corrected as soon as possible" (BDA, 1979).

Planning Theory: Social Cybernetics vs. Political Economy

The third kind of witness I now call on is the planning theorist as an impartial observer of what is going on in the planning scene. Unfortunately, there has been much disagreement in German planning theory about the nature of planning and the role of scientific methodology in planning. Therefore, this section again is a description of a controversy.

Planning was dicovered only recently as an object of scientific investigation and theory by political scientists in West Germany. During the postwar and reconstruction period, the recollection of the misuse of centralized control in the Nazi period, the dominant neoliberal economic doctrine, and the abhorrence of economic planning à la East Germany all worked together to associate planning with being a menace to individual freedom. However, with the changing economic policy and the evolving *Ostpolitik* after 1966 this taboo became obsolete. This meant for the political sciences that a considerable deficit had to be compensated in a relatively short time.

This first period of German planning theory was largely influenced by American political science, and in particular by authors like Parsons, Deutsch, or Easton who tried to apply systems theory concepts to societal or political organizations. Accordingly, the German planning theory of the late sixties was dominated by systems

theory thinking (Senghaas, 1967; Narr, 1967; Naschold, 1968). The most influential formulation of this paradigm was presented by the sociologist N. Luhmann (1966b). For Luhmann *planning* is a sophisticated kind of selection mechanism by which a social system reduces the extreme complexity of its environment. A *planning decision* is a choice act through which by excluding potential actions from further choice a planning object is fitted to a mental or internal model of itself by the planning system. Planning differs from other choice acts by its reflexivity: "Planning means to set premises for future decisions, i.e. to decide on decisions" (1966b).

For this school of planning theory *methodology* is important. As planning is understood as a cybernetical process, the failure to adequately process problem complexity is a prime bottleneck of the process. Every possibility to increase the problem processing capacity of the planning system is appreciated as a progress towards more *system rationality*, i.e. the "ability to predict and control the consequences of actions over as many links in the causal chain as possible" (Luhmann, 1966a). The increasing scientific character of planning methodology is accepted as a necessary correlate of the growing complexity of society, moreover, it is recognized that science for societal planning is going to be more and more technical, i.e. approaching the ideals of exactness, plausibility, and falsifiability associated with the natural and engineering sciences. The use of sophisticated systems methods is part of the system process itself: Acting *in the system* requires the awareness of reality as a "network of problem-solving structures, secondary problems of such structures, solutions for such secondary problems, etc." (Luhmann, 1969).

Accordingly, most planning theorists of that period were strongly in favour of implementing the new, mostly yet unknown systems analysis methods for public planning. However, as these methods became better known, a first phase of criticism developed. This first critique challenged the methods in their own terms, i.e. did not question their usefulness, but their efficiency.

Some critics generally questioned the possibility of identifying causal relationships between human acts. It was argued that human actions

are rational only in a loose sense and are determined by expectations and aspirations, roles, institutions, and "latent needs" which defy quantitative analysis (Tenbruck, 1967). Other critics pointed to the "wicked" nature of societal planning problems (Rittel, 1970) and questioned the relevance of statistical and other quantitative data for the solution of such problems (Fehl, 1970) in contrast to "informal" and ad-hoc (Fehl, 1971), or normative, explanatory, or instrumental information (Rittel, 1973). A third group of critics challenged the claim of the methods to grasp and reproduce the complexity of human society and, of course, found severe deficits. While some of these deficits could be attributed to insufficient data or modelling techniques, at least one deficit seemed uncorrectable: The undeniable ambivalence of systems analysis methods with respect to *values*, in particular democratic norms, made many critics concerned about their possible political misuse (e.g. Naschold, 1968).

This last critique was the main concern of the second stream of planning theory which developed only a few years later. The *political economy* paradigm of planning theory is founded on the Marxist theory of fundamental conflict between the working and capitalist classes which, in this final era of capitalism, is bound to lead to perennial crises. Political planning in this context has the function to overcome or avoid such crises in order to safeguard the conditions for capitalist exploitation. The ultimate goal of Marxist planning theory is the transformation of the political-economic structures. Two different ways to approach this are discussed: While a minority propagates to concentrate all efforts in a Marxist political party (e.g. Schuon, 1970), the majority favours a long-range strategy of political consciousness-raising in "planning-oriented political base organizations" (Offe, 1969). It is hoped that by utilizing existing channels of citizen participation "movements of countervailing power" can be mobilized which will gradually transform the political system (Offe, 1970).

Towards the end of the decade Marxist planning theory attracted more and more followers for whom, as for the student protest movement and the "extraparliamentary opposition" (APO) of that time, the Vietnam war, racial violence in US cities, and the pending state emergency legislation of the West German government converged into a fundamen-

tal crisis of Western civilization. This landslide carried away many earlier proponents of the systems theory paradigm with the result that in 1970 German planning theory was more or less Marxist.

This is worth noting because it had implications for the use of systems analysis planning methods in research, education, and practice. For the Marxist planning theorist "social-cybernetic" approaches are "ahistoric" and "idealistic", and therefore cannot provide guidance for political action (Fehl *et al.*, 1972). Moreover, their political vacuousness makes them disposable for any sort of political abuse (Ronge, 1971), while the adaptive, stabilizing mechanisms of complex systems are associated with conservative tendencies in society (Kade, Hujer, 1972). This is not to say that the "heuristic value" of systems analysis methods are denied (Fehl *et al.*, 1972), but it is believed that their "progressive aspects can unfold only in the course of a thorough transformation of the production system" (Arch+, 1971). Under the capitalist system their application is, at best, irrelevant, in the worst case, however, an instrument to prepare "a new cycle of capital accumulation" (Kade, 1973).

These arguments were widely accepted by younger planners and planning students. The systems approach lost its progressive image and more and more became associated with being technocratic, conservative, and anti-democratic. By 1971/72 the period of innovation and optimism of the late sixties were ridiculed as the time of "planning euphoria". Unfortunately, it had been much too brief to establish any permanent tradition. Today the attitude of most planning theorists towards methodology questions is desinterested if not hostile.

Political Theory: Technocracy vs. Advocacy

The final section of this chapter, while less directly related to urban planning methodology, in fact presents the intellectual background from where most of the ideas and arguments of the controversies reported in the preceding sections originated.

I am talking about the deep and lasting influence exerted on political life in West Germany by a series of debates in political science, so-

cial philosophy, and science theory during the sixties and seventies. They all were made possible by the fortunate fact that West Germany, unlike many other countries, in the *Frankfurt School* has developed a rich tradition of Marxist political theory and social philosophy. The works of Horkheimer, Adorno, Marcuse, and Habermas represent a most fruitful effort to unfold the political theory of Karl Marx into a meaningful tool for analyzing and criticizing modern capitalist society. The debates I am referring to were all disputes between the *Critical Theory* of the Frankfurt School and other, non-Marxist, theories of society. I will briefly excerpt three of them most relevant to the subject of this paper. All three deal in some way with the role of the scientist or *expert* in social decision making, i.e. with the old question of how scientific *knowledge* and human *values* are to be integrated into decisions or actions.

The first challenge came from the sociologist H. Schelsky (1961) who extrapolated certain tendencies of the techno-scientific development into a future where an anonymous *technocracy* of unaccountable experts decides about the direction of technical progress on the grounds of technical requirements instead of human needs. The most radical opposition to this Orwellian projection was formulated by Habermas (1963a; 1968) in the form of his *"pragmatistic" model* in which the division between technical requirements and human values is transcended by way of a *dialogue* between the scientist and the politician, i.e. by "public, unrestricted and uncontrolled discussion about the suitability and desirability of action-guiding principles and norms" (1968).

The second challenge originated from the science theory of Karl Popper. The controversy started from Popper's criticism of philosophical idealism and dialectical philosophy (1957; 1961) which was attacked by the Frankfurt School as *positivism*, i.e. a kind of "ahistoric" empiricism unable to grasp the process of societal development of which it is a part. In contrast, the Critical Theory asks for a theory of society which realizes the totality of the societal process, i.e. accepts that all cognition is determined by the *emancipative interest* of the scientist (Adorno, 1961; Habermas, 1963b). This position was questioned by "critical rationalists" like H. Albert who, following

Popper, insisted that even socially progressive values can become irrational if they are set absolute and shielded from continuous critical scrutiny (Albert, 1964).

The third challenge was caused by the diffusion of systems theory in the social sciences and led to an extensive debate between Luhmann and Habermas in the early seventies. It will be remembered that for Luhmann society is a cybernetical system which stabilizes its existence in a hypercomplex environment by the reduction of complexity. Reduction of complexity is thus the *raison d'être* of social systems, it is achieved by various reduction techniques, among them planning; their application is system rationality. Habermas concluded from this description of self-stabilizing system behaviour that a systems theory of society must be "conservative" and "apologetic": Inasmuch as system rationality is directed towards system stabilization, the theory must avoid issues that might jeopardize the existing power structures, and this makes it "disposable for technocratic use" (Habermas, 1971).

These three debates were by no means only academic exercises. The utopian spirit of the pragmatistic model not only contributed much to the optimism with which in the early seventies the ex-APO students started their "march through the institutions", it also had great influence on the architectural and planning students of the time, because it offered to them the attractive role of the enlightened mediator between scientific knowledge and the public. The emancipative function of science also played an important role in the 1967-1969 student movement and later on was constitutive for the motivation and social and political involvement of younger scientists and planners. It is the merit of the first two debates that they, from the critique of the technocrat, developed the concept of the *critical*, i.e. politically involved scientist or planner who sees himself as the partisan or advocate of the emancipation of underprivileged groups of society.

The third debate, however, made it clear that the optimistic belief of the late sixties that advanced scientific techniques and reform-oriented democratic planning could go together, was an illusion. The allegation that systems theory and all methods and techniques related

to it are conservative, technocratic, and antidemocratic persisted, was repeated over and over again, and today is a commonplace among intellectuals in this country.

CONCLUSIONS

I have attempted to show that the history of systems analysis methods in urban policy making and planning--arrival, decline, and stagnation--had remarkable parallels in other fields of the political and intellectual development of West Germany. In the *urban planning practice* long-range, strategic planning made way to incremental planning for particular client groups. The scientization of *urban planning as a discipline* was brought to a halt in favour of the revitalization of the "generalist" planner. In *planning theory* systems theory thinking was replaced by the political economy paradigm. In *political theory* the critique of the technocrat led to the concept of the critical, politically involved scientist or planner.

What these four controversies have in common is the shared critique of the onedimensional concept of rationality which has dominated public decision making in most Western countries for a long time. This "engineering" kind of rationality was predominantly oriented towards economic growth and technological "progress", and was completely insensitive towards aesthetic and emotional needs, environmental qualities, grown fabrics of social relations, and the concerns of minorities and underprivileged groups of society. With this critique these controversies are part of a larger process of reevaluation and reformulation of societal goals going on during the last decade, moreover, they contributed themselves much to it.

This larger process has also deeply influenced the style of public policy making and planning in West Germany. While it cannot be said that technocratic planning has completely disappeared, at least it has become much more difficult to carry out controversial large-scale technical projects affecting the natural environment or the quality of life in existing neighbourhoods without taking account of the reactions of a watchful and critical public.

The decline of systems analysis methods in urban planning in West Germany must be seen as primarily a consequence of these changes in the context and style of urban planning. And it can be no doubt that for that the systems analysts, model builders, and other proponents themselves are to be blamed in the first place. By their irresponsible promises, their narrow-minded preoccupation with technical detail and jargon, their stubborn insistence on a type of planning process which did not exist any longer, and their failure to adapt their methods and models to the changing planning environment, they are mainly responsible for the present disrepute of the field.

And yet, if one looks closer, one can also find in all these controversies and debates, inextricably intermingled with their progressive intentions and effect, strong undertones of a *general* rejection of science and rationality as tools for improving the human condition. This is obvious not only where the architects' lobby, under the pretext of practice-orientation, tries to sabotage the new planning discipline, but also where "political" planners use science only in an *opportunistic* fashion to support their particular cause, or return to rhetoric or other less rational techniques to produce consensus. Here is the critical point where the enlightening intention of the critique of technocratic planning is in danger of turning into its irrational counterpart, and where progressive and regressive tendencies in the present planning discussion in West Germany meet in an insidious way.

These undertones are well in line with other antirational tendencies of the present cultural development of West Germany. A most significant example is contemporary architecture where the achievements of half a century of socially oriented functionalism currently are being thoughtlessly thrown overboard and replaced by the short-lived fashion of a shallow and sterile eclecticism which, ironically, calls itself the *New Rationalism*. Antirational tendencies can also be found in the contemporary theatre, in popular music, and in other fields of cultural production, as well as in certain backward-oriented changes of lifestyles, and in the nostalgic esteem for past periods and fashions and its correlate, the general aversion against our technical civilization.

It would be very surprising if these tendencies would have had no effect on urban planning. It can therefore be assumed that the decline of systems analysis methods in urban planning in West Germany was at least to a certain degree also influenced by the general turn of the *Zeitgeist* to the antirational. If this interpretation is not totally amiss, most of the discussions about technical aspects of the methods and models, e.g. about model performance or model cost, have in fact missed the real issue. Because, if the hypothesis is only partly true, technical deficiencies of the methods and models were not the prime reason for their not being accepted: Even if they had performed better and at less cost, they would not have been accepted anyway. Rather, it can be said that the present unsatisfactory state of the art is a consequence of the fact that society did not *want* these methods and models for reasons that had not much to do with their performance or cost. If society had *wanted* something in the kind of these methods and models, it would have provided the conditions to improve them regardless of cost.

What conclusions can be drawn from this analysis for the future development of systems analysis methods in urban planning?

It seems obvious that improving the methods and models in their own terms alone would probably not have much effect on their acceptance in the planning practice. Nevertheless, there is much to be said in favour of doing just that. First, nobody would disagree that the work still to be done in terms of model specification, model technology, and model calibration is enormous. Second, it can realistically be expected that the near future will see even greater advances in terms of data availability and hardware performance than the past, which will make modelling concepts feasible which are still utopian today. However, those who decide to work *only* in this field probably will have to be prepared to work mostly in a research environment at the university, unless they are willing to offer their services to clients of questionable respectability.

Those, however, who wish to see their methods and models be put to use in the service of public policy making and planning, must do more than that: They must make society *want* the methods. How can this be accomplished?

Unfortunately, systems analysis methods have so far been undiscriminatingly associated with being inseparably linked to technocratic planning. For this misunderstanding the systems analysts and model builders themselves are to be blamed, as they have in the past failed to demonstrate that there is nothing inherent in systems analysis techniques which reserves them exclusively to one particular style of planning (Fehl, 1976). On the contrary, systems theory offers a great variety of concepts and techniques directed towards decentralization of control, system transformation, conflict resolution, and learning. However, except in laboratory settings, almost nothing of this potential has been explored or demonstrated, let alone effectively introduced into urban planning.

But in fact this potential of systems analysis methods offers the only chance of their survival in urban planning. Various proposals have been made to exploit this potential (cf. Wegener, 1978). All of them are based on some concept of a *communicative* planning process embracing all groups of urban society in which systems analysis methods serve as *channels* or intelligent communication media for conflict analysis and conflict resolution. Planning by enlightened discussion is an old dream of planning theorists in the United States (Etzioni, 1968; Friedmann, 1973) as well as in West Germany (Senghaas, 1967; Naschold, 1968; Offe, 1969; Fester, 1970; Fehl, 1971; Habermas, 1973). However, none of them offers any advice how in the face of the "unalterable low attention potential of human experience" (Luhmann, 1967) it can be brought about.

Of course, there is no guarantee that systems analysis techniques can. Too many problems have to be solved, e.g. how to make systems analysis techniques available to a large public, how to overcome the enormous didactic difficulties, how to handle the privacy issue, how to channel the information explosion, how to structure the communication process, how to prevent its abuse. And yet, two-way TV communication, home computing, and remote access to computer networks are a technical potential too powerful to be rejected without careful scrutiny.

To choose this strategy would mean to shift the emphasis away from model refinement to questions of transfer, acceptance, man-model and man-

machine interfaces, and, of course, questions of relevance, conflict, and human values. It would force the field to undergo a fundamental transformation of goals and standards, but would at least promise the chance of a modest revival.

FOOTNOTES

/1/ I am grateful to Ekkehard Brunn, Klaus R. Kunzmann, Claus Schönebeck, and Hans-Georg Tillmann for their helpful comments on a draft of this paper.

/2/ The term "systems analysis methods" is used throughout the paper in a loose fashion to summarize a variety of methods from the fields of mathematical statistics, decision analysis, and operations research directed towards the organized or systematic processing of complex information for policy making and planning. These methods, sometimes also called "systems engineering methods", have in common that they attempt to analyze, explain, forecast, and evaluate observed phenomena and processes, including societal and economic ones, in terms of quantitative dimensions in the fashion of the natural and engineering sciences. Another common feature of these methods is the fact that their application usually requires the use of electronic computers.

/3/ More details on computer applications, urban models, and software development for urban planning in West Germany (with references) are contained in an earlier paper (1979) which is in a way a companion paper to the present one.

/4/ This and all following quotations throughout the paper are my own translations.

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