Walter Isard, regional science and spatial planning

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Introduction

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The origins of regional science

Regional science as a field of study is widely acknowledged to have its origins in the late 1940s and 1950s and owes its existence to the herculean efforts of one man: American economist Walter Isard. Isard was deeply dissatisfied with the failure of his fellow economists to handle space in their deliberations and felt that, to remedy this, the rigorous analysis of cities and regions would benefit greatly from an inter-disciplinary approach that drew from other social sciences as well as from economics. He organized a series of informal meetings among regional researchers which began to sketch out the scope and content of a new field to be named 'regional science'. Isard emerged as a tireless advocate for regional science, first among economists, and later sociologists, geographers, planners, economic historians and political scientists. He was able to tap into a growing interest in regional problems bringing with it a demand for innovative theories and techniques that might aid analytical understanding and assist in the making of public policy (Isard 2003).

Among academics and practitioners alike, there was keen anticipation of what could be achieved in regional science. The success of these early exploratory meetings encouraged Isard to found the (then) Regional Science Association[2] (RSA) in 1954. Initially regional science was almost entirely a North American pursuit, but in the following decade-and- a- half, Isard was to devote much of his energy to founding and promoting sections of the Association throughout the world.

So, what was it that the Regional Science Association hoped to achieve? Here it is helpful to quote from the constitution:

> "…..the main objective shall be to foster exchange of ideas and promote studies focusing on the region and utilizing tools, methods and theoretical frameworks designed for regional analysis, as well as concepts, procedures and analytical techniques of the various social and other sciences." (quoted in Isard 1998, 1)

On this last point, Isard was particularly keen to encourage dialogue between academics from different disciplines. Thus, for example, in planning the programme for the 1956 Meetings in Cleveland, he invited five speakers to address the conference on the contribution they felt regional science would make to their discipline, choosing to focus upon geography, city planning, economics, sociology and political science. In those days there were no parallel sessions which meant that delegates had the chance to hear the views of those from other subjects than their own. In this chapter, the contribution of regional science to one of those disciplines, city planning, is explored.

The chapter in outline

This chapter focuses on the evolving relationship between regional science and city planning over the sixty-five years since the Regional Science Association was founded, emphasizing throughout regional science methods and the scope they may offer to help the planning analyst. It reviews some of the early attempts to make planning more 'scientific' before examining the efforts of Walter Isard and others to involve planners[3] in regional science. "Bringing planners on board" raised its own

[2] Re-named the Regional Science Association International (RSAI) in 1991.

[3] No single term is used to describe planners in this chapter. The term chosen varies according to the context in which it is being used. At different points the terms 'planners', 'city planners', 'regional planners' and 'spatial planners' appear as appropriate.

particular difficulties since many planners were unprepared for the mathematical and statistical approach that characterized regional science. It was only once the first regional science textbook, *Methods of Regional Analysis*, had been published that regional science methods began to reach a larger audience of planners. Isard's move to Penn proved to be crucial in terms of the relationship with city planners and the chapter identifies Robert Mitchell, then head of the planning school, as Isard's key planning ally in endorsing regional science as a valuable aid to city planning. The chapter highlights three demonstration projects from the 1960s in order to illustrate some of the most advanced regional models of that time and, where feasible, their application. The chapter then turns to Isard's efforts in the 1960s to take regional science to Europe, focusing on Britain where it turned out to be much more difficult to establish an RSA section than he expected. It examines how regional science methods entered British planning through Brian McLoughlin's so-called 'systems approach' and underlines the important role of Alan Wilson – himself a strong advocate of planning analysis - in getting regional science off the ground in Britain. The chapter describes the pragmatic way in which British practitioners view the full range of planning methods, including those emanating from regional science. It draws attention to the big part now played by firms of consultants in providing planning analysis, a situation brought about by the diminished resources of local authorities. In a final section, the chapter reviews the updated version of the Methods of Regional Analysis text questioning whether it has anything to offer the planning practitioner. And if planning techniques no longer feature as part of regional science meetings what other forum exists for them? The chapter ends by drawing attention to a new methods text, Klosterman et al (2018)the first in many years a format from which regional scientists can learn and suggesting that the time may have come for a second edition of Isard's own undergraduate regional science text.

Bringing planners on board in the early days

Before regional science

City planners have long debated the role of surveys in the making of plans. An important early influence was a series of major social surveys on both sides of the Atlantic (Batey 2018), notably in Pittsburgh and Chicago in the US, and London and York in the UK, in the early years of the twentieth century. They generated substantial publications documenting in considerable detail the plight of the poor in large cities and making an urgent call for government action. This led to greater awareness among planners of systematic survey methods, the use of statistical methods to analyse survey results, and the role that social mapping could play in presenting those results. In particular, the Pittsburgh survey of 1907, led by Paul Kellogg, encouraged many American planners to undertake systematic data-collection exercises. This activity was spurred on by an efficiency craze that swept the country from 1911 onwards, linking data gathering with *scientific management*, promoted by Frederick W Taylor. 'Taylorism', as the movement became known, was embraced enthusiastically by many leading business leaders, city officials, and politicians. Understandably, many city planners felt that in order to convince civic leaders of the merits of their city plans, they too needed to be more scientific in their diagnosis of a city's problems (Scott 1969). In their view, planning was about more than civic beautification, or the City Beautiful. Some went so far as to present planning as an exact science – the City Scientific (Ford 1913). Although the City Scientific movement failed to attract lasting support, it nevertheless serves as a useful precedent for what followed many years later when Isard was seeking to launch regional science.

There are several other landmarks in the 'pre-history' of regional science. The *Regional Plan of New York and Its Environs* (1929) was the first long-range, region-wide plan of its kind. It collected and examined extensive quantitative data about demographics, population distribution, and economic conditions; it advanced the development of population projection methods; it first introduced economic base theory; and it developed new theories of intra-urban location. The plan stands as an exemplar of the important contribution applied (and interdisciplinary) social science can make to regional planning.

The US *National Resources Planning Board* (1933-43), a small independent federal agency reporting directly to the President, did much to advance the analysis of industrial location, culminating in a major report, *Industrial Location and National Resources* (National Resources Planning Board 1943). The methodology set out in this report represented a major advance for contemporary planning practice, which, in the view of Friedman and Weaver (1979), was unsurpassed decades later as a framework for industrial promotion. Significantly, many of the leading planners and economists subsequently involved in creating the RSA, including Isard himself, were at some time staff members of, or consultants to, the NRPB.

Helping planners to benefit from regional science

Regional science came at a very good time as far as city planners were concerned. By the mid-1950s, there was burgeoning interest in coping with high levels of projected growth in metropolitan regions, and the implications this would have for planning the transportation system. In the mid-1950s, fresh thinking about plan-making was starting to emerge. In two important books, Meyerson and Banfield (1955) introduced the notion of a rational planning process, allied to rational decision theory, while Mitchell and Rapkin (1954) pointed to the need for planners to understand, and to plan for, the inter-relationship between land use and traffic. Arguably, more so than at any point in the previous fifty years, planners were receptive to advances in planning technique.

It is not surprising, therefore, that from the outset, city planners played a full part in the Regional Science Association. Isard, who had earlier worked with Wassily Leontief on the Harvard Economic Research Project, took up a post in the MIT planning school as a regional economist, a position that carried with it the Directorship of the Section of Urban and Regional Studies. This provided him with ample scope to work on a range of applied regional research projects (Isard and Coughlin 1956a and 1956b), while at the same time continuing to develop the theoretical side of regional science (Isard 1956).

Isard set high academic standards for regional science. He pitched the first RSA conferences at a high technical level but quickly realized that city planners in particular were not trained to think of regions in an abstract way and generally had little grounding in mathematics and statistics that would enable them to fully understand and apply the new regional science techniques. He therefore took steps to 'bring planners on board', organizing joint meetings of the American Institute of Planners and the RSA. From 1956 onwards these meetings focused on economic base analysis, gravity models and inter-regional linear programming models.

Isard himself played a major role in these sessions, as did his research students Ben Stevens, Robert Coughlin and Gerald Carrothers. Indeed, the lectures drew extensively on their PhD work and were technically very demanding. Clearly some of the material would be familiar to the small

minority who were regular readers of their professional journals, but for the majority the content of the lectures, and the overall approach, were entirely new. Isard expressed himself well pleased with the level of interest generated among planners and others working in the expanding field of metropolitan planning. But among his audience there were undoubtedly those who needed more convincing about the value of regional science. The fact that the cynics amongst them gave Isard the nickname "Wizard" suggests that they were left mystified by his presentations[4]. By catering deliberately to the high fliers, he ran the serious risk of alienating many potential adopters of these new ideas.

Notwithstanding the limited success of this educational venture, concern continued to mount over the widening gap between academics and practitioners in regional science. This led to the preparation of a statement outlining specific ways in which this gap could be filled: *Needed Metropolitan and Urban Research*. The paper was discussed in the business meeting at the 1958 RSA Meetings in Chicago. A committee, made up of representatives from most of the disciplines contributing to regional science, was set up to explore what exchange of information, stimulation of research and types of meetings would best serve the specific metropolitan field and how such gaps could be filled by the RSA.

A textbook for regional science methods

With hindsight, it is clear that one of the biggest obstacles to bringing planners on board was the absence of a comprehensive textbook, covering the full range of regional science methods. The solution came in 1960 with the publication of *Methods of Regional Analysis.* Written by Isard, again in collaboration with his PhD students, the book was an extremely ambitious undertaking, running to 784 pages. First conceived in 1954, the book was intended:

> "….to make available in a relatively simple and clear-cut form the several techniques of regional analysis which have proved to have at least some validity. An attempt is made to set forth the virtues and limitations of each of these techniques so that the research worker and policy maker may be able to judge its applicability for a particular regional situation and problem." (Isard et al 1960, xi)

Topics covered include population projections, migration estimation, economic base analysis, regional multipliers, industrial location analysis, industrial complex analysis, and input-output analysis. There is a remarkably full bibliography that captures a vast amount of what was then current literature, providing a valuable resource for those readers wanting to delve more deeply into the subject material.

The most challenging part of the book comes in the final four chapters which set out the techniques of interregional linear programming, gravity models, and, most ambitious of all, an attempt to integrate the various techniques under a single framework called Channels of Synthesis. Unlike the earlier sections of the book that deal with the state of the art, these chapters are included to show what the future of regional science might hold. Whereas the bulk of the book may be seen as directed largely towards an audience of practitioners, these later chapters are aimed at (present and future) academics wishing to embrace the new field of regional science.

[4] Recollected by John Reps, Cornell University: interview 21 June 2017

In a retrospective review written in 2009, Andrew Isserman described the book as "the practical side of regional science that caught on worldwide" commenting that "It is more thorough and thoughtful than the slimmer texts written since." and "Any planner who uses these methods will benefit from the rock-solid, wise discussion it provides." (Isserman 2009)

Methods of Regional Analysis would no doubt have played an important role in Isard's efforts to spread the word about regional science beyond the United States. Even today, nearly sixty years after it was published, the book is a key reference, frequently quoted. Anyone reading it now, however, will find that the methods described are largely those originating from economics: the book came too early to be able to reflect the growing interdisciplinary nature of regional science. This means, for example, that it omits important developments in quantitative geography, dealt with fully in Peter Haggett's influential *Locational Analysis in Human Geography* published just five years later (Haggett 1965). And those expecting to learn about suitable computational methods will be disappointed: the use of computers was then in its infancy. Perhaps more surprisingly, there is very little coverage of matters to do with data, especially since this was something that loomed large among those participating in the early discussions about regional science (Isard 2003).

Regional science and Penn

Isard's planning ally: Robert Mitchell

Isard's move to the University of Pennsylvania (Penn) in 1956 proved to be a milestone in the development of regional science, and particularly in its evolving relationship with city planning. At MIT, he and his colleague Lloyd Rodwin had been developing plans to establish a PhD program in Planning Analysis. When the proposal was deferred, because of the uncertainly surrounding the impending arrival of a new departmental chair, he began to look elsewhere. He chose to move to Penn, ostensibly because the Economics Department was at a low ebb and was receptive to a change in direction in order to remain competitive. This, however, was only part of the story: he could also see that he would have important allies in the Department of City and Regional Planning. Established some five years earlier, the Department had succeeded in attracting an extremely strong faculty. Table 1 lists those planning faculty members based at Penn at around the time that Isard took up his appointment as a Professor of Economics.

A key figure here was Robert Mitchell who had joined the Department when it was created in 1951 and had served as its first Chairman. Mitchell's contribution to regional science turned out to be crucial. He had extensive experience as a city planning practitioner, working on housing renewal projects in Chicago in the 1930s and with the National Resources Planning Board in the early 1940s as head of its urban division. His main project with the NRPB was to develop a standard method of plan-making capable of being used in cities lacking trained planning staff. Tacoma, Corpus Christi and Salt Lake City served as examples of how the method could be applied in practice. At Columbia University in the early 1950s, he had collaborated with Chester Rapkin on a path-breaking study *Urban Traffic: A Function of Land-Use* (Mitchell and Rapkin 1954) which did much to advance thinking about transportation modelling. In the view of one of his close collaborators, Henry Fagin, Mitchell had "emerged not only as keen analyst of urban structure and change but also as a respected leader of public thought and action" (Fagin 1963). It was perhaps not surprising, therefore, that Mitchell was chosen as one of the early Presidents of the Regional Science Association, indeed he was the first person, other than Isard himself, to lead the organization.

Mitchell and Isard had worked closely together over the years, so that, for example, it was Mitchell whom Isard chose to chair one of the early (1952) interdisciplinary metropolitan regional research. (Isard 2003, 53)

Mitchell's Presidential Address, delivered in 1960, looked at how regional science could assist city planning and outlined new thinking about the plan-making process, drawing on the recent work of Meyerson and Banfield on rational decision-making in planning. This provided a useful framework for thinking about analytical planning methods and the role they could play. Mitchell had this to say about what regional science means for the planner of cities:

> "It can…help provide a discipline for thinking about problems. Even if the method in all its details may be non-operational, the framework may be still valid; and if one has to make assumptions, even if non-quantitative, they can be more easily recognized." (Mitchell 1961a)

This strong endorsement of the value of regional science to city planning came at just the right time and was able to counter some of the seeds of doubt that had been sown. Mitchell went on to state: "Even in its early stages, regional science can permit us to revolutionize planning method." Like other Presidential Addresses, Mitchell's paper was published in the *Papers of the Regional Science Association*. Significantly, however, a very similar version found its way into the *American Institute of Planners Journal*, thus ensuring that Mitchell's message was received by a wider cross-section of academics and practitioners. (Mitchell 1961b)

Testing and demonstrating regional models

Soon after arriving at Penn, Isard established a PhD program in regional science and two years later, in 1958, was able to found a Department of Regional Science and a new journal, the *Journal of Regional Science*. In the 1960s, the new Department set about establishing a series of projects intended to demonstrate how regional models could be constructed and applied. Many of the projects were undertaken in conjunction with the newly-established Regional Science Research Institute.

Three examples have been chosen here to illustrate the type of demonstration projects that were undertaken. Two were based at Penn and focused on the Philadelphia region, while the third was carried out over a number of years in Nova Scotia, Canada by Stan Czamanski from Cornell University. At a time when the field was rapidly gaining new followers, these were cutting edge studies that gave regional scientists something to aspire to, while at the same time recognizing there were likely to be pitfalls along the way.

The Philadelphia Regional Input-Output Study

The first of these projects was the *Philadelphia Regional Input-Output Study* designed to test the feasibility of building a highly-detailed (500 sector) regional input-output model. Starting in 1962, the project was initially intended to explore the impact of the National Aeronautics and Space Administration (NASA) upon the Philadelphia economy but later evolved into a series of wider investigations of the impact of federal agency expenditures. Most notable is a study concerned with the impact of Vietnam War expenditures (Isard and Langford 1969).

The *Philadelphia Regional Input-Output Study* was extremely ambitious, especially given the modest computing facilities available at that time: never before had anyone attempted to build a regional model on such a large scale and many practical lessons were learnt along the way. These were carefully documented as it was intended that other researchers should have access to the data for their own research. Interestingly, the direct coefficients input-output table itself was made available, in hard copy form, for a minimal charge to other researchers in the field, in what was essentially a very early example of data sharing. The project as a whole must be regarded as a mixed success: a big achievement in terms of data collection and handling but probably too ambitious, and long-drawn out, to be useful to the bulk of regional scientists at the time. Some years later the experience, good and bad, was recorded in a book, described by Isard in the Foreword as "a book which brings regional science down to earth and firmly roots it in the world of reality." (Isard and Langford 1971). The Philadelphia Study was like no other, before or since, in its close attention to the nitty-gritty aspects of data collection and handling, and was, in its own way, a landmark in the development of applied regional science.

The Penn-Jersey Transportation Study

The second example is also based on Philadelphia: The *Penn-Jersey Transportation Study*, covering the nine-county Camden-Philadelphia-Trenton metropolitan region. Begun in 1959, the Study owes much to Robert Mitchell who wrote the study brief. At about the same time, Mitchell was advising a US Presidential Committee on land-use transportation planning (Mitchell 1959) and therefore well-informed about developments elsewhere, such as Chicago, Detroit and Pittsburgh. Mitchell's brief for the Penn-Jersey Study placed particular emphasis on the two-way relationship between land use and transportation, so that:

> " …the recommended transportation system should provide convenience and economy of travel, but also that its influence on the development of the area should tend toward facilitating a desired pattern of regional development. Stress is to be laid on the design and analysis of alternative patterns both of possible transportation systems and of the future regional development likely to be associated with each system." (Penn-Jersey Transportation Study 1959)

The Penn-Jersey Study was well funded and viewed at the outset by the Federal Government and the Bureau of Public Roads as both a research and a practical planning effort. There was an expectation that, rather than being a one-off exercise, the Penn-Jersey Study would provide the springboard for a permanent regional planning process (Fagin 1963). It soon emerged that the value of the Penn-Jersey Study was as a series of research experiments, each of them ambitious and innovative, and leading in due course to fruitful academic research on urban modelling. There is little or no evidence though that the Study had any direct impact on planning practice.

Britton Harris, seconded from the City and Regional Planning Department at Penn, had a big influence on the design and execution of the research programme. Early in the Study a scoping exercise gathered information about concepts and techniques being applied in other metropolitan planning studies. In the Penn-Jersey Study there would be much more emphasis on developing a suite of models covering land use, transportation and their interaction. Today, the Penn-Jersey Study is perhaps best remembered for the so-called Herbert-Stevens Model, developed by Penn

regional science doctoral student John Herbert and his supervisor Ben Stevens. In a pioneering application of linear programming, the model is designed to distribute households to residential land in an optimal configuration. It was part of a larger model designed to locate all types of land-using activity. (Herbert and Stevens 1960)

As far as city planning is concerned, the Penn-Jersey Study is important because of its wider influence on *integrated* land use transportation planning, in technical and conceptual terms, rather than its immediate effect upon the planning of the Penn-Jersey Study area. And like the *Philadelphia Regional Input-Output Study*, because it was ambitious and using largely untried techniques, it was very much a matter of learning lessons as the Study went along. It did serve to demonstrate what could potentially be achieved using a large-scale regional model even though in practice planners had to settle for less.

Czamanski's regional studies in Nova Scotia

The third and final example is based on Stan Czamanski's regional studies in Nova Scotia. Czamanski, born in Poland, had a remarkably broad education, including textile technology in Lodz, foreign trade and textile technology in Vienna, economics and social science in Geneva, philosophy in Jerusalem and culminating in a PhD in regional science in 1963 with a thesis that developed an early regional econometric model. His previous career had included spells as an urban and regional planner, in his native Poland, and as the production manager of a textile company in Israel. After gaining his doctorate at the age of 45, Czamanski was appointed to a post in the Department of Regional Science at Penn. His academic career developed quickly from that point on and he moved shortly afterwards to Cornell University, working with colleagues to establish the field of regional science there.

At the same time, Czamanski began what proved to be a ten-year research collaboration (1966-76) with the Institute of Public Affairs at Dalhousie University, Nova Scotia in Canada, spending his summers there working on a series of regional model-building studies, as he put it "… testing and sharpening the tools of regional analysis."(Czamanski 1972, xvii)

Czamanski went on to explain the purpose of his research studies:

> "My work in Nova Scotia …provided me with a long-sought opportunity not only of experimenting under realistic conditions with methods of analysis but of expanding an hypothesis of urban growth, focusing on locational attractiveness and investment equilibrium as significant determinants of progress." (Czamanski 1972, xvii)

Nova Scotia was a stagnating region: two of the principal industries – coal mining and iron and steel – were facing serious problems, per capita income was low, and labour force participation rates were low too. Czamanski found that while there were many planning initiatives, there was a distinct lack of coordination at the regional level, with the result that there no agreed-upon planning objectives. This meant that the set of regional studies had to be designed to provide a framework and be capable of answering a host of pertinent questions. Czamanski had to anticipate the sort of questions that might be relevant to the policy-makers whose job it was to deliver a better future for the province. He identified for main topics to be addressed in his studies:

- An attempt to *assess and measure backwardness and decline*: low per capita output; per capita income; it was important to consider the role of non-economic goods but this would be difficult to measure.
- *Industrial development*: whether to try to attract new industries by investing public funds in infrastructure or by providing direct subsidies; deciding which industries to promote?
- *Location within Nova Scotia*: one growth point or several? What would be the cost of re-location and re-settlement? What would be the value of abandoned assets?
- *The costs of development to achieve socially-desirable results*: what factors determine the rate of economic advance? What is the optimal allocation of resources to promote growth?

This list of topics proved very helpful in structuring Czamanski's regional studies. And regional planners in other stagnating regions were likely to find that the contents of the list also reflected the conditions they were facing themselves and so could identify with the research. Czamanski wrote up the results of his first five years' research in Nova Scotia in a book that was notably successful in demonstrating the relevance of the regional science techniques he used (Czamanski 1972). And more so than either of the Philadelphia studies, there was a refreshing degree of realism in the Nova Scotia work reported in the book.

Regional science methods and British plan-making

The slow take-up of social science among planners

Compared with their American counterparts, British planners were slow to discover the social sciences and the potential they offered for enhancing and strengthening the plan-making process. However, during and immediately after the Second World War, there were signs of change. In a series of what Hebbert (1983) has described as "daring experiments", small teams of planners were able to carry out regional surveys that drew upon geography, sociology and economics and began to demonstrate the value of quantitative methods in the systematic analysis of data. In two areas in particular, in the English West Midlands and in Middlesbrough in North East England, planners were able to show what could be achieved with limited resources and raised the bar with respect to plan content, presentation and methods[5].

However, the results of the experiments filtered through very slowly to British planning practitioners. Lloyd Rodwin, the American land economist and sometime MIT colleague of Isard, spent a sabbatical in Britain in the early 1950s. In a classic paper (Rodwin 1953), Rodwin identified what he called the "Achilles Heel of British Town Planning" He was moved to comment as follows:

*"*Rigorous socio-economic analysis and systematic research rank among the key weapons of the planners. They have been neglected, partly because many planners do not yet know how to use them." (Rodwin 1953, 34)He attributed this to a general absence of research in planning, putting the blame partly on the universities where, it seemed to him, there was little or no interest. He also pointed to the almost complete neglect of the social sciences.

Part of the answer to this problem lay in the system of planning education which was then firmly based on physical planning. An important development was the publication of the UK Government's

[5] A fuller account of this work may be found in Batey (2018).

Schuster Report (Schuster 1950). This supported the opening-up of planning education to social scientists. As a result, by the early 1960s, many more social scientists were being employed in the British planning system, and it became more realistic to expect plan-making to reflect this.

Isard's efforts to establish a British Section

In this respect, Isard's early efforts to found a British Section of the RSA are instructive. In 1960 he had made a tour of Europe, stopping off for conferences and workshops along the way, intended to raise the profile of regional science. The time was ripe for new developments: the North American RSA was by now well-established and on a stable footing; Isard had published his textbook, *Methods of Regional Analysis*, a showcase for regional science methods; and the RSA constitution now made allowance for the formation of sections. A meeting held at the LSE, in London, in July 1964 provided him with a platform to launch the new section, or so he thought. It attracted a big turnout, much bigger than Isard had anticipated or indeed wished for. Interest in regional planning was growing rapidly as a result of the actions of a recently-elected Labour Government in creating a framework for regional planning. Half the audience of more than one hundred attending the LSE meeting were planners concerned with solving practical regional problems. Isard's notes from the time (see Figure 3) indicate that he attempted to align his presentation to their interest, but that much of what he had to say undoubtedly went above their heads: in fact a repeat of what happened in the US during the early days of the Regional Science Association. In this case, however, the consequences were more far-reaching, with several of the most influential people attending deciding to found their own organization, the Regional *Studies* Association (Hopkins 2015).

Brian McLoughlin's systems approach to planning

By the late-1960s things begin to change. British planners in the larger local authorities had begun work on a new type of strategic land-use plan, the structure plan, and needed guidance on how these plans might be prepared. A series of articles by Brian McLoughlin, published in the Town Planning Institute's professional journal, suggested how the planning process might be re-interpreted in the light of new thinking emerging from the US. (McLoughlin 1965 and 1966) A paper delivered by McLoughlin to an audience of planning practitioners at the Town and Country Planning Summer School in Belfast in 1967 (McLoughlin 1967) brought these ideas together in what McLoughlin called the "Systems Approach." He had recently been seconded from his post at Manchester University to direct a sub-regional planning study of Leicester and Leicestershire, a growth area in the English East Midlands and this gave him and his planning team the opportunity to use some of the new techniques 'for real'. Like Robert Mitchell, McLoughlin had a mixed background in academia and planning practice. This increased the likelihood of planners listening to what he had to say. McLoughlin was clearly an admirer of Mitchell's work, commenting that:

> "No better description of the plan-making process has been given than that by Mitchell (1959) to a US Presidential Committee." (McLoughlin 1969)

Alongside his work as Director of the *Leicester and Leicestershire Study*, McLoughlin found time to write a textbook about his Systems Approach, published in 1969. As one of a small number of British planners who kept up with the American planning literature, McLoughlin acted as a valuable conduit in communicating these new ideas to an audience of British planning practitioners. He used Mitchell's ideas about the continuous metropolitan planning process to structure the book, blending

discussion of American work on land use transportation planning with ideas drawn from systems theory and cybernetics. His use of the term "Systems Approach" at the time was new to planning, but was familiar to academics working in management science, thanks to the work of Stafford Beer. His two books *Cybernetics and Management* (1959) and *Decision and Control* (1966) are frequently quoted in McLoughlin's textbook. Moreover, it probably suited McLoughlin in promoting the book to use a phrase in the title that suggested a move away from traditional physical planning.

The textbook was a great success, capturing the imagination of students and practitioners alike. It was not highly technical – in more than 330 pages, there is not a single equation - it nevertheless did just enough to persuade his readers what might be possible. For many readers it was perhaps enough to learn at the very least about a rational plan-making process and to recognize that inter-relationships are important, whether it be in cities, plan-making or in making development decisions.

Alan Wilson's role in advancing planning analysis

Having failed in his earlier attempts to found a British Section of the RSA, Isard tried again in the late 1960s, and this time was successful. He was assisted by Allen Scott who at the time was seconded from his post at Penn to the Joint Unit for Planning Research at University College London. Working with David Harvey and Alan Wilson, Scott organized the first conference of the newly-formed Section in 1967 and began to build up a network of British regional scientists. Scott shared Isard's view that regional science must be rigorous and challenging. This was reflected both in those invited to give papers and in the make-up of the audience. Significantly, this was a younger set, many of whom had done graduate work in North America, and therefore knew something about regional science. There was hardly any overlap with the larger group that had rejected Isard's initial plan to form a British Section at the LSE meeting in 1964. The conference programmes were dominated by presentations from mathematicians, transportation analysts, statisticians, operational research specialists, as well as quantitative geographers and numerate planners. Interestingly, unlike regional science in North America, other parts of Europe and Japan, there were comparatively few economists, at least in the early days of the Section. On the other hand, there was a strong representation of planning academics and practitioners. Partly this reflected the interest in analytical techniques associated with the new structure planning. Some, no doubt, would have been inspired by McLoughlin's textbook, and had gone on to teach themselves the mathematical, statistical and computing skills needed to apply the new methods.

Just as important, however, was the academic leadership of Alan Wilson, who served as Chair of the British Section for its first seven years. A mathematician by training, Wilson's route into planning and regional science was via transport modelling. For a short time he led the Mathematical Advisory Unit in the UK Government Ministry of Transport where his biggest project was to develop a suite of models for use in transport planning. The test-bed for this work was the Greater Manchester metropolitan area, then known as SELNEC (South East Lancashire and North East Cheshire). The development of the SELNEC Model paralleled similar developments in the US and was notably successful in its application to land use transportation planning (Wilson et al. 1969); Nickson and Batey 1978). Wilson's main technical contribution at the time was in the development of spatial interaction models derived using an entropy maximizing procedure (Wilson 1971). Wilson soon went on to lead the Centre for Environmental Studies in London and from that base recruited a team of researchers to work on planning techniques. And when he moved to a Chair in Geography at Leeds

University in the early 1970s, he maintained this research interest in planning analysis, while at the same time developing a strong research and development programme based on applications of regional science methods in business. One of Wilson's other major contributions was as the founding editor of *Environment and Planning,* first published in 1969. For many years this journal focused on analytical approaches to planning, setting the same high standards of rigour that Isard had encouraged throughout his development of regional science and the RSA. Throughout the 1970s, McLoughlin's book continued to influence British planners who developed an appetite for regional science methods to the extent that an active user community emerged (Batey and Breheny 1978a and 1978b). By the early 1980s, however, some of the novelty of regional science methods had worn off. It prompted Batty in 1982 to remark "It is an open question as to whether planning will swing back to such a technical approach during the next decades." (Batty 1982).

Pragmatic practitioners

The answer to Batty's question is not as straightforward as might first appear. Planners were not abandoning methods, they were merely less self-conscious about the use they made of them. The interest of British planning practitioners in methods was a pragmatic one based on identifying useful tools that would yield useful results without adding significantly to the time taken to prepare a plan or develop a policy. Unlike academic researchers, practitioners were generally not impressed by the quest for greater sophistication.

So the British planner's toolbox included not only the types of analytical methods to be found in Isard's 1960 textbook but also a wider range of methods, quantitative and qualitative, supporting the different stages in the (rational) plan-making process necessary to prepare a plan or keep it up to date. They are systematic, formal and documented so that, if necessary, their results can be replicated. This broad coverage is well represented in Bracken's (1981) planning methods textbook. Bracken identifies three main types of method: methods for urban planning and policy making; methods for urban research and methods for urban policy analysis. It encompasses forecasting methods, simulation models, methods for generating and testing alternatives, a whole range of evaluation methods, methods for plan monitoring and review; methods for various types of impact analysis, and methods for analysing, manipulating and presenting geographical information. While some of these methods may be a product of planning research, it is just as likely for them to be drawn from another discipline, such as economics, sociology, operational research, quantitative geography, landscape architecture, management science or geographical information science.
The second point to make in relation to Batty's question is that there has been a big shift in who uses planning methods and how often. British plan-making tends to run in cycles of approximately twenty years and when plan-making is at its peak, then there is renewed interest in planning techniques. So, for example, a new system of development plans introduced in the early 2000s was accompanied by UK Government advice on such matters as options (aka "alternatives"), plan generation and appraisal (see Figure 4). And what is often the most contentious component of spatial plans, the forecasting of local housing needs, is now in the hands of consultants that have developed their own modelling packages for this purpose. As Figure 5 shows, consultants now offer a range of products, each aimed at meeting specific technical requirements, for example, *FEMAplan: Defining Functional Market Areas* and *Integrate: Assessing Development Needs through an Integrated Evidence Base.*

So, whereas in the past a local planning authority would have had a small team capable of carrying out these technical tasks in-house, now it is much more likely that a firm of consultants will be commissioned to do the work. This reflects the large budget cuts over the last ten years which mean that local authorities can no longer afford to have technical specialists on their payroll. The planning analyst will probably be performing the same set of tasks for a number of different local authorities and so it is important to ensure that the commissioning is done well and meets their requirements. It almost goes without saying that a local authority which has de-skilled may find it difficult to specify what it needs.

Regional science and city planning: parallel tracks

This chapter has shown that city planners were to the fore in the early discussions about regional science. City planning was seen as a valid and worthwhile destination for much of the analytical work carried out by regional scientists. A sub-field of applied regional science developed, focusing on the one hand on policy-focused work connected with particular regional problems, and on the other hand, methods-focused work intended to increase analytical understanding of cities and regions in ways that would ultimately aid practical plan-, and policy-making.

Methods of regional analysis revised

In the early days of regional science, the textbook *Methods of Regional Analysis* offered a good guide that covered a large proportion of the methods then available. Over time, inevitably, the book became obsolete. Recognizing this, in the 1990s Isard assembled a team of regional scientists to produce a new edition. After a writing process that took several years, eventually the new book was published in 1998. (Isard et al 1998). However, unlike its predecessor, which had a wide readership, the new book was aimed specifically at graduate students. By this time, the field had grown to the extent that it was impossible to encapsulate regional science methods in a single volume, in enough depth to provide the foundation for advanced research.

Nearly forty years after the first edition, much had changed, notably in the development of econometrics and spatial micro-simulation and both of these topics are given detailed treatment in the new volume. And while there is some mention of GIS, it hardly begins to break the surface of the subject. The title of the book, *Methods of Interregional and Regional Analysis,* now reflects a much fuller coverage of inter-regional analysis, an important distinguishing characteristic of regional science. Disappointingly little is said in the new book about the methods derived from disciplines that contribute to regional science, other than economics. This is particularly so for city planning which is almost entirely ignored. Fortunately, alternative textbooks are available and in recent years, a planner seeking a general treatment of quantitative planning methods would have the option of consulting Wang and vom Hofe's 2007 book (Wang and vom Hofe 2007). This too is disappointing, however, in that the coverage of methods sticks very closely to those that have been available since the very early days of regional science.

Methods for planning practitioners

Nowadays, while there continues to be a thriving research interest in matters to do with policy, methods-based work directed at planning practitioners has all but disappeared from calls for papers and conference programmes, Regional science meetings are clearly no longer a forum for city

planners interested in advancing planning analysis: it is rare to find more than a handful of city planners at a regional science conference.

This begs the question as to where such matters are discussed, if anywhere. An obvious place to look would be in conferences organized for planning educators and researchers. Sure enough, the AESOP Congress in Europe regularly has a track devoted entirely to "Methods". In inviting papers for the 2018 meeting in Gothenburg, Sweden, for example, the Methods Track places particular emphasis upon harnessing new technology to support plan-making. Keywords in the call for papers specify: analytical tools; planning support systems, decision support systems, smart approaches, ICT, open source data, mobile apps, social media, generic tools, public participation GIS, visualization methods, rationality, data, and information. Arguably, these are all topics that would benefit from the kind of interdisciplinary discussions that the RSA was created to encourage. The various camps have got much to learn from one another.

One most encouraging development in the last twelve months has been the publication of a new planning methods textbook, *Planning Support Methods*. Written by Klosterman and his co-authors (Klosterman et al 2018) it is said to be only the second planning methods textbook to be published in the last thirty years. It replaces one of these texts, Klosterman's *Community Analysis and Planning Techniques* (Klosterman 1990). The new book is aimed at undergraduates and at planning practitioners and retains and expands the demographic and economic analytical and projection methods found in Klosterman's earlier book, while at the same time adding substantial new chapters on spatial analysis and land suitability analysis. The title's reference to 'planning support methods' makes it clear that here are practical methods, each of which has a specific function within the plan-making process. The book uses a real life city and county, De Kalb and Decatur, throughout to illustrate the methods that are being described and there are appendices that provide a guide to American data sources and are intended to encourage students to test the methods themselves.

The reason for describing the book in such glowing terms is to make the point that regional scientists can and should learn from its approach and that it is very often better for planners to seek to use simple, understandable, and easy-to-use methods than aiming for ever-greater levels of sophistication. More than forty years ago Isard himself wrote a regional science textbook (Isard 1975). Sometime overlooked by academics, this book succeeds admirably in giving a gentle but nevertheless authoritative introduction to the concepts, techniques and its application to policy-making. Perhaps the time has come for a second edition of Isard's *Introduction to Regional Science*.

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Figure 1:

City and Regional Planning at Penn: The Golden Era of the Late 1950s/Early 1960s

The Penn planning faculty: an all-star team:

- Robert Mitchell, Chair (Transportation Research)
- William L C Wheaton (Housing)
- Martin Meyerson (Theory and Practice)
- Walter Isard (Economics and Regional Planning)
- Ian McHarg (Landscape Architecture and Regional Planning)
- Chester Rapkin (Transportation and Land Use Research)
- David Crane (Physical Planning and Design)
- Lewis Mumford (City Form and Culture)
- Research Associates at the Institute of Urban Studies: Herbert J Gans, John Dyckman and Britton Harris
- Complementing the core faculty were research assistants Tom Reiner, Janet Scheff Reiner and Paul Davidoff

Figure 2:

Czamanski's Nova Scotia Book: Contents

1. Introduction: Study Background
2. Locational Attractiveness: The Resource Base
3. Structure of the Regional Economy: Contribution of Income and Product Accounts
4. The Industrial Basis: Contribution of Location Analysis
5. Sectors and Linkages: Contribution of Input-Output Studies
6. Invested Capital and Infrastructure: Contribution of Wealth Accounts
7. A Simple Econometric Formulation
8. Conclusions

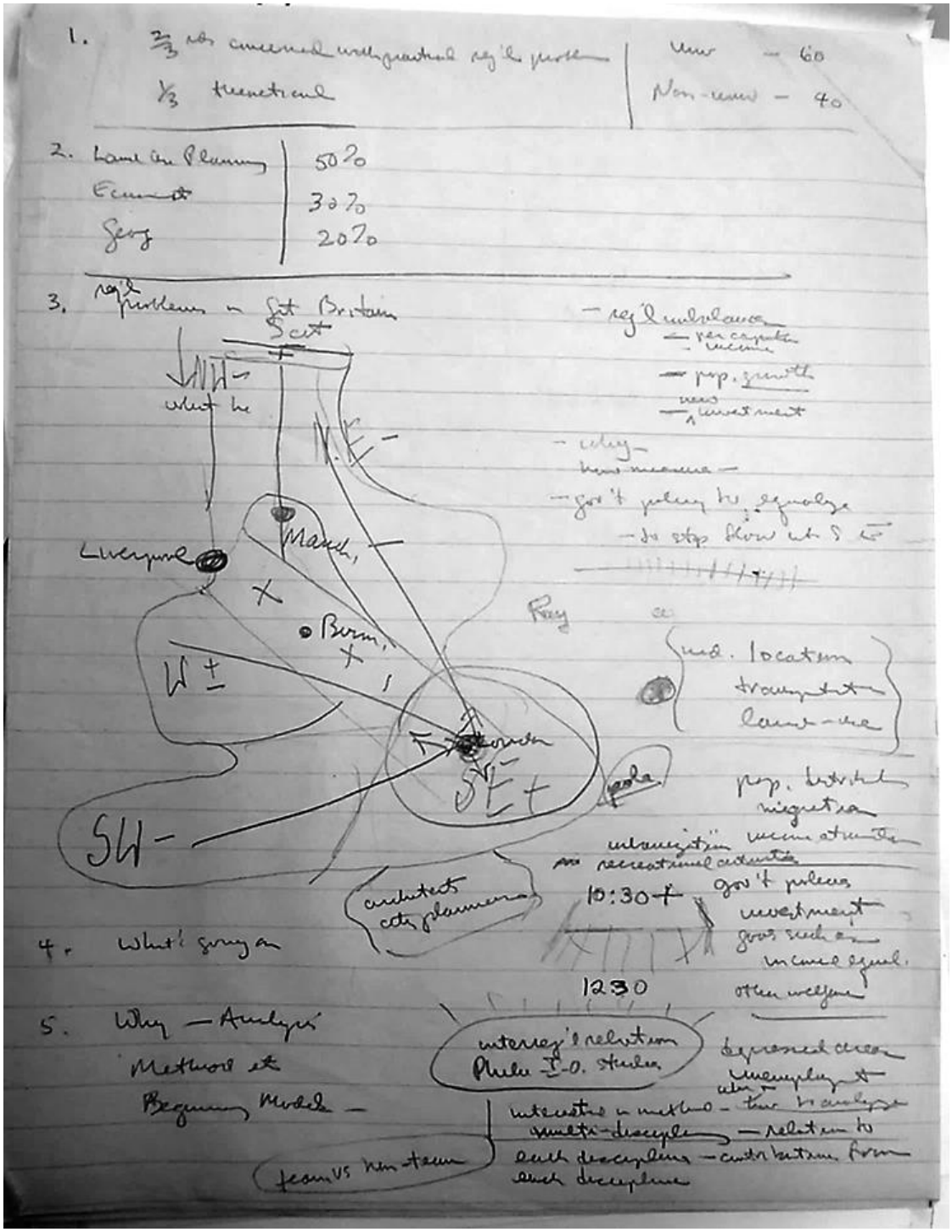

Figure 3: Isard's notes for the lecture he gave in June 1964 in which he sought to gain support for a new British Section of the RSA.

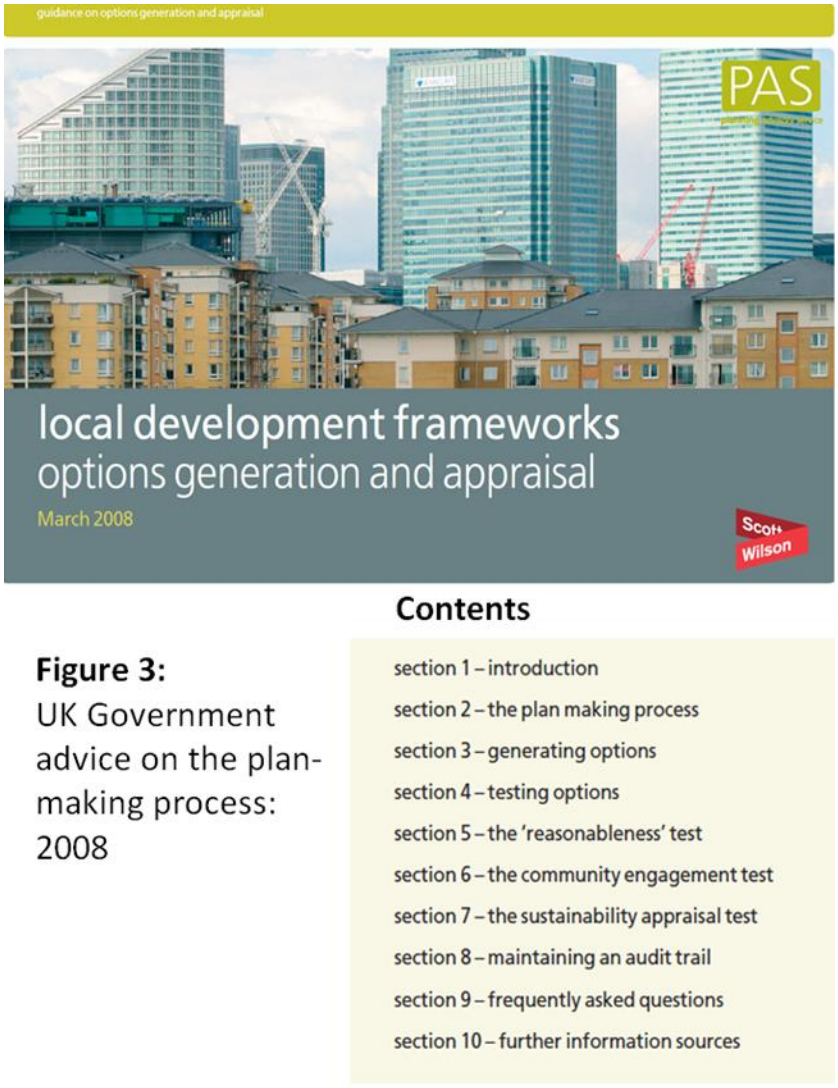

Figure 3: UK Government advice on the plan-making process: 2008

Figure 5: A consultant's prospectus 2019