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## BOOK REVIEWS

HANDBOOK OF REGIONAL AND URBAN ECONOMICS, VOLUME 1: REGIONAL ECONOMICS edited by Peter Nijkamp. Elsevier Science Publishers B.V. (North-Holland), 1986, pp. xxii, 702. Hardcover, \$65.00.

This is the most useful survey of the regional economics (science) literature since Isard's *Methods of Regional Analysis* appeared nearly thirty years ago. Nijkamp has assembled a truly impressive, international list of social scientists with the intent of providing "a definitive source, reference, and teaching supplement for use by professional researchers and advanced graduate students" (p. v). Drawing upon perspectives and problems appearing at the nexus of economics and geography, Nijkamp identifies three broad fields for which regional economics (science) has a rightful claim: (1) locational analysis for firms, facilities, and households; (2) intraregional/interregional flows and transactions and spatial interaction; and (3) regional development models. The composition of the volume follows accordingly.

In the second (and longest) chapter Beckmann and Thisse examine the concepts, models, and the principles of firms' location theory. An emphasis is placed on the choices of "economic agents whose activities are coordinated through markets or through planning authorities" (p. 87). A very extensive literature (200 references) is summarized according to the restrictions placed upon firms' decisions: short-run, medium-run, and long-run situations are considered in turn. The authors blend traditional and novel topics in an intelligent fashion, stressing the importance of market processes (and not patterns) throughout. Rather than imposing equilibrium conditions on spatial markets (as, e.g., in the case of long-run monopolistic competition), they correctly prefer to examine the existence and nature (unique or not) of spatial equilibria as determined by the expectations and actions of producing agents. In short, Beckmann and Thisse analyze the complex micro-level behavioral underpinnings of modern location theory. A good grasp of mathematics is needed to appreciate their analysis, however.

Chapter 3, written by Clark and van Lierop, focuses on household location and links "the two underlying components of housing markets and residential mobility and emigration" (p. 97). The authors reject simplistic interpretations (à la rent theory) of the housing market; instead they view that market essentially in systems terms, thereby highlighting the existence of different actors with different motivations making complex decisions that are constrained temporally, spatially, and institutionally. The chapter has two useful functions. First, the traditional literature streams of household choice and household mobility are reviewed and then seen to be integrated in the research of the 1980s. Second, a number of prevailing modeling strategies are outlined and evaluated. The virtues of nested discrete choice models are discussed at some length, since these distinguish the mobility decision from residential choice and effectively stratify markets into submarkets. While the chapter does not intensively critique much of the relevant conceptual and operational literature (the reader can pursue details in the 120 or so references), it nevertheless provides a useful historical synthesis of that literature.

Johansson and Leonardi next examine the public facility location problem, focusing especially on those cases where the consumer travels to receive benefits from a pure service/good. The authors stress that traditional issues should be extended to include (1) coordination between different (competing)

regional authorities (e.g., municipalities) and (2) the mutual accommodation of different-leveled authorities (with different objective functions) in a single institution. As a result the chapter fails to take up those very topics (e.g., the median problem, efficiency-equity conflicts) that should be included in any survey of the public facility literature. This reviewer urges the interested reader to consult Rushton's Optimal Location of Facilities or Ghosh and Rushton's more recent Spatial Analysis and Location-Allocation Models.

Spatial equilibrium analysis is the topic taken up in Chapter 5 by Takayama and Labys. Per well-established tradition demand and/or supply regions are represented by points in space and these are connected by various transport links. The simple one-commodity, two-region model is first outlined and the equilibrium solutions are specified for both the simultaneous equations approach and the mathematical programming approach. The authors go on to consider the multi-commodity, multiregion static problem using the well-known quadratic assignment model, leaving the more complicated dynamic problem to be pursued elsewhere. The chapter closes with a lengthy (and interesting) summary of applications in agriculture (stable demand and unstable supply), energy (demand responses to large price hikes), and minerals (stock adjustments for time lags) at both the world and national levels. Over 100 useful references are given in both theoretical and applied dimensions.

Part 1 of the book, focusing on locational analysis, is completed by Andersson and Kuenne, who cover the issue of spatial/regional dynamics. They are concerned with truly dynamic (endogenous time) processes, especially those employing differential and difference equations, calculus of variations, optimal control theory, Markov processes, and bifurcation/catastrophe theory. Particular attention is given to locational adjustments in spatial oligopolies, stabilities of spatial structures in transportation models, diffusion models, single-region and multiregion growth models, and factor mobility. This last topic is still one that is largely unappreciated by social scientists (e.g., we know very little about industry-specific, location-specific age distributions of capital, and how this affects—in space and time—the decisions of firms to stay or move). The chapter fails, however, to mention the regional application of adjustment theory, as recently outlined by Clark, et al. in Regional Dynamics.

Chapter 7, by Nijkamp, Rietveld, and Snickars, surveys regional and multiregional models. The conceptual and analytical advantages of multiregional models are stated at the outset. Next a historical review of modeling approaches (economic base, input-output, etc.) is provided. However, the main contribution of the chapter involves the detailed outlining of a "prototype" model having a number of interconnected modules. These modules focus on balances or supply/demand relationships in different spheres of economic activity: regional investment and consumption, the labor market, the public sector, etc. A short section then highlights national-regional and interregional linkages, stressing the advantages and shortcomings of both bottom-up and top-down models. This well-designed chapter closes with a short "perspectives" section wherein the authors admit continued neglect of supply factors (e.g., infrastructure) and various flows (e.g., capital, taxes) in current models.

Hewings and Jensen next provide a comprehensive (200 references) and enlightening review of regional, interregional, and multiregional input-output analysis. In the spirit of Leontief the authors stress relationships between input-output models and national/regional accounting systems. The first half of the chapter nicely clarifies how a family of interregional models has grown up around varying interpretations of per-unit interregional commodity flows.

Special attention is given to the construction of regional input-output tables, and short summaries of commodity-based methods, survey and nonsurvey methods, and hybrid approaches (GIS, GRIT, etc.) are given. Methodological issues (errors and stabilities of coefficients, etc.) are not avoided and a useful caption of various input-output multipliers is presented. The chapter closes by clarifying how input-output models can be linked to wider models of socioeconomic and environmental systems.

Chapter 9 then reviews spatial interaction, transportation, and interregional commodity flow models. Batten and Boyce point out that two schools of thought have evolved in this area: a macroscopic school stressing a statistical/probabilistic approach (various entropy models) and a microscopic school stressing a behavioral/choice-theoretic approach (various utility and discrete choice models). The authors argue that these are "complementary views which may lead to identical parameter estimation equations and solutions for the same problem" (p. 376). The most interesting portion of the chapter, however, is a brief examination of recent developments in the field. Here the authors call for the joint integration of location (firms, housing, shopping centers, etc.), production and reproduction (goods, factors), and flows all in a single model.

Bennett and Hordijk next discuss regional econometric models. Stressing their dynamic aspects the authors first overview growth (accelerator) models, unemployment and inflation models, location-allocation models, and rapid-adjustment spatial-field models. Concern then turns to the general linear models and related methodological issues (estimation, spatial autocorrelation, missing data, etc.). Here the extensive (200 or so) list of references is much more useful than the cursory treatment of complex issues.

Wrigley and Brouwer close out the middle part of the book in Chapter 11. The recent, exciting advances in qualitative statistical modeling are given extensive treatment, and special attention is devoted to log-linear models for multi-dimensional contingency tables. The authors nicely complement their analytical discussion with three empirical examples, thereby clarifying just how model selection and diagnostics are carried out in actual case studies. One only wishes that other earlier chapters (particularly 4 and 9) of the book employed similar numerical examples to clarify mathematical models.

The third (and, in many ways, most successful) part of the book begins with a discussion of multiple objective decision analysis by Nijkamp and Rietveld. An informed survey considers such topics as efficiency and uncertainty and then the authors provide a useful overview (punctuated with examples) of choice theory. Methodological issues such as the weighting of objectives and the aspiration levels of decision makers are also considered. Finally, results are given of an interactive multiple criteria decision procedure for industrial complex analysis. This chapter should have been used as a model for all others in the book—it embraces both theory and its application, balances mathematical statements with verbal explanations and numerical examples, and offers food for thought to both initiates and veterans.

Chapter 13 is a well-referenced (150 items) treatment of labor market analysis written by Isserman, Taylor, Gerking, and Schubert. Such analysis entails the matching of labor supply and labor demand, and involves the simultaneous consideration of such factors as population change, migration, labor force participation, and regional production functions. Special attention is given to wage determination across space, highlighting both the wage diffusion concept and the so-called interregional wage gap. The chapter is informative and well written but perhaps too short; for instance, the section on labor demand could

have been extended to include the use of input-output models (with projections of the final demand vector).

Lakshmanan and Bolton next address energy and environmental issues. After clarifying the special characteristics (specific locales, inelastic supply, etc.) of energy/environmental resources, the authors argue that atomistic decisions do not lead to welfare-maximizing solutions, "given the interdependence in regional environmental welfare functions and the free rider program" (p. 589). They suggest that environmental policy is best undertaken at a variety (i.e., regional, national) of levels, depending upon the resource at hand. The chapter next examines resource-based effects on the interregional distribution of income, highlighting both sources (income) and uses (expenditure) sides. Then four families of models are identified and discussed: economic-environmental (e.g., pollution abatement), environmental management (with multiobjective functions), energy policy (e.g., energy content of goods), and comprehensive assessment (e.g., SEAS).

Chapter 15, by Malecki and Varaiya, examines the role of innovation (technological change) in regional economic change. Traditional regional growth models are briefly summarized and attention is then given to agglomeration and polarization effects. The authors indicate that empirical research has forged ahead of theory in this area, largely because the regional context for technological change is so varied (regions have different labor forces, corporations have different strategies, etc.).

Finally, Richardson and Townroe close the book with a brief chapter focusing on developing nations. The authors outline three approaches to understanding uneven development: cumulative causation, radical, and neoclassical. Each approach suggests different remedies although a policy package can possess elements from two or more approaches. Particular attention is given to various instruments/strategies for promoting development: planning agencies, infrastructure, industrial promotion, and human resources. The authors stress throughout that the experiences of developed nations are of limited relevance in understanding the present-day problems of developing nations, and that the regional problems of developing nations should not be overgeneralized (e.g., middle-income nations like Brazil have problems different from poorer nations like India).

All in all the book must be judged a considerable success although, as is the case of many edited volumes, redundancy is commonplace and contributed material is targeted to different audiences (despite the best intentions of the editor). This volume also noticeably lacks a chapter on population and migration; such a chapter could have replaced Clark and van Lierop's which has more a local than a regional focus (and could have been moved to an upcoming sister volume covering topics in urban economics).

One's overall impression is that regional economics (science) has made tremendous strides in the past thirty years. Theory now prevails at both the micro and macro scales, models increasingly articulate interdependent modules or subsystems, and different forms of data are used in substantiating hypotheses. Nijkamp's book admirably captures these sweeping qualitative changes.

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SPATIAL CYCLES edited by L. van den Berg, L. S. Burns, and L. H. Klaassen.  
Gower, 1987, pp. xvii, 277. Cloth, \$53.95.

Spatial Cycles is a collection of papers whose origin was a meeting held in 1983 at the University of Cambridge (entitled "Long Swings in Regional Development"). The primary objective of this book is to demonstrate the superior power of cycles over linear or kinked trends for describing past urban and regional development (see Chapter 1). Clearly this sort of subject matter is both important and relevant to regional science research, especially since so many urban and regional analysts have preferred to examine differences among spatial units within the context of static, cross-sectional analysis, rather than in terms of patterns over time.

Chapter 2 presents a good summary of the book's contents. Burns notes that Chapters 3-8 deal with demographic changes and cyclical processes of growth and decline at the level of cities, suburbs, metropolitan areas, and agglomerations. He then notes that Chapters 9-13 focus on economic changes involving cyclical movement between regional prosperity and regional depression. Against these two background generalizations, selected chapter-by-chapter themes merit highlighting. Goldberg (Chapter 3) notes that centralization and decentralization are complementary and simultaneously occurring phenomena that work jointly to shape cities and city systems. He also points out that since the large standing stock of urban structures will remain, more research needs to be devoted to the bounds these urban constants place on change. Johansson and Nijkamp (Chapter 4) stress that urban dynamics are marked by a complexity that is hard to disentangle by means of conventional analytical tools, especially since nonlinear change processes characterize interacting urban subsystems. Funck and Blum (Chapter 5) observe from empirical evidence that urban development does not follow a strictly monotone growth trajectory. Van den Berg and Klaassen (Chapter 6) argue that urban growth and decline can occur simultaneously at the regional or national level. They contend that urban agglomerations tend to develop in systematic and predictable patterns, passing from overall growth during the stages of urbanization and suburbanization to decline in the stage of disurbanization. Kawashima (Chapter 7) contrasts and compares the U.S. and Japanese experiences, identifying the following two general facets of the urban problem: (1) rapid concentration of population in major urban centers, and (2) population decline in large metropolitan areas. Van den Berg, Klaassen and van der Meer (Chapter 8) propose that easy and abundant transportation has transformed urban constellations into nontraditional urban forms described by cyclical behavior. Klaassen (Chapter 9) documents that cycles characterize recent Dutch regional development. Van den Berg, Klaassen and van der Meer (Chapter 10) argue that regional development is cyclical in nature with spatial lags, and note that urban developments supply strong impulses for regional evolution, while these developments in urban areas largely reflect developments taking place at the

regional level. Burns (Chapter 11) observes that regional economies, like those of nations, experience broad swings in the course of their development, with their cycles occurring in spatially regular ways (waves crossing the national landscape). Cameron and Bailey (Chapter 12) study one aspect of the costs of urban decline that has received very little attention, namely the fiscal effects upon those local authorities that have to attempt to adjust their budgets to cope with the loss of both economic activities and population. Finally, Burns (Chapter 13) points out that while there is no shortage of good research concerned with metropolitan growth and its causes and consequences, understanding decline is far more complicated than simply replacing increments with decrements.

Conceptually the set of themes addressed in this book is too mixed, a common feature of edited volumes. In addition, the variety of authors that usually is the strength of an edited book, in that a wide range of viewpoints is represented, is diluted here by the inclusion of more than one paper written by the same person(s). Most of the research findings reported tend to be conceptual and verbal in nature; few papers include technical treatments of subject matter. State-of-the-art space-time modelling is not undertaken in most cases, either. The single exception to these two criticisms is the chapter by Johansson and Nijkamp! As the preceding summary indicates, important and relevant themes are explored here. Throughout the book a reader is constantly reminded that cyclical behavior is exhibited by regional systems. A reasonable balance is established between theoretical and empirical research. However, there is no demonstration that cyclical models are superior to linear models; cyclical models are not shown to be good descriptors in and of themselves, either. Thus, in some sense the book fails to achieve its primary objective. But this drawback does not detract from the book's contribution to the regional science literature, for few books exist that address the topics of spatial dynamics, evolving geographical structures, and transformations through space and time. Furthermore, the closing note on the importance of spatial contraction and decline is an especially refreshing and long overdue shift in emphasis.

One substantive contribution to the regional science literature that comes from this book refers to the predictions by theory, and the demonstrations by empirical evidence, that agglomerations pass sequentially through the well-defined stages of urbanization, suburbanization, and disurbanization. These transformations occur in space at different points in time, reflecting to some degree the prevailing regional urban hierarchy, suggesting that decentralization and centralization are complementary and simultaneously occurring phenomena working jointly to shape cities and city systems. Accordingly, continued deconcentration of some agglomerations will accelerate growth of other agglomerations, speeding up their urban developments along the sequential path, and hence hastening the date when they too will decline. Therefore, the first two stages of urban development are characterized by overall growth, while the third stage is characterized by decline. One interesting hypothesis put forth here is that declining agglomerations will develop into negative growth poles. Meanwhile, placed into an historical context, regional differences in these patterns of urban development apparently have tended to disappear through time, whereas urban cores and their affiliated rings have been diverging.

Overall, I feel that Spatial Cycles is a book worth reading, and recommend it for perusal to the regional science community.

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POPULATION IN AN INTERACTING WORLD edited by William Alonso. Harvard University Press, 1987, pp. 286. Cloth, \$30.00.

In this collection are nine papers that derive, in part, from an Author's Conference on Population Interactions between Poor and Rich Countries, held at Harvard University in 1983. The papers are organized into two parts. The first part includes rather broad perspectives on migration and other processes linking various populations. Included are a premodern historical perspective by William H. McNeill, a history of labor movements to Western countries by Aristide R. Zolberg, a global economy perspective by Hedley Bull, and a discussion of transnational identities by Alonso.

The five chapters that comprise the second part of the book focus on: the economic dimensions of recent international migration flows (Juergen B. Donges), recent immigration to Europe (Hans-Joachim Hoffmann-Nowonty), international migration from a Third-World perspective (Myron Weiner), refugees (Francis X. Sutton), and the migration systems affecting the Caribbean Region (Orlando Patterson). A short introductory chapter written by Alonso identifies foundations and themes for the papers and provides short summaries of the forthcoming chapters.

Generally, this is a well-edited volume. Most chapters have clear statements of intent and most are well written. Several would be very interesting reading for the non-scholar as well as for the research specialist. The papers, however, are somewhat uneven in terms of documentation, and some are weakened by the absence of references.

In the introduction, Alonso sets the foundation for the book by stressing the breadth of population-related interactions among various countries and regions, including migration, trade and other types of movements, and various forms of assistance. He identifies two basic themes that are woven through the various chapters: the importance of migration and the role of nation-states in influencing demographic processes. Let me examine the two in turn.

Migration is either the major topic or is clearly addressed in all of the papers. Indeed, this is a book about migration. A major strength of this collection is the variety of temporal, regional, and thematic perspectives on migration. Particularly appealing is the examination of various systems of migration in their historical and cultural contexts, thereby significantly enriching the contemporary economic- and policy-oriented perspectives. Only two chapters seem narrow in this regard: papers by Bull and Duges seem too narrowly "economic" in their approach compared to the other chapters which are uniformly more broadly based. Overall, the book represents an effective juxtaposition of various perspectives on the causes and impacts of international migration in most of its forms, including slavery, guest worker movements, and refugee movements.

The second theme identified by Alonso, the importance of the nation-state in shaping recent demographic trends, also is addressed by most of the papers. There is little question that state-based policies directly and indirectly influence, during both the short term and long term, a variety of population processes. Paradoxically, however, one can read this book and come away with the impression that nation-states are not the most important unit of analysis for many population phenomena. This is nowhere more strongly felt than in Alonso's own chapter, "Identity and Population." He argues that many important identities, based on race, religion, even nationality, are not well bounded by nation-states. Migration, in particular, has created and perpetuated "regions" of

strong identity that do not correspond well to national boundaries. "Mexicans" are of Mexico and the United States; "West Indians" are of the Caribbean, New York, and London; "Turks" are of Turkey and West Germany; and "Jews" are clustered in many places. The replacement of broad colonial empires with new political-economic realms have realigned identities as well. Alonso laments the fact that population projections and other measures are difficult to obtain for people adhering to such identities because they do not appear in convenient packages, such as nations, needed for traditional demographic manipulation. But their "qualitative" importance is emphasized.

Similar conclusions come, implicitly or explicitly, from a number of the chapters. Patterson, for example, in his excellent essay on the Caribbean area ("The West Atlantic System"), argues for a lessening importance of the nation-state. The variety of overlapping migration systems that have affected the area have resulted in complex communities that neither adhere to nor are strongly influenced by national boundaries. Similarly, Weiner encourages units of analysis other than nations (such as ethnic groups) in the examination of the overall costs and benefits of migration from the Third World.

In addition to the themes identified by Alonso (i.e., migration and nation-state), I would add two perspectives that persist through most of the book. The first is the employment of standard clumpings of nations—variously referred to as rich and poor, Third World, the West, North and South, core and periphery—as frames of reference for many of the discussions. The varying terminology between and even within chapters is distracting and some of the papers seem to be oversimplifying population issues by implicitly assuming homogeneity within these regions. Fortunately, however, most papers use them as only the broadest frame of reference and some clearly demonstrate the complexity of the problems within broad realms.

Another perspective that characterizes this book is the emphasis on ethnicity. Various authors discuss the importance of ethnic group migration, language and other ethnic characteristics as barriers to assimilation, the role of ethnic groups in the formulation of population policy, ethnicity as the basis for transnational communities (or "identities"), ethnic conflicts, and the recent creation of new ethnic diversity in hitherto relatively "homogeneous" societies (particularly, major Western cities). Population analysts have long recognized the importance of ethnic groups to population processes and problems. This book reaffirms that importance and emphasizes, perhaps inadvertently, that the role of various dimensions of ethnicity to population are as poorly understood as they are universal.

Although various theoretical perspectives are presented in this book, it is not formatted as a debate. Nor is it "analytical." For the regional scientist, however, it can provide a set of useful and rich perspectives on broad-scale population issues.

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TEORETYCZNE PODSTAWY GEOGRAFII EKONOMICZNEJ by Ryszard Domanski, Panstwowe wydawnictwo ekonomiczne, 1987, pp. 436. Paper.

In his new book, entitled Theoretical Foundations of Economic Geography, the eminent Polish economic geographer R. Domanski sets for himself an

ambitious task of offering "an alternative model to economic geography." The need for a new approach arises from requirements to create a dynamic model which reflects not only spatial structures but also spatial processes, and which helps in steering both society and the economy in a desired direction. Such a model presupposes that we know the values and objectives of the society. As an instrument the optimal control theory is deemed the most appropriate one by the author.

Spatial decision making presupposes the knowledge of values and objectives, which make up the starting point of the new theory. To Domanski the relevant decision makers are central planning organs, enterprises and other regional and sectoral organs, which means that the author has a centrally-planned economy in mind. When setting objectives, concepts like "systems and values" and "spatial objectives" become relevant. As basic values he considers "quality of life," "spatial accessibility," "spatial efficiency" and their different combinations. Much of the book is devoted to Poland's spatial problems and processes. As Domanski states, the "basic means of steering spatial processes is the regional economic plan of the country" (p. 378). Such a plan was elaborated in Poland for the years 1971-90 but real processes did not obey the plan, as forces of centralization proved stronger than polycentrism. The author illustrates his ideas by taking additional examples from other countries, including the USSR, Western and developing countries. This implies that he wants to see spatial processes in question as universal phenomena, independent of the economic system. This, however, poses problems which Domanski does not touch upon. Major theories of economic geography (like location theory or innovation-diffusion theory that Domanski presents) presuppose a functioning market mechanism. But under which circumstances are these theories applicable to countries with another economic system? Domanski does not answer this question although, for example, the chapter "Spatial Decisions" would be a good place to do so.

An additional problem arises concerning Domanski's main contribution, optimal control theory. He adopts it to conditions of the Polish planned economy, in which decision making has been centralized and an official system of values and objectives may be uniform enough to justify such an approach. This is apparently not the case in a market economy, which does not meet the requirements of the model. The applicability of optimization raises doubts even under conditions of a planned economy.

This theory can be seen as part of the tradition of optimal planning, which has for a long time been elaborated and debated in the USSR and also in other socialist countries. The ongoing reforms in these countries (*perestroika*) indicate that optimal planning has not been able to steer these economies in a desired direction. Thus, the feasibility of this approach raises misgivings if also applied to the optimization of spatial processes.

These questions should undoubtedly intrigue a western reader who is interested in the operational contents of Domanski's theory. But the book is much more than this theory, it is also a broad presentation of the basic issues of economic geography. Domanski is well acquainted with both Western and East European research in the field, which is very seldom the case with his western colleagues. The result is an inspiring, interesting synthesis of economic geography, which certainly deserves to be known by Western readers. Before that the open questions mentioned above should be answered in one way or another.

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DIVISION OF LABOUR, SPECIALIZATION AND TECHNICAL CHANGE edited by G. Törnqvist, B. Gyllström, J. -E. Nilsson, L. Svensson. Liber, 1986, pp. 278. Paper.

This book grew out of an international symposium held in Sweden in 1982, supported by the International Geographical Union and various Swedish groups. It is a collection of essays, more than half by Swedish writers, focusing on global, national, regional and workplace levels of analysis. Three brief introductory chapters (total length less than 20 sides) in Part I provide a background to the topic and the papers. The first, by Gunnar Törnqvist, notes the economic, technological and social vulnerability of industrial society, and suggests that the 1980s have brought a new recognition that problems are structural and likely to remain with us. He argues that comprehensive appreciation of our problems, focusing both on a broader systemic perspective as well as the impact on individuals, is essential. These two perspectives have been inadequately linked to date, he believes. A second essay by Nilsson reviews the changing division of labour from the craft era to the present, noting the recent patterns of global decentralization and the greater freedom enjoyed by transnational firms in choosing locations today. Another current feature is rapid changes in space and time, so that mobility is a factor challenging today's workers. The introductory section is completed by Törnqvist with a review of the essays contained in the volume.

The main section of the book consists of fifteen essays, by an international group of authors, with analyses at global, national, regional, and workplace levels. Because of the broad title of the book, it is hard to argue that any of these essays do not fit the theme, but they nevertheless do not hang together well, and there are real problems of balance. Five of the essays focus on the workplace, considering the nature of work, organizational elements, union matters, etc. within the plant. Two of these essays, by Edwards (on control systems) and Karlsson (on technological impacts in the workplace) deal with broad themes, but the other three are fairly narrowly Swedish in content. No effort is made by any of the writers of these essays to seriously link the topics to questions concerning other plants within a firm, never mind city or regional contexts. As three of them focus entirely on Sweden, it is easy to see why there is some difficulty in associating them with, say, export-oriented industrialization in South-East Asia.

No essay concentrates specifically on the impact of change from the point of view of firms themselves, although an analysis of a multinational or two would clearly be highly relevant. Also, the local level, as opposed to the workplace level, is neglected in empirical studies. There are, however, two interesting essays in the direction of local entrepreneurship. Johannisson discusses attempts to encourage entrepreneurs to work together cooperatively in local development, arguing for a counterbalance to a systems perspective with what he calls an "arena" perspective, focussing on the action field of the individual. Nilsson goes back to the roots of growth pole strategy in Schumpeter's work, and argues that the policy can be effective in times of recession as well as expansion. This is really an essay on regional policy and argues for new directions in making sure that technology is well used.

The first half of the empirical papers in Part II are more along the lines of what would be expected by regional scientists, although even here the theoretical focus is not very strong. Stohr and Todtling, for example, emphasize mainly policy questions related to regional policy in Western Europe. It is an

interesting paper but marginal to the main theme. Alvstam has a short and not very satisfactory paper on international trade, which has little relation to others, while Malecki's paper on technology is a good conference paper, but has little new to offer. There are two good reviews of regional change in British regions (London and the North-West, respectively), which show impacts of recent trends on the regions. There are also two interesting pages on South-East Asia by Choo and Lee. Both focus on export-oriented industries, but Choo deals only with Malaysia while Lee considers a wider range of countries, all of which have expanded their exports considerably in the last quarter-century. Choo's essay is a very interesting one, and he stresses the use of a young female labour force by the expanding manufacturing sector. These workers are highly exploited—with low wages, long hours and considerable work pressure—and this is leading to "burn out" and physical debilitation. The last essay to be mentioned, by Hamilton, provides a comparison between capitalist and socialist systems in their international expansion. He notes that socialist systems have been much less international and have stressed rather autarkic development. In contrast, the capitalist system already had a strong international pattern well before the Russian revolution of 1917, which ushered in the socialist era.

The book has a short concluding chapter by Gyllström and Svensson. It is again very brief—ten pages—and focuses on the idea that the effects of the division of labour depend on where the control lies. They discuss the possibility of political change, but argue that little is possible at the international level or, in fact, in most developing countries. They consider various possibilities for improvement via organizational change. Although the paper attempts to draw the book together, it is really too brief to do so adequately.

On the whole, this book must be rated as disappointing. I believe part of the problem is the theme itself. Really most essays are about the division of labour (which is, of course, influenced by both specialization and technical change) but there is too much laxity in focus for that to be clear in all essays. There are also more typographical mistakes than one should expect, but this is a minor flaw as the overall look of the book is good.

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SPATIAL ASPECTS OF INFLUENZA EPIDEMICS by A. D. Cliff, P. Haggett, and J. K. Ord. Pion Limited, 1986, pp. ix, 280. Cloth, \$52.50.

This masterful work in eight clear chapters uses several scales of analysis, different time periods, and multiple statistical methods to cross-check conclusions about the spatial behavior of influenza occurrence. The authors not only test several epidemiological models, but develop geographical models of the diffusion of a multi-wave phenomenon. Diseases such as influenza are like innovations whose spread in a changing regional context, over periods of time, can be measured, analyzed, and forecast.

In the opening chapters the authors describe the influenza virus, the major epidemiologic models, and the sources of influenza data. Influenza viruses periodically sweep the world in great pandemics. Curiously, they seem to disappear in summer and later emerge, suggesting latency within human carriers or in the environment. In an influential epidemiologic model, Kilbourne (1973) explained the dampening of pandemic waves in subsequent years by the

accumulation of population antibodies to the virus. The surface antigens of the influenza virus slightly change or "drift," allowing it to spread despite growing population immunity. When the population becomes saturated, the virus will shuffle its genes and "shift" into a viral type to which the population is again susceptible. Poor data are always a problem: mortality intertwines with pneumonia, morbidity is often based on absenteeism, and sentinel detection and viral identification programs are sporadic in time and space, and uneven in quality. With this background, the authors proceed to analysis at micro, macro, and meso scales.

The first study is based on a 4000-patient medical practice in England during 1945-1975. The authors described seasonality and wave characteristics, analyzed the spread process using joint-count statistical measures of clustering, cross-correlation of urban and rural incidence, and Box Jenkins techniques. Next global patterns were addressed, after inventive efforts to standardize partial World Health Organization and League of Nations data. Cross-sections in space and longitudinal sections in time were used to study spatial spread and seasonal shift in incidence between the hemispheres. Techniques used included intercorrelation, autocorrelation functions, cluster analysis, and multi-dimensional scaling.

For the next three chapters the authors addressed a regional application in Iceland, a nation that offers a natural laboratory for the study of disease diffusion. Here there is a high-quality historical series of incidence records at the medical district level. The population is too small to maintain the disease endemically and so each individual epidemic wave is identifiable. The authors used data spanning the twentieth century to address the effects of such factors as growing population size, urbanization, developing transportation and boarding school systems, emergence of air transportation, and introduction of vaccination, as well as to separate the effects of urban hierarchy from those of proximity to the capital. To understand the simultaneous geographical and temporal variations, a range of statistical techniques were used, including biproportionate transformation, multidimensional scaling, logistic curve fitting, Bayesian entropy and chain binomial models, and those techniques based on the general linear model.

As final results, no evidence for anything except continuous person-to-person contagion is found; an endemicity threshold of population of about 100,000 is determined; the Kilbourne model is confirmed at every scale of analysis; and a predictable path of spread through the urban hierarchy and thence to the surrounding hinterlands is determined. This path can be adjusted by transportation parameters of internal mode and network and external connectivity to account for changing periodicity and speed of epidemic course in succeeding decades.

This book is written so clearly that even the most complex statistical procedure can be followed. It is elaborately illustrated with graphics and documented with data. The arguments can be followed by readers with little mathematical background, but the derivations and equations are provided in text and appendix for those interested. The statistical applications could be followed almost as a text; enough information is provided that it would be possible to replicate the entire study. Seldom are studies in medical geography so rigorous.

There are few points to criticize. Lacking quality global data, the authors looked for patterns of global spread by focusing on study areas in cold-winter Scandinavia and the tropical Pacific Islands. In examining the islands as a

physical region, no cognizance was taken of the human regionalization of the area. Guam is tied to Hawaiian and Northern Hemisphere tourist patterns; New Caledonia and Fiji are tied to Australian and Southern patterns. No evidence of spread in the Pacific was found, but the studied islands are not a functional region within which influenza might spread. The greater, although unavoidable, deficiency is the gap in the scale sequence. Iceland is used as a meso- and regional-scale study, but it is an isolated island and a nation. Having elucidated the processes of spatial spread in the laboratory, the authors should be challenged by the more profound and complex problem of diffusion at the true regional scale: within Europe, or across the United States and Canada. At this scale influenza continually spreads, and not only multiple waves wash over the land but different strains simultaneously circulate and are endlessly reintroduced. Iceland allowed the authors to address multiple-wave phenomena; the continental scale would entail multiple and simultaneous waves.

Although this book explicitly addresses a disease, its real object of study is the spatial process and structure of multiple-wave diffusion. It makes a contribution to public health, especially for the design of vaccination programs. It makes a more important contribution to the regional scientific literature, however, because of its use of numerical data to elucidate the structure of connection over time and space and its original and comprehensive application of spatial statistical procedures in such a rigorous research design.

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TOWARD A NEW IRON AGE? QUANTITATIVE MODELING OF RESOURCE EXHAUSTION by Robert B. Gordon, Tjalling C. Koopmans, William D. Nordhaus and Brian J. Skinner. Harvard University Press, 1987, pp. vii, 173. Cloth, \$25.00.

The book examines for copper a central theorem of mineral economics, that the optimal allocation of exhaustible resources is a function of the interest rate (Hotelling, 1931). Absent technical change the discounted present value of the price (net of cost per kilogram of metal foregone in future periods) will rise over time. Substitution ensures that demands will diminish relative to alternatives as the price rises. Thus the time to exhaustion is a function of the cost of capital and the elasticities of supply and demand. The authors find that depletion in the United States' (U.S.) copper resources is most likely to raise the price fiftyfold within a hundred years to \$113 per kilogram (kg), and the royalty from \$0.93/kg to \$50/kg on conventional deposits. Will this cause significant income loss to consumers and herald the return to more abundant metal resources and hence a second iron age?

To explore the conditions of this and alternative likelihoods, the authors employ a simple linear program (LP) transportation problem to simulate the exhaustion of U.S. copper resources, holding constant technologies, rates of substitution and potential supply costs. The novelty in their use of this time-

honored LP to simulate multi-market equilibrium of supplies and demands in interregional trade (Henderson, 1958) is their substitution of the capital cost of carrying the inventory of copper resources across time for the transportation cost of delivering copper across space. This not only mimes the theory but translates an intractable problem of dynamic optimization over time and space into a simple comparison of static positions over time only. As a bonus, the authors can pay unusual attention to the geology of U.S. resources and engineering cost constraints. These are extended beyond mining and fabrication to the substitution of rival materials in the major categories of U.S. demands formulated in terms of engineering characteristics. The number of simulation possibilities are many, including more optimistic scenarios in which the authors find that copper prices and rents decline. This raises the question: how plausible is their preference for a pessimistic finding?

Historically, of course, copper's price and royalty have declined secularly despite the deterioration in domestic deposit grades. Clearly the costs of exhaustion have been avoided or deferred by substitutions, many associated with technical change. In the model, as mining progresses to the ultimate extraction of copper from virtually inexhaustible common rocks, the copper price rises fourfold to \$9/kg even when the rate of technological change is assumed to continue at 2% per annum.

In terms of the cumulative discounted present value of net national income lost over the period 1970-2150, the base case cost is 0.4%. By the turn of this century, 80% of copper-equivalent services should be met with substitute materials in the principal demand categories: viz., small heat exchange systems, power transmission, transformers and building pipe. This nontrivial drop in real income increases to 22% if the residual inelastic demand categories of electronic and communications services need be met by existing technical substitutions. A sevenfold increase in the cost of copper-equivalent services results. The loss would be much higher were it not for the increased recycling rates for old scrap. However, the most important factor limiting losses is the substitution of aluminum, plastics and fibre optics. Technologies in place are already diminishing the apparent consumption of copper in the United States. Even so, supplying the residual copper demands will require a policy of permitting massive increases in mining activity once the backstop resource base is reached.

On the other hand, by increasing further the rate of new technological change to 4%, the cost of providing equivalent services could be cut by 96% and the price of copper would decline. Thus, the prospects of the authors' new iron age depend critically on their choice to restrict to historical levels the rate of technological change in copper and related industries, a most important sensitivity of the model.

The implications of this preference are that, while mining on a massive scale with uncalculated environmental costs is required, economic growth is not eliminated by scarcity. This finding resembles the optimism of other economists, e.g. Robert Solow (1974). Indeed, we may consider the opinions of technical optimists to be represented in the study's alternative scenarios. These are "minority reports" demonstrating zero or negative drag as technical change rates approach 4%. Other ways of relieving depletion are offered, such as lowering discount rates. Finally, the authors are generous in expressing their own reservations: that the future may be too uncertain to model with such accuracy, that the world trends may not follow those of the U.S., and that future technological developments may simply be unforeseeable.

Thus, while the economic framework is elegant and Skinner's construction



of geological constraints compelling, the quantitative modeling results will seem implausible to engineers. Materials science breakthroughs argue in favor of the rates of technological substitution increasing rather than slowing. For estimating potential supply, a growing number of geoscientists are conceding the merit of more sophisticated geostatistical modeling in the broader appraisal of resources, as exemplified by the work of Harris (1984). This indicates that the resource bases in copper and other geochemically scarce ores are probably much larger throughout the world than estimates by conventional geologic surveys.

For economists, the ingenious simplification of the LP comes at a price too high for practical applications when it eliminates the potential of traded resources from domestic market price simulations. The U.S. is unlikely to abandon trade in the ores and metals as well as in intermediate and final metal-intensive products. The latter represent a growing imported component of actual copper use which is not considered by the authors in consumption. This will mitigate significantly their forecasts of domestic mining demands, assuming that the restrictive factors now limiting the ability of U.S. exports to balance imported manufactures are removed.

These deficiencies hardly lessen the instructional value of the book as an exercise in applied regional science. This remains impressive for its economy of technique. On the contrary, my reading argues for extended research into the qualifications which engineering science and technology may impose on economic policy implications. Should subsequent research teams include equally notable experts in engineering and trade, the times to exhaustion forecast for Skinner's conventional deposits may increase many centuries. Could not this prospect encourage a title revision: *Toward a New Materials Rage?*

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ECONOMICS AND TECHNOLOGICAL CHANGE by R. Coombs, P. Saviotti, and V. Walsh. Rowman and Littlefield, 1987, pp. xv, 296. Paperback, \$12.95; Cloth, \$35.95.

This book is a rather complete summary of relevant research on the subject of technological innovation and economic growth. It attempts to show that research and development is endogenous to the economic process, rather than exogenous. Thus, economic theory must no longer ignore technological innovation and institutional change. The book demonstrates that improvements in the organization of the research and development process, leading to sustained periods of economic growth, are the result of conscious efforts and institutional

changes on the parts of private firms, interest groups, and government. Such activity has been recently associated with the research and development departments of private firms and specific government projects, but was actually seen as early as the Alkali Acts of 1863 and 1874. Numerous specific examples are given of the relationships of technical change to economic growth, industrial development, and the international relocation of production. The book is divided into three parts: Microeconomic Aspects, Economic Analysis and Technical Change (largely macroeconomics), and Socio-Political Aspects of Technological Change. An extensive bibliography is also included.

In part I, the authors argue that technological change and innovation have common identifiable threads across dissimilar industries and economic systems. Furthermore, it is pointed out that, historically, technological change has brought about institutional change which has in turn been frequently responsible for even more technological change. This section then proceeds to demonstrate how the institutions of private firms and markets affect research and development.

A major point is that isoquant theory is limited in explaining the role of research and development within a firm, because static efficiency, largely process innovation, is emphasized to the exclusion of dynamic efficiency that includes product change. The authors suggest that a management-organization approach is preferred as this shows the mutual interrelationships between decision-making and technical change and innovation. It is management organization that decides the research and development budget for an institution and how much effort must be devoted to basic, applied, and "debugging" research. The authors further imply that research and development efforts will be limited by the management decision-makers' expertise, short-term profit motives, preferences, and fears of uncertainty. It is emphasized that research and development has more uncertain payoffs relative to other production activities and may be subject to "market failure" in that knowledge can easily be disseminated.

Part II points out that only product innovations lead to the creation of new industries and new exports. The point that technological change is ignored by important economic works is emphasized in a review of neoclassical-economic, epidemic, diffusion, heterodox and evolutionary theories of technology and economic growth. It is strongly suggested that comparative advantage theory does not explain the production of new products and the growth of multinational companies. Multinationals are alleged to exist because other forms of exporting production would compromise the intangible asset of research and development.

Part II emphasizes that all firms and workers are not equally affected by technological advance. Firms operating under different circumstances may time an innovation differently and there is no guarantee in the labor market that labor displaced by innovation will be reemployed elsewhere in like numbers, as all industries grow at different rates. Thus, statistical analysis must include industry-pertinent historical features to be accurate. Finally, Part II deals with long waves of economic activity and innovation clusters. The authors see these as alternative periods of growth and structural crisis.

The main thrust of part III is to explain government intervention in research and development. Since science is controlled by managers, the managerial structure is important to technological change. Thus, project selection is subject to both scientific and social-value judgments. Government intervention is considered supplemental to private technological endeavors.

"Market failure," due to larger social than private returns to research and development and the large costs of such activities, is used to justify government intervention. In the 1870s the government's role was primarily that of prohibiting undesirable side effects of technological change. World War II established firmly the right and duty of the government to promote technological advance for reasons of defense, international competition, and economic growth. The aero engine and motor vehicle industries of the United Kingdom are presented as examples. The 1970s' change in attitude, from citizens' acceptance of technological change to a desire on their part to participate in shaping this change, is discussed. The rise of trade union inputs to management, the role of pressure groups such as environmental activists, and expert testimony are also detailed.

This book gives a thorough discussion of the issues related to technology and economic growth. However, it covers so many topics that the reader may have difficulty focusing on the primary theme of the book, which is the need for economic analysis to better incorporate the subjects of technological change and innovation into its basic theories. People interested in industrial organization and economic growth will be very interested in the book. Planners and geographers will find the material presented beyond page 153 of greater interest than that presented earlier.

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HOW SICK IS UNCLE SAM? by R. Earl Hadady. Key Books Press, 1987, pp. xvi, 405. Hardback, \$17.95.

The author seeks to impress on a nonspecialist audience new perspectives on a plethora of modern concerns. Included are self-contained chapters on the deficit, growth of Government, inflation, the economy, the monetary system, LDC debt, the stocks and futures markets, defense, welfare, education, crime, technology, and capitalism. It is argued that since conventional wisdom is incomplete, a theory of macroeconomics which emphasizes consumer optimism is required. Informal evidence to support the pivotal role assigned to the consumer is presented. An expectations index derived from the Conference Board and University of Michigan data is used to indicate that consumer expectations precede GNP changes.

The deficit is contextualised by showing that not since the 1920-1940 period has gross interest expense as a percentage of Government receipts exceeded current levels. Federal Government outlays after inflation adjustment show a real annual growth rate of 4%. One of the causes of inflation impacting on Government is low productivity growth in this sector. Another is general inflation, which the consumer, it is argued, alone controls through expectations resulting in "self-fulfilling prophesy." This interpretation overlooks the interaction of aggregate demand and expectations-augmented aggregate supply. More convincing is the suggestion that the instability of velocity is a result of changes in consumer confidence. Unfortunately changes in savings behavior are not clearly distinguished from changes in velocity.

Increased taxation is advocated to control the deficit. However, invoking Laffer's argument, it is suggested that taxes be increased to a level consistent with the backward bending "prohibitive" range of the Laffer curve. It is argued

that with such a tax structure, countercyclical tax cuts will further reduce deficits. Laffer's comment that "cutting tax rates automatically reduces deficits should never have seduced any profound insider" provides a counter-argument to this suggestion. Finally, long-run reduction in inflation can best be achieved by a return to the gold standard forcing restrained monetary growth.

The discussion of the stock and futures markets is quite informative and controversial. This perhaps reflects the fact that it is the author's original interest. It is suggested that fundamental and technical analysis does not reflect real (short-run?) driving forces in these markets. Rather, it is the expectations of market participants, which need not be closely correlated with real-world events, which can be polled to give optimal forecasts. In discussing the futures market, it is argued that large money interests will always win over the margin money of small investors since random price fluctuations will shake out the less well financed group first.

The author turns next to defense and social issues. Correct assessment of intentions and an aggressive posture are identified as prerequisites for avoidance of hostilities. Such efforts require both military hardware and intelligence software to be successful. Ancillary suggestions include control of arms sales through vendor countries' coalitions and the fixing of defense expenditures as a constant proportion of Government receipts. Despite an international comparison showing that the US has one of the highest proportions of GNP devoted to education, it is suggested that the problems of poverty and illiteracy require remotivation of target groups. The author suggests a rearranged educational hierarchy with values and parenting displacing the three R's. In the area of crime, international comparisons indicate the relative severity of the US problem. Less convincing evidence (in a data base which would greatly benefit from statistical analysis) is used to indicate that poverty and unemployment are not instigators of crime. Making crime more expensive and dealing severely with high-rate offenders is advocated.

In final chapters on technology and capitalism the need to pioneer artificial intelligence and proceed with nuclear power is suggested. Capitalism is weakened by the program of farm price supports operated by the USDA. The phasing out of these programs is advocated in order that foreign competition can be continually met. In this segment it seems to be suggested that all cheap foreign goods are a result of poor US performance. No mention of specialization and gains from trade is made.

The major problem with this book is that it is overly ambitious. One would prefer to see a more thorough analysis of fewer issues. Macroeconomics, defense, and social issues are enormous challenges in and of themselves. Although an interesting and rich statistical data base is presented, the text is prone to wander into polemic and pontification. The macroeconomic model appears to be the income expenditure regime reemphasizing the role of consumer optimism. Since there is nothing new here, the author does not succeed in presenting a radically new macroeconomics. The text does present very informative statistical tables, especially in the areas of international comparisons of LDC debt, welfare, and crime. The data base is well used in the presentation of a "big picture." However, a convincing theoretical link between current evidence and policy proposals is not always evident.

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**ECONOMIC APPRAISAL OF TRANSPORT PROJECTS: A MANUAL WITH CASE STUDIES** (revised and expanded edition) by Hans A. Adler. World Bank Economic Development Institute Series in Economic Development. The Johns Hopkins University Press, 1987, pp. xii, 235. Paper, \$12.50.

Hans Adler's contribution to the transport-sector and project-planning methodology has been significant and his work on the economic appraisal of transport projects is well respected in the community of research analysts and practitioners of economic development. For that reason, this revised and expanded manual will attract a lot of attention from development economists and others, especially from those who have a strong pragmatic bias, since the focus of the book is on questions dealing with the actual process of economic development rather than theoretical discussions. Consequently, the theoretically-minded regional scientist and economist cannot be considered the primary readers of the book. However, the manual provides new insights and outlines the persisting methodological problems associated with measuring costs, benefits, predicting traffic volumes in developing countries, etc. By illustrating the methodological problems, providing insights and discussing assumptions often made by analysts in the field, the author's work could stimulate more research work and inspire regional scientists into long lasting and penetrating research involvement in the area of economic evaluation of transport development projects.

The manual provides a reasonable update on state-of-the-art aspects of transport-economic evaluation research. It brings together the growing mass of published information as well as the author's long experience presented in the form of well-organized and penetrating perceptions. It is a much improved edition (the original manual was published in 1971), much higher in sophistication and much easier to read. The principal objective of the book is to outline the methodology of economic evaluation. The secondary but no less important objective is the aim of illustrating how to apply the methodology to real-life situations. In Part I, the economic appraisal methodology is introduced to the reader and discussed in five chapters, titled: Introduction, Economic Costs, Forecasting Traffic, Economic Benefits, and Comparing Costs and Benefits. The author is neither trying to present a method that can be applied in any developing country at any time, nor offering a new methodology of transport-economic appraisal. Instead, he is presenting to the reader a well-documented technique useful to all those who have to decide about transport projects in developing countries. There is a definite focus in Part I on growing dimensions in appraisal techniques of transport projects—on the techniques of quantifying the costs and benefits, especially on the use of shadow prices and related adjustments. These topics are handled with great authority and exceed in sophistication the original version of the 1971 edition. Overall, Part I will serve as a valuable source of information and knowledge and impress perhaps some experts who often argue that economic appraisals of transport projects in developing countries are of very questionable value because they frequently lack reliable data (those same experts often tend to prefer making exclusively political decisions).

In Part II, fifteen case studies are introduced. Here lies the main contribution of the manual, since the author exemplifies thoroughly how to evaluate six road, four railway and pipeline, four port and one airport projects. Almost all of the fifteen projects were discussed in the original 1971 manual. Only one road project was added to the list (Chapter 6: A Highway Maintenance

Program) and one deleted (Procurement of Aircraft). Thus, fourteen case studies constitute revised versions of the original 1971 chapters and the new case study (Chapter 6) conforms with them in style and organization. The verbal part of each chapter has been improved significantly to make the discussion easier to read. The tabular information was reorganized and "modernized" to resemble the customary textbook format. The original (1971) quantitative data were partially adjusted. The indices representing traffic volumes, transport stock, passenger volumes, travel time, etc. were kept in their original form while the indices representing costs and benefits were multiplied by three to make them more "realistic" for the 1980s. Also, some of the numerical indices were labelled in a less misleading fashion. For example, to prevent possible misinterpretation, the quantitative data labels referring to real time periods were deleted.

For pedagogical purposes, Part II is completed with the 1971 Table showing "Discount Rates" and with an impressive List of References. This section contains 57 selected references, all very relevant and modern published sources. Also a very useful Bibliography is included which complements the List of References and is organized under three subjects: (I) The Economics of Transportation; (II) Project Appraisal, General; and (III) Project Appraisal, Transport. The third subject topic is further subdivided by modes: (A) All Transport Modes, (B) Roads, (C) Railways, (D) Ports, (E) Aviation, and (F) Urban Transport. This organization makes cross-referencing possible and consequently the Bibliography provides an "easy to use roadmap" to the growing fields of transport economics. A brief Index of names and concepts concludes the manual.

Overall, the manual is a welcome addendum to the literature, despite the sense of *deja vu* it may generate among some well-informed transport economists. But this revised and enlarged manual is to be viewed chiefly as a proposal for advancing the sophistication of real-life transport project appraisals through the use of more refined measures of costs and benefits, and through the application of well-formulated appraisal strategies. The need for efficient economic appraisal techniques of transport projects remains great in the governmental planning agencies of developing countries. Those who are responsible for transport-economic policy making in those countries, as well as transport economists and planners in general, would find the manual helpful. Without it, they would be hard pressed to stay as well-informed professionals within a complex but growing discipline of economic appraisals of transport projects.

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URBAN ECONOMICS AND PUBLIC POLICY (3rd Edition) by James Heilbrun.  
St. Martin's Press, 1987, pp. xii, 506. Cloth.

The field of urban economics has never been blessed with a large number of available textbooks. James Heilbrun's text, having first appeared in 1973, has proven to be one of the most durable in the field. The advantages of this text that provided its previous hold on the market are preserved in the third edition. Most of the major topics in urban economics are covered, not necessarily in depth but at least in passing. The usual topics are included: urbanization, simple growth models, location theory, systems of cities, urban spatial structure and land markets, transportation, poverty, housing, and the public sector. As the

author notes, the book contains a good deal more material than can be effectively covered in a single semester. The second major strength of the book is its strong policy orientation, which would recommend it to many non-economics courses such as in urban planning, urban studies, or public policy.

Despite the author's claims that the contents of the book have been extensively changed, most of the changes appear to be in updating the statistical data, and perhaps in citing a small number of relevant newer empirical studies. While this updating is clearly necessary in a text which contains a large amount of statistical data, it does not appear that the substance of the book has been altered significantly. Indeed, for those familiar with previous editions, the structure and content of this edition are almost identical to the second edition. To this reviewer this is somewhat disappointing, since this edition would have been a golden opportunity for the author to have improved the book by filling in its most salient deficiencies.

The book has a somewhat dated feel to it. For one thing, the book has only a sparing use of economic theory. It appears to be intended for students with a minimal background in economics, which may account to some extent for its widespread adoption. Second, there is very little coverage of the newer general equilibrium urban models that incorporate numerous sectors of the urban economy, nor of the many related topics that have appeared in the Journal of Urban Economics. For example, only a couple of paragraphs are devoted to urban econometric models and simulation models. Although econometric analysis and modeling has been applied in all areas of urban economics, little of that flavor comes through in this book. For that matter, many of the more practical empirical techniques now used by practitioners, such as fiscal impact analysis, also are not mentioned.

Third, while the book emphasizes urban poverty, welfare, and job-training programs, many of the more current urban policy issues have been ignored. Missing are discussions of local growth controls, zoning, and other land use policies that have been discussed extensively in the literature as well as in the popular press. Given the suburbanization of our metropolitan areas, these issues are probably more pressing to a larger share of urban population than some of the other topics to which considerable space is devoted. The dated feel of the text probably stems from the author's excessive concern for central cities as opposed to metropolitan areas. As an example, the last chapter of the book examines the future of central cities, not urban areas. Heilbrun should perhaps pay more attention to the data in his own text that show that the rate of population growth in metropolitan areas outside of the central cities has exceeded that of the central cities in every decade since the 1930s.

Despite the many areas in which the Heilbrun book could be improved, the text is still serviceable. For those instructors who wish to cover the omitted topics, supplemental readings will be necessary. However, this problem has plagued most texts in urban economics. The field of urban economics is simply too broadly defined for a single text to be able to incorporate the entire spectrum of potential topics that will be of interest to instructors. And, for many instructors, the advantage of the Heilbrun book is that it comes closer than most in providing the needed coverage of the field.

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THE WORLD COPPER INDUSTRY: ITS CHANGING STRUCTURE AND FUTURE PROSPECTS by Kenji Takeuchi, John E. Strongman, Shunichi Maeda, and C. Suan Tan. Staff Commodity Working Paper No. 15, The World Bank, 1987, pp. xxix, 178. Paper.

This work is important for its excellent, and all too rare, treatment of the effect of exchange rates and differential inflation rates on comparative national copper costs. It also provides a plethora of interesting yet questionable data. Unfortunately, major deficiencies and serious problems prevent the realization of the title's promise.

Although it deals with a world traded commodity, this provisional copper study is only tangentially concerned with trade. Conventional and descriptive in approach, the analysis unfortunately is self-limited to the supply, demand, and price of the refined product only. As the study deals with a world market in which trade in concentrate, semi-manufactures, manufactures and copper embodied in other products is important, the analysis is simplistic and superficial.

Inferentially and implicitly, from the thrust of the discussion and the prominence given the U.S. components, it is an attempt to offset U.S. protectionist arguments, to rationalize the U.S. loss of world and domestic market share, to explain its net copper imports and forecast its perpetuation in this mode. As private international lending is often contingent on the sanction provided by World Bank project funding it may be hoped that project analyses are far more rigorous.

Following a descriptive perspective (1900-1973) of copper cycles, post-WW II demand is placed in context with economic environments, primary commodity markets and the problems of developing countries. With material substitution and the declining rate of copper demand increase, the demand side argument for current, chronic industry overcapacity is presented. Appendices provide future demand arguments, highlighting Chinese prospects and fiber optic impacts. Unfortunately, little of this appears explicitly in the copper model structure or the long-term projection.

Two chapters, relative costs and industry organization, present a comparative statics analysis of supply aggregated to country level and refined copper stage. Based on weighted average production costs, modified by the impact of currency devaluations and changing exchange rates (for a traded commodity denominated and compared in dollars) as well as by-product credits, as the study exogenously determines future output, the result is justification of who exports and why the U.S. (primarily) absorbs output reductions. The text and two appendices impressively demonstrate costing methodology and, especially, the impact of exchange rates. The latter, unfortunately, is not extended to demand. An appendix on long-run marginal costs is limited, methodologically questionable, and not explicitly used for the forecasting.

There are serious problems. No differentiation is made among porphyrys, massive sulfides and, particularly, multi-metallic ores. By-product credits, of major importance in reducing net copper costs (some to negative values), are highly variable due to price, but no geologic limits are shown. The basic cost data, a product of a 1984 confidential, multi-client Brook Hunt Associates Ltd. study, receives a World Bank imprimatur, but cannot be checked, thereby making peer review difficult and the analysis questionable. The data do not, for example, agree with those of a 1982 Commodities Research Unit Ltd. multi-client study, The Costs of Producing Primary Copper. Furthermore, Mexico is



designated a high by-product producer yet its major mines and recent expansion (La Caridad and Cananea) are not geologically different from the low by-product mines in southern Arizona, some of which have recently closed. Like the U.S. giant, Bingham Canyon, only partially reopened, the small complex, San Luis Potosi, is the only Mexican multi-metal copper producer. Therefore, comparative production costs may be questioned.

Supply and demand yield a chapter on trade and price followed by long-term prospects. Despite adequate description, there is no recognition of long-term contracts, trade barriers, specific inter-country and inter-regional trade flows, or the role of transport costs and location. The crucial role of concentrate trade is noted, as is the establishment of smelters in the non-mining Japanese, West German and South Korean industries, but is not analyzed or utilized. Scrap, the major U.S. export, appears in the model, but the necessary analysis is omitted.

Some major problems remain. Limited to the refining stage, the reported national copper demand elasticities, apparent consumption, and intensity of use estimates cannot be correct. It is shown that South Korean and Japanese intensity of use (1983) is 3.1 and 1.6 times that of the U.S., respectively (Table 4.3). As a poor nation, South Korea apparently consumes 1.7 times more refined copper per capita than Brazil and 46.2 times that of the copper-producing Philippines. Compared to the U.S., the equivalent estimates for Japan and West Germany are 1.4 times (Table 6.2); missed are concentrate imports with smelting, refining and manufacturing for product reexport. Surely this is a part of the world copper industry relevant to U.S. and world production and demand.

It is noted that "...fabricators in their purchases of standardized refined copper are indifferent between integrated copper producers and custom smelters/refineries" (p. 140). As the U.S. is a major importer of copper semis and manufactures as well as a major exporter of copper scrap (a gross input substitute for blister to refiners), one may conclude either that U.S. copper is noncompetitive at all stages, not just mining, or that U.S. manufactured copper exports are importer restricted. Though relevant to U.S. output, the problem is not addressed.

Finally, the study states: "An alternative to the massive expansion of smelting/refining capacity...[in Japan] could have been to increase imports of refined copper, but this course was not taken" (p. 171). As Japan does not produce copper this is of critical importance to any understanding of both world copper trade and the level of mine/mill/smelter/refinery production in the several producing countries. Yet, in the model, Japan, like West Germany and South Korea, is treated as a simple consumer.

Had the analysis started with the last two issues and, perhaps, included the first, it might have been both interesting and relevant.

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COMMUNICATION AND INTERACTION IN GLOBAL POLITICS edited by  
Claudio Cioffi-Revilla, Richard Merritt and Dina Zinnes. Sage, 1987, pp. 271.  
Cloth, \$29.95.

This is a disparate collection of pieces referring in one way or another to relations between nations. Some are seeking a direction, some report work in

progress, and others report work done. There is a little bit of algebra, a little bit of analysis, a little probability, a little econometrics, a little gaming, a little inferential statistics, and even a little descriptive rumination. Something for everyone. But the components are not the chapters of a book—as they are labelled. This is a collection of papers presented by a clique of political scientists and mathematicians to one another. For those of us who are not members of this set and who do not read the journals they publish their work in, this book is a sampler of quantitative attacks on international politics. Clever though some of them are, there is, however, no feel here of emergent coherence. The editorial first chapter proclaims that these are contributions to an integrated, theoretical structure but fails to demonstrate the nature or existence of this structure.

Zinnes and Muncaster mathematicize some contentions of Deutsch by making arbitrary assumptions, constructing a set of equations for international transactions on this basis, and then proving that the solutions to the equations satisfy the assumptions. A couple of graphs and a few words might have been more economical and revealing. Cioffi-Revilla probabilistically calculates the implications of a conjecture on crises and war made by Quincy Wright in 1942. Pollins and Kirkpatrick present an interim report on the development and estimation of an international trade model. Allan follows a seam opened by Isard at the start of the 1970s on the time dimension in the social sciences. For the level and precision of theorising liable to be achieved in this field, it strikes me that the economists' device of short and long run, defined in terms of relaxation time for constants, seems adequate. Amidst all this abstraction, Nicholson's discussion of the Falklands war stands as an island of clarity on the insight which game and hypergame formulations may provide in understanding complex conflicts marked by ignorance and confused motives. In the next chapter Brams and Davis use game theory to explore the temptation to lie in nuclear competition, and they are followed by Dacey calculating the benefits of saber rattling and deceit as ploys in the nuclear game. The last three chapters are descriptive. Laponce takes a Eurocentric and inconclusive look at linguistic convergence and Clark and Merritt indulge in a little "ante hoc ergo propter hoc" over the EEC and mail flows between European nations. The final chapter by Mintz and Schrodtt extends from description to conjecture while examining the frequency of cooperative acts and conflicts between nations. They find that it is an uncertain world where a null hypothesis of randomness cannot be rejected. Although this brings them into such good company as the Tallahassee ecological mafia led by Simberloff, the authors seem unhappy and yearn for determination.

There is a general question arising. Some of the modes and methods employed were devised to deal with the behaviour of large numbers of homogeneous things and then applied to social systems which could be construed as consisting of many automaton-like buyers and sellers of homogeneous goods. Whether they are appropriate to understand the workings of a sparsely connected system having a small number of highly idiosyncratic wielders of power is moot.

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**ECONOMICS OF CHANGE IN LESS DEVELOPED COUNTRIES (2nd Edition)** by David Colman and Frederick Nixon. Philip Allan/Barnes & Noble, 1986, pp. vx, 445. Cloth, \$31.50; Paper, \$19.75.

The authors aim to analyse the changes that are at present taking place in Less Developed Countries (LDCs), to examine the problems that the processes of change are generating and to look at the agents of change themselves. In pursuing these aims they address numerous related topics in separate chapters, including the vexed question of economic equality and economic development, as well as such phenomena as employment, urbanisation, trade, foreign exchange flows, agricultural transformation, industrialisation, the role of transnational corporations, technology and inflation. Their mode of treatment in each of the twelve chapters consists of a critical examination of the relevant literature, a treatment of theoretical models where these are available, a discussion of the measurable effects of the application of the different development instruments in various groupings of LDCs and, at the end of each chapter, a presentation of their own conclusions.

A very wide field of literature is covered—some 500 names are listed in the author index—including many publications which have appeared as recently as 1985 and 1986. Inclusion of this latter material entailed rewriting the first edition, which appeared in 1978 and was reprinted in 1980, 1982 and 1985. Quite evidently the first edition enjoyed a lively demand, and an even better demand can confidently be expected for the present expanded version, particularly among scholars at all levels.

The authors have succeeded in posing theoretical approaches against empirical results in a manner which grasps the attention; they use a fluent style and show an admirable objectivity. By their critical approach, their logical development of each subject, their wide coverage of the available literature and their professional insight as shown in their discussions and conclusions, they have made their book little less than compulsory reading for any student working in this field.

This does not mean that the publication is without shortcomings. The subject index at the back is lamentably incomplete, and the text itself is marred by the overabundant use of acronyms, even for relatively unfamiliar concepts. The inclusion of a list of abbreviations at the beginning does little to facilitate the readability of the text. One also misses names of some scholars well known to regional scientists, such as John Friedmann, Walter Isard, Francois Perroux, H. W. Richardson and others. But for these shortcomings and two or three printing errors, the book is of a very high standard.

A feature of the book is the ever recurring conclusion of but meagre success achieved in the development of most of the LDCs by implementing the different strategies and instruments which the authors discuss. Even in their introduction they warn that "there have been many impressive reports by international bodies advocating specific development policies for LDCs, but they often had a greater effect on academic economists than on the countries at which they were aimed."

This raises the question why so much scholarly theorising has resulted in so little success, particularly, as the authors demonstrate repeatedly, in LDCs in Sub-Saharan Africa, of which this reviewer has some experience. Could it be that the people of these LDCs are less susceptible to development than those of other continents? Surely this is not so. Perhaps the answer to this problem—and simultaneously a challenge to the regional scientist—is to be found in the long

history of development of the LDCs themselves. The customs that they have inherited from previous generations—their tribal heritage, their system of communal ownership, their local government structures, their subsistence economic activities (or what remains of these phenomena)—have evolved over many centuries of constant interaction between man, his environment and his economy. These social systems are no less deserving than, and by no means inferior to, those developed anywhere else. But they are not easily compatible with many of the contemporary free enterprise instruments treated in this book—instruments which also are the results of generations of development, but in a different economic philosophy. For free enterprise had not always been just there: it had to develop from humble beginnings as a particular way of economic adaptation by man to his environment and his philosophies—and during the centuries that followed, both the system and man's institutions changed progressively. Is it feasible, by any stretch of the imagination, to expect that these instruments (which serve people who had over generations made this system part of their being) can be readily transplanted holus-bolus into an environment where the free enterprise system has not yet had enough time to adjust to it?

This poses a further question: if the chances of compatibility between present development instruments and the conditions in LDCs are low, should the proposed development instruments not be remoulded, so as to increase their assimilability in LDCs, instead of trying to change the objects of development before the LDCs are able to absorb the tools of modern developed countries?

The fact that these problems remain unsolved probably explains why the authors begin their book by posing questions about the *raison d'être* of development planning as a legitimate discipline. Perhaps the regional scientist can assist in finding at least some solutions, particularly in respect of the spatial concept which gives due recognition to the frictional effect of distance and the hindrances this imposes upon the spread effects of development projects in environments distinguished by inadequate items of infrastructure, physically as well as socially and economically. In pursuing this quest, the regional scientist will find an invaluable aid in this book.

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STATISTICAL METHODS FOR GEOGRAPHERS by W. A. V. Clark and P. L. Hosking. John Wiley and Sons, Inc., 1986, pp. x, 518. Cloth, \$27.95.

Clark and Hosking's Statistical Methods for Geographers is a welcome addition to the increasingly crowded market of statistical textbooks in geography. The book's contribution lies in its detail and cohesiveness. It provides insight into geographic research design and specific techniques which relate to spatial data. It also covers basic methods for hypothesis testing and analyzing functional relationships. Where other texts lead the student through a series of bewilderingly disjointed techniques and methods, Clark and Hosking go to great lengths providing chapter synchronicity and a progressive sequence of thought. The explanation of concepts and methods is exceptionally detailed. As such, this text may become an invaluable, dog-eared companion for quantitatively-orientated students.

Despite its merits in terms of organization and detail, and the coercive

simplicity of the book's title, one should not be deceived into thinking that this is an introductory text. The book, designed for upper-division undergraduate and first-year graduate courses, would leave students tackling statistics for the first time (and even those with an intermediate statistical background) with the feeling that quantitative methods are one of the more masochistic manifestations of geographic endeavor. Clark and Hosking do not emphasize mathematical formality, but neither do they shy away from it. An understanding of introductory differential calculus and matrix algebra (although not necessary for the more casual reader) takes the sting out of this text.

My major criticism of the book lies with its emphasis. For an advanced level text, the authors spend an unprecedented amount of time outlining basic statistical principles: it is not until Chapter 10 that multivariate techniques are considered. Should we not expect upper-level undergraduate students to have some working knowledge of probability and sampling techniques? By excluding discussion of quantitative methods beyond statistical and inferential techniques, the authors do avoid the confusing brevity that many contemporary geographic texts employ when handling these statistical concepts. Moreover, they go beyond other geographic quantitative texts by discussing alternative forms of multivariate analysis such as logit regression. Nonetheless, Clark and Hosking's emphasis on basic statistics preempts discussion of more advanced spatial modeling. As a consequence, the book only partially fulfills the requirements of an upper-level text for quantitative geography. Techniques commonly found in courses at this level—such as Markov-chain modeling, factor analysis, principal components analysis, multi-dimensional scaling, cluster analysis and location/allocation modeling—are conspicuously absent from Clark and Hosking's book. To the authors' credit, they admit this deficiency at the end of the first chapter.

The first three chapters introduce statistical concepts, and ways of displaying and summarizing distributions. The authors are careful to maintain a spatial perspective and the chapters are replete with geographic examples. I was disappointed with the relatively short discussion on centographic measures at the end of chapter three. Moreover, the authors make no mention of nearest-neighbor analysis as an important measure of spatial distributions. Also, Chapter 3 would have been an ideal opportunity to introduce (at least conceptually) spatial autocorrelation measures which are somewhat hidden in a later discussion of linear modeling. Chapters 4, 5 and 6 provide a fairly thorough discussion of the basics of probability and sampling design as they relate to inferential statistics—areas that are often given "short shrift" in statistics texts. Chapter 6, in particular, contains a clear discussion of functional relationships. Chapter 7 contains a thoughtful treatment of hypothesis testing: Clark and Hosking avoid the common format of merely listing appropriate tests and stating their applicability to different levels of data; instead, the principles of hypothesis testing are well stated in terms of fitting probability functions. Unfortunately, their discussion of nonparametric tests is extremely limited. Chapter 8 deals with measures of association based on bivariate relationships. Chapter 9 introduces simple regression and is the preface to three chapters on general linear modeling. These last three chapters are coherently put together and extremely detailed. They include multiple regression and its assumptions, analysis with dummy variables, autocorrelation, stepwise logit regression, and canonical and discriminant analysis.

The text is peppered with many spatial examples to suit most types of geographers and regional scientists. In many cases, the examples are augmented with raw data and associated SPSS, SAS and BMD computer set-ups and

outputs. The interested student with access to these computer packages would have enough to keep occupied for a semester or two.

In conclusion, I would like to acknowledge the help of senior undergraduate and graduate students who used this book in my quantitative methods class (Fall, 1986). Their comments throughout the semester and after the class was over are reflected in this review. I will use this text again. I have yet to see an advanced text of statistical methods for geographers presented in such a meticulous and logical way. Nonetheless, for those like myself who want to cover the gamut of quantitative methods in their advanced courses, this text would have to be supplemented with other readings.

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**PUBLIC HEALTH AND THE ENVIRONMENT: THE UNITED STATES EXPERIENCE** edited by Michael R. Greenberg. The Guilford Press, 1987, pp. xix, 395. Cloth, \$35.00.

The enthusiasm generated in the 1960s and 1970s for environmental issues appears to have waned in the 1980s. This is not surprising; the promise of most revolutions meets with reaction and discouragement eventually sets in. The authors contributing to Public Health and the Environment, however, clearly feel that the time has come to launch a second environmental movement. This new effort, if it is to be successful, must differ from the first one. It must be informed by carefully marshalled facts, it must use more subtle means to convince the public and policy makers of the importance of environmental protection, it must make less noise, and it must be more pragmatically active.

Public Health and the Environment attempts to bring together the fields of public health and environmental protection in order to address environmental problems. It is important to recognize the problems faced by people working in these two areas. Public-health personnel recognize that there is a trend in the United States toward more chronic disease, which often arises from the man-made environment. Environmental protection workers seem to be losing ground as new technologies develop so rapidly. It is a major premise of this book that public health and environmental protection scientists and administrators can best work together to solve each other's problems. To this end, a collection of interdisciplinary experts from university faculties, government- and private-health agencies, and environmental protection agencies was assembled to write the chapters of this volume.

The first section of the book is an assessment of current environmental threats; it includes chapters on health problems related to lifestyles, the workplace, water supplies, air quality, and solid wastes. In the second half of the book, each chapter deals with solutions to environmental health problems: hard and soft technology solutions; policy, legal, and administrative considerations; strategies for compromise; education of the public; the role of the medical care system; and economic issues, such as cost-benefit analysis. The first half of the book, although it does offer several specific solutions to the problems it addresses, is relatively factual, while the second half offers more general solutions. I found the latter section of the volume more interesting, possibly because innovative ideas about how to solve environmental questions are simply more appealing than facts.

Since the book was written by several authors it is somewhat disjointed. Each writer speaks with his or her own voice and emphasizes favorite concerns. Not all readers will be completely satisfied with these emphases. For example, very little attention is paid to humanist perspectives (e.g., the perceptions people have about environmental hazards) or structuralist perspectives (e.g., underlying political and economic factors that may produce inequalities in environmental protection efforts among geographical areas or population groups) which would serve to balance the generally positivistic approach. An advantage of having experts write separate chapters, however, is that the information (e.g., recent findings on indoor air quality) is current (although, inevitably, much will have changed by the time this review appears). In addition, the editor has clearly attempted to make the book coherent by having the authors pursue certain themes.

One recurrent theme is an historical perspective on various environmental issues. As examples, water use is traced through different civilizations and the ups and downs of environmental laws passed to curb pollution are documented. This historical view serves to present issues of the moment in a long-term context. The advantages derived from expending effort on prevention rather than cure is another important theme. A United States Department of Health, Education and Welfare study is cited which showed that approximately 50 percent of United States mortality from the ten leading causes of death in 1976 was due to behavior or lifestyle variables, 20 percent was due to environmental factors, 20 percent was due to human biological factors, and only 10 percent was due to inadequacies of health care (USDHEW 1979). The lesson is clear: the major portion of mortality is preventable. A third theme deals with how risk is measured (through product performance, human experience, and animal experiments), and how we can cope with risk (through market mechanisms, voluntary professional standards, and government regulation).

Another concept that the authors treat with varying emphasis is the need for research and education that will inform policy decisions. Research studies are reported in detail and in some instances research strategies are outlined. Education is perhaps the most important thrust of the book. It contains, first of all, a great amount of pedagogic material and copious references to further information which should be useful for "public health professionals, environmental scientists, economists, geographers, planners, political scientists, sociologists, and other scientists, engineers, or students concerned about public health and the environment" (p. xii). The basic idea is that an informed citizenry will be able to make better personal decisions concerning environmental health and also be able to more successfully influence public policy. Many specific, controversial policy issues are raised, such as worker safety, hard versus soft technology paths, laws passed to regulate industrial pollution, and efficiency versus equality in environmental planning. Both sides of these issues are presented fairly, although the authors' active environmentalist stands usually show through. The point is made that if both sides to a controversy understand where the other side "is coming from," mutually beneficial compromises are possible.

In conclusion, Public Health and the Environment is a very serious, pragmatic attempt to revitalize the environmental movement. It is a comprehensive text or reference work which summarizes the basic environmental issues. It also provides a baseline for the tremendous amount of research, education, and informed policy making that is required to keep our future environment safe and healthy.

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THE DEVELOPMENT OF CAPITALISM IN AFRICA by John Sender and Sheila Smith. Metheun, 1987, pp. xi, 177. Cloth, \$33.00; Paper, \$16.95.

The tone and approach of this book contrast sharply with recent titles on sub-Saharan African development and underdevelopment. The authors make clear from the outset that one of their objectives is to depart from the doom and gloom analyses of the African crisis literature by emphasizing the dynamic and progressive nature of capitalist development taking place across the sub-continent. Although they frame their discussion within the Marxist analytical tradition, Sender and Smith are not dependency theorists. They give analytical priority to internal rather than external forces in charting the development (versus blockage) of capitalism in Africa. Macroeconomic indices are provided for eleven countries (Ethiopia, Ghana, Ivory Coast, Kenya, Malawi, Mozambique, Nigeria, Senegal, Tanzania, Zambia and Zimbabwe) to support their basic argument that capitalist development is not only taking place in Africa but that its sustained development requires more coherent policies than those offered by the proponents of autarchy or the free market. In keeping with their emphasis on the importance of internal forces, the authors argue that sustained accumulation and growth have been and will continue to be based upon effective domestic initiatives grounded in sound macroeconomic policies.

This short book contains five chapters—including a 4-page introduction and a 21-page conclusion. The heart of the book is found in the three middle chapters which focus on the importance of trade, wage labor and state intervention in the development of capitalism in Africa. Chapter 2 examines the impact of trade during the colonial period on the expansion of domestic markets and exports as well as on the development of productive forces. Particular attention is given to the process of commoditization of subsistence goods, and the establishment of a variety of forward, backward and fiscal linkages.

Chapter 3 traces the development of wage-labor markets during the colonial period with emphasis given to the rise of working classes as new political and social forces. Many themes of African labor history are covered in this chapter, particularly the sources of wage labor, the shift from widespread coercion to an uneven process of proletarianization, conflicts between the colonial state, settlers and trading interests over labor supplies, and the role of trade union organizations in improving wages and working conditions for their members.

Chapter 4 argues that the colonial and post-colonial states have played pivotal roles in promoting industrial development and export growth in a number of African economies. The scope and form of state intervention in these processes is examined and, despite severe data problems, the authors conclude



that dramatic structural changes have occurred as a result of the state's active economic role.

The concluding chapter addresses some macroeconomic determinants of economic stagnation with greatest attention given to the poor performance of export growth. Contrary to the anti-statist policies of the IMF and World Bank and the anti-trade position of dependency theorists, the authors argue that greater export growth and higher quality public-sector investments could substantially improve the conditions and performance of stagnating economies. They conclude on a political note by urging those who recognize the reality of capitalist development to support trade union rights and efforts to improve the working conditions and wages of African workers, who are viewed as "the sole repository of forces for progressive political change."

The major strength of this book is its convincing depiction of African capitalist development, which runs counter to the more dogmatic neoclassical and radical analyses bemoaning its absence. The authors' comparative macroeconomic approach is effective in delineating the more general aspects of this growth. Their approach falls short, however, in informing the reader of critical differences among the countries they examine as well as between these countries and the advanced capitalist economies. By eschewing detailed historical analyses in favor of examining the general dynamics of capitalist growth, Sender and Smith present the reader with a generic capitalism that changes little over time and space. One must assume, following their argument, that the form of capitalist development taking place in Africa generally conforms to the same structures, classes and contradictions present in advanced capitalist economies. For example, in the absence of any discussion highlighting the major differences between the accumulation strategies characteristic of export-enclave economies like Zambia's, and the more domestic-market-oriented economies of Zimbabwe and France, one gains little insight into the fundamental causes of stagnation, retrogression and growth. Such a differentiated analysis would require more attention to the class composition and external linkages of African economies and how these influence the accumulation process. Consequently, the authors' argument that a national bourgeoisie dominates African economies and politics is not convincing since they have not discussed the relationship between this class and the dependent bourgeoisie who characteristically dominate the export-oriented economies typical of Africa. Such distinctions and discussions are crucial to any analysis of and recommendations for "effective export strategies" and improving the conditions of workers. In export-oriented economies, where the market for goods is geographically located outside the country, accumulation is dependent upon external demand. Thus, in the absence of any necessary connection between wage rates and accumulation by capitalists, the political strategies of trade unions (where they exist independently of government control) will be quite different from those pursued by workers in economies in which the internal market is central. In short, how workers fare is dependent upon the locus of accumulation and its class configuration. By failing to make such basic distinctions, Sender and Smith's call to support working-class causes lacks an appreciation of the political, social and economic forces facing African workers in their attempts to organize what Gramsci calls an "active" politics.

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A GAME-THEORETIC APPROACH TO POLITICAL ECONOMY by Martin Shubik. The MIT Press, 1987, pp. viii, 744. Paper, \$15.95.

The book is the second volume in the author's compendium of game theory. The first volume, Game Theory in the Social Sciences, was published in 1982. The present book surveys the applications of game theory in many topics, including among others: duopoly, oligopoly in general, markets for houses and horses, marriage, welfare economics with few and many traders, intergenerational relations, labor markets, voting, and political systems. The main omission is location. Spatial factors are virtually ignored. The material is notably diverse, ranging from abstract theorems on cores to data on the ages of corporations. The high point of the book is a resolution of the St. Petersburg Paradox. The book is mainly valuable as an encyclopedic review of the literature of game theory. Anyone wishing to do research in the area should find the book useful. There is a twenty-six page bibliography.

The book is idiosyncratic when dealing with economics other than game theory. The term "isoquant" is misused. In a chapter titled "Monopolistic Competition," the author treats that topic in passing and then switches to the different subject of oligopoly. There is no significant analysis of monopolistic competition. Another idiosyncrasy is the use of aggregate utility functions. The author supports this by citing two obscure references and a 1965 article in Econometrica that surveys theories of international trade that were old at the time. The Econometrica piece dismisses the justifications for aggregate utility functions as farfetched. The most interesting idiosyncrasy is the author's concept of cardinal utility. In the context of the von Neumann-Morgenstern model, it is standard to regard a cardinal utility as any (increasing) affine transformation of any individual utility function. In the standard view, then, there is no distinction between  $U(x) = ax + b$  and  $V(x) = x$ . Any difference in magnitude is considered analogous to the difference between stating distances on a highway in miles and kilometers. The magnitudes themselves are of no significance. In the standard theory of consumer behavior there is less interest in cardinal utility, and none in the particular numbers generated by utility functions. The author, on the contrary, seems to regard utility magnitudes as intrinsic to consumers. In Chapter 10, he speaks of "true cardinal utilities" where the word "utilities" refers to different numbers, not different classes of functions. It would be interesting to pursue the author's line of thinking, but he does not make it explicit, and it is not clear exactly what he has in mind.

The main weakness of the book is its inconsistency. The mathematical and non-mathematical parts are not connected, and the later chapters are not consistent with the early ones. On page 3, for example, the author states that the book is limited to "...outcomes involving economic goods," and he continues by discussing money and commodities. This limitation no longer applies on page 638 where it is stated that: "Power, status, glory,...have provided more motivation for kings, chiefs, generals, ministers, senators, courtiers, and functionaries than any economic drives. The challenge to the social scientist is to analyze the implications of these...factors." The author typically analyzes a topic by first presenting a variety of models and then delivering sweeping opinions that take no account of what has gone before. For example, he first analyzes oligopoly with a linear market demand curve, constant average costs, and capacity constraints. There is no consideration whatsoever of institutional factors specific to particular industries. The author subsequently remarks that oligopoly theory is intrinsically institutional. He then continues by introducing

several more models with absolutely no institutional content.

At the beginning of his earlier volume the author acknowledges Lloyd Shapley for putting the author's ideas into mathematics in other works. The services of such a mathematical collaborator would have certainly improved the present book. The mathematics is ragged. In Chapter 4, for example, the author forgets his own definition of "Pareto set." The author also has the habit of presenting graphs of solutions without stating explicitly what the problems were supposed to have been. The reader must work backward from solution to problem and wonder whether the formulation he recovers is precisely equivalent to the intuition that the author has in mind. Another indication of raggedness is the author's failure to define terms. Many mathematical terms are used before they are defined, and some terms are defined inadequately or not at all. The book should have a glossary. All in all, the book is too ragged for a subject based on fine mathematical distinctions.

The readability of the non-mathematical parts varies. There are some witty epigraphs in the later chapters. On the other hand, the author attempts throughout the book to cite in detail the specific points contributed by the works in the bibliography. This often involves citing a particular reference a half-dozen times in a few pages. The thoroughness is impressive but makes for boring reading.

In summary, the work is miscast as a book. It should have been cut, and published as a series of survey articles and a note on the St. Petersburg Paradox. The book is mainly valuable as a survey of the literature of game theory.

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INDUSTRIALIZATION AND GROWTH: A COMPARATIVE STUDY by Hollis Chenery, Sherman Robinson, and Moshe Syrquin, with contributions by Gershon Feder, Yuji Kubo, Jeffrey Lewis, Jaime de Melo, and Mieko Nishimizu. Oxford University Press for the World Bank, 1986, pp. x, 386. Cloth, \$29.95.

The days of large-scale theorizing about economic growth, à la Harrod, Solow, Swan, Meade, Phelps, et al., are over, and we must face up to the intricate and tedious work of assembling and studying the information on growth, formulating and testing quite specific hypotheses, and fitting together analyses from both the micro and macro scales. The good news is that excellent progress is being made on these fronts, and *Industrialization and Growth* reports on that research. This book continues Simon Kuznets's and Edward Dennison's traditions of empirical research on economic growth, extending the coverage to a number of developing countries through 1980, focusing particularly on nine semi-industrialized countries: Colombia, Japan, Korea, Mexico, Norway, Taiwan, Turkey, and Yugoslavia. The analysis is neoclassical but devotes much attention to demand-side influences on growth, since factor growth can account for only half of the postwar growth of developing countries, whereas it accounts for some 70% of growth in developed countries.

The book has four parts, which examine structural transformation, industrialization experiences, the interactions of productivity growth and structural change, and the general equilibrium effects of various development strategies. The book is very intricate but is well organized. The first chapter

contains a reader's guide to the topics and methods of analysis, and the last chapter is a summary of major findings. However, some of the chapters have useful summaries while others do not.

One of the motivations for emphasizing the influences of demand on economic growth in the developing countries is that the structure of activities changes so drastically wherever a five-fold change is experienced in per capita income (this being the sectoral transformation of economic development). The share of manufacturing in total output and value added more than doubles during the transformation, and the share of primary production declines by even more. The authors find that, in the developing countries, foreign trade is a more important influence on this change than Engel effects on domestic demand. The importance of trade appears again and again throughout the work, and it is one of the significant themes in the findings.

One of the major inquiries of the work is how different development policies affect the progress of development (the transformation) and income growth. Not surprisingly, export promotion has fostered earlier transformations and faster growth. However, even among the East Asian superexporters, Korea and Taiwan, the authors find that the period of export promotion was preceded by a period of at least selective protection and import substitution, apparently to build a manufacturing base. The trick has been to know when to let go of import substitution, or possibly to be able to muster the political power to do so, before infant-industry promotion becomes Latin-American-style protection of stagnant home industries. Study of the structure of intermediate manufactured inputs in production identifies a major virtue of earlier export promotion: an exporter can import higher-quality, more sophisticated intermediate inputs than it can produce itself, and can, through trade, very nearly replicate the more complex intermediate input structure of an industrialized country, while a serious import substituter must make do with the intermediate input structure that it can produce itself, retarding its ability to capture higher-priced, foreign markets.

Chenery, et al. find further costs to the import substitution strategy than simply foregoing foreign markets. Engaging in the competition of foreign trade is associated with faster total factor productivity growth. The authors are careful not to assign causality to their findings, since exogenous productivity growth could permit greater success in international markets, but the implication is strong that greater openness to trade increases productivity growth.

Another important and robust finding of this study is that productivity increases are created by reallocating factors from traditional to modern sectors, from primary activity to manufacturing, and from modern, inward-oriented sectors to modern, outward-oriented sectors. The authors find that 20% to 30% of a country's growth rate during a period of industrialization and export growth typically comes from the reallocation of factors across sectors.

The authors find that trade policies are more influential on growth rates than are domestic allocation policies, and simulations can demonstrate this fairly cleanly. However, the world is not that clean, and my own assessment is that governments that are more willing to try to block foreign market forces are likely to try to block domestic ones as well. Additionally, any government with extensive and sustained interventionist inclinations is unlikely to be adept at designing and implementing economic policy. The sum result is that sustained import substitution is unlikely to be separable from extensive domestic distortion; maintaining serious distortions in some sectors eventually will require introducing serious distortions in remaining sectors just to put off the day the house falls in. The authors appear reluctant to introduce serious indictments of

sustained import substitution strategies (as opposed to temporary infant industry protection) on the grounds that those economies eventually do make the industrial transition and that their growth rates are "moderate" rather than "poor." However, they note that their estimates of growth rates of income and total factor productivity probably are biased upward by domestic price distortions, which are more extensive in the import substituters. They find that import substituters are more likely to borrow for investment than are export promoters, leaving the former economies more exposed to crippling foreign debts, just as happened to the import-substituting countries of the world recently. Since their information base may not have been sufficient to support more critical examination of import substitution, the authors probably were justified in their reserved criticism.

There is nothing spatial or regional about this book, yet regional scientists are likely to find much of interest in it. Regional scientists have been interested in growth and structural change at the regional level within nations, and this book offers excellent empirical insights as well as a good exposition of the use of input-output analysis for studying the influence of policy on growth and structural change (Chapter 5, "The Methodology of Multisector Comparative Analysis"). The book stands well as a treatise on postwar growth in the Third World, but would be useful as a text in a course on economic growth.

As a final note, observing that there were eight contributors to this work puts into perspective the magnitude of Kuznets's pioneering efforts in this field, even if he was aided by legions of graduate assistants.

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FOOD, AGRICULTURE, AND DEVELOPMENT IN THE PACIFIC BASIN:  
PROSPECTS FOR INTERNATIONAL COLLABORATION IN A DYNAMIC  
ECONOMY edited by G. Edward Schuh and Jennifer L. McCoy. Westview Press,  
1986, pp. xvii, 276. Cloth, \$27.50.

This collection of papers grew out of a 1982 workshop of the Pacific Basin Project, an undertaking of the University of Minnesota's Hubert H. Humphrey Institute of Public Affairs and (initially) the Aspen Institute for Humanistic Studies (subsequently replaced by the University of Pittsburgh). The workshop and book represent the third field, food and development, in a project series.

The overall purpose of the Pacific Basin Project was policy research toward establishment of a "Pacific Community" through identification of specific problems and regional responses "that might require new forms of international consultation, cooperation, coordination, parallel national action, or common action." This particular volume deals with management of world agricultural production, international trade and distribution of food supplies, and regional labor migration. Specific issues addressed concern the means by which the agricultural sector can contribute to economic development, and potential policy areas for international cooperation.

The book is composed of thirteen papers (including an introduction by the editors), divided into five parts. The first section reviews the relevant economic theory, policies, and post WWII regional performance in agricultural production, food consumption, trade, prices, and development. The other papers are

organized around four "themes"—Food Security, Domestic Policy and International Trade, International Labor Market, and Technology and Research in Agriculture—with a concluding paper on future issues and collaborative opportunities. A majority of the authors are economists, mostly from Pacific Basin universities/research centers. However, with a few exceptions the material should be readily understood by those from other disciplines. Analysis is largely descriptive or qualitative, including simple geometric models, with quantification limited to descriptive statistics and tabular presentation of (mostly) secondary data.

The first theme considers strategies for securing adequate and stable national food supplies, tackling the issue of self-sufficiency in domestic production versus specialization and trade based on comparative advantage. Two papers, by Lattimore, and Luiselli and Cruz-Serrano, present opposing viewpoints. The latter authors make a case for self-sufficiency with integrated development of the entire food system, arguing such an approach will also better promote social and economic development. While Luiselli and Cruz-Serrano openly reject a comparative advantage food strategy due to "oligopolization" of the international trade system, they lay out a framework based on "existing (national) trade patterns and production potential" to identify complementarities and possible cooperative exchanges for regional agricultural development. The Lattimore paper emphasizes the gains from specialized production and trade in achieving both food security and economic development. Lattimore reviews the short- and long-run costs and inefficiencies caused by protectionist domestic policies, and suggests specific national and multilateral policy actions to deal with international commodity market instabilities.

The Domestic Policy and International Trade section continues and expands on the food security theme. Lee and Roumasset first present an application to regional rice policies and trade. A static market model is developed to demonstrate the increased world price instability brought about by protectionism in major trading nations. Domestic policy reforms designed to reduce world market distortions yet meet food security requirements are evaluated. The other two papers by Ahn and Wu offer case studies from South Korea and the PRC, respectively, of the comparative advantage versus self-sufficiency dilemma, giving greater emphasis to dynamic agriculture-industry interactions in the development process. Both discuss future national policy directions. Ahn foresees a decline in Korean government support for non-rice agricultural prices. Wu argues that China must remain largely self-sufficient in grains, and considers recent liberalization measures extended to increase domestic agricultural incentives and production.

The next theme, International Labor Markets, examines the causes and effects of U.S. immigration on the larger economy. The first paper by Huffman focuses on Mexican in-migration. Huffman uses a general equilibrium model of the linkages between U.S. agriculture and manufacturing output and factor (labor and capital) markets to analyze the impact of migration on production, prices, and factor returns. The other paper, by Greenwood and Stuart, considers migration in a broader regional and development context. Statistical analysis of U.S. data confirms that economic factors like relative source-country wages and labor force attachment are important, though not the sole, determinants of migration. Subsequent qualitative analysis of employment and development effects is inconclusive.

Agricultural Technology and Research is the strongest section in terms of the completeness and complementarity of papers, and in publication of results

generally not available before. The first part of the lead (Judd and Evenson) paper provides a useful introduction to world agricultural research investment. The authors go on to investigate the role and development of national patent systems in promoting different types of private invention, concluding that the lack of legal protection in developing countries has hindered local, particularly indigenous, technological innovation, adaptation, and use. The second paper by Ruttan assesses Asian research capacity with case studies of six national (public) agricultural research systems. An overall critique reveals serious shortcomings in the support, allocation, and administration of research resources. To improve the stability and consistency of financial support for national programs, Ruttan proposes a formula approach for external assistance tied to the level of domestic funding and fiscal capacity. In the final paper, Pineiro and Trigo analyze the evolution of Latin American research institutions and technology diffusion within an induced technological change framework. Agriculture commercialization has meant increased private-sector research activity, with the basic technological alternatives originating in the developed world. The authors conclude that the government's role and capabilities in determining technology supply are now more limited, and advocate greater attention to demand-related policy tools.

The issues raised by this book are especially topical at this time, and the book offers non-economist, regional specialists a succinct yet fairly balanced and comprehensive exposure to the economic theories, analytical results, policy debates, and empirical work. The analyses of domestic agricultural and development policies are particularly welcome in the extended and thoughtful considerations of government roles, available policy alternatives, national and world impact of government interventions, evaluation criteria, and the political economy of policy formulation and reform.

An important omission of the thematic papers, however, is macro-economic policy, including the international monetary system and Third World debt problems, which receives detailed discussion only in the introductory and concluding papers. International capital flows now dominate world trade in goods and services. The emergence of an integrated international capital market has widespread trade and development implications through its influence on exchange rates and foreign reserves, as well as national fiscal and monetary policies.

A more fundamental criticism is the limited and uneven attention given to areas of possible regional cooperation, a key Pacific Basin Project objective. A third of the papers do not address the topic at all, or do so only perfunctorily with short, general assertions. In other cases, specific recommendations are simply tacked on a final section independent of the prior analysis. A related question is the extent to which proposed cooperative actions in trade, food security, and financial and monetary reform can be negotiated or effectively implemented on a regional versus international basis given the interdependence between world commodity markets and the international capital market and monetary system. This issue is not directly confronted by the book.

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**TOURISM TODAY: A GEOGRAPHICAL ANALYSIS** by Douglas Pearce. Longman, 1987, pp. xv, 229. Paper, \$27.00.

The growing significance of tourism on the world stage has been noted and examined by a number of social scientists and one of the more prominent amongst these is the geographer, Douglas Pearce. In this, his second text on tourism, Pearce has focused on the spatial aspects of tourism, using as his basic analytical framework an "origin-linkage-destination system" to examine the movement of travelers around the world. To provide a comprehensive setting for this approach the text examines these spatial patterns at a variety of geographic levels, ranging from international travel patterns down to the local scale of individual resorts.

To accomplish his objectives Pearce has organized the text into eleven chapters. The first chapter introduces a variety of tourism models which are used to provide the theoretical basis for his subsequent spatial emphasis. These include models of tourist-recreationist travel, origin-destination patterns, industrial structure, and the evolution of destinations. Chapter 2 examines some motivations and demand characteristics of travel, tracing some regional variations in travel demand within two case-study nations. This is followed by three chapters which examine various features of international travel flows, culminating in Chapter 5 which attempts to integrate these international movements and their associated travel patterns within generating and receiving nations.

Chapter 6 changes the focus to domestic travel and examines inter-regional tourist flows and vacation hinterland patterns. Chapter 7 "reviews and evaluates the range of factors and approaches used to define and describe the spatial variations" discussed in the previous chapters. It points out some of the difficulties and limitations involved with data collection and analysis in tourism, and presents some techniques that have been used to overcome the problems associated with the variety of data sources and definitions used in the industry. Chapter 8 examines the nature and regional structure of tourism in terms of whether domestic and international tourists favor particular areas or the same parts of a destination region or country. Chapter 9 focuses on the special situation of island tourism and related spatial tourism structures.

Chapter 10 marks another major change of focus, this time to a local scale of enquiry as represented by the coastal resorts and urban areas. The chapter examines the morphological patterns and the evolution of resort destinations, and describes the formation of Recreational Business Districts and various tourism-related land use patterns within urban areas. The final chapter attempts to summarize the previous materials and focuses on "two major and recurring themes—concentration and spatial interaction." Included with this summarization is a short section on the impact of tourism.

As may be determined from the book's title and the above brief description of its contents, Pearce has attempted to synthesize a wide range of materials and studies into a manageable overview of geography's commitment and contribution to tourism research. In so doing he has produced a book with several strengths. These include: its balance of First and Third World examples and studies, many of them a reflection of the author's personal research experience around the world; the use of primary sources, particularly international and national agency statistics and reports; an exposure to the European, especially French, tourism literature, which again reflects the author's personal experience and library research in Europe; an abundance of figures and



diagrams to illustrate various points and the linkages between models and case studies; and, finally, and by no means least, the author's willingness to comment on current gaps and weaknesses within the spatial analysis of tourism research and to suggest future research directions. Such critical appraisals will be a boon to aspiring tourism researchers, especially graduate students.

While the book's strengths are many, its weaknesses are few and relatively minor. One irritation which could have been avoided is a more accurate subtitle. The author has really focused on one aspect of geographical analysis, namely the spatial interactions of tourist movements. Subsequently, there is limited material on the land use problems and management issues associated with these mass movements—something that many would expect given the current title. Another irritation concerns the layout of the text. The book would have been easier to follow had its wide range of topics been structured into sections, possibly along the lines discussed in the introduction (p. 2). It was also puzzling to come across a chapter on measurement and definition in the middle of the text rather than at the beginning, where it could have functioned as a cautionary note. Finally, and this is probably the most difficult aspect for any synthesis to satisfy, an inappropriate degree of detail was provided in the case-study reviews. At times this reviewer felt the text became bogged down in unnecessary detail, to the detriment of the text's flow and overall structure.

Overall, Tourism Today is a welcome addition to the literature on tourism because it is the first to concentrate on the spatial patterns of tourist movements, and thereby fills an important gap. This spatial focus and the variety of geographic scales should make the book particularly relevant to students of regional science, and in fact its depth and detail will make it a fine reference for all interested in tourism research.

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RULING THE WAVES: THE POLITICAL ECONOMY OF INTERNATIONAL SHIPPING by Alan W. Cafruny. University of California Press, 1987, pp. xvii, 323. Cloth, \$40.00.

This book is concerned with the rise and fall of shipping regimes, especially the American hegemonic one instituted at the end of World War II and amended over the last two decades in response to compelling global forces. Shipping is symptomatic of hegemony in the international political economy and has the additional useful property of both imposing and reacting to global divisions of labor in the furnishing of ships' crews. The cyclical nature of the industry, combined with shifts in the power blocs as a result of changing strengths in underlying economic and political comparative advantages of nations, contrives to place shipping at the forefront of global competition and national self-interest. To add to the witches' brew, technological change can be forthcoming with direct implications for shipping—the container revolution in modern times—sufficient to destabilize the shipping regime in its own right. These issues are all grist to Cafruny's mill, and he concludes by claiming that the American-imposed shipping regime of 1945 is still the prime mover in world shipping despite challenges from the Soviet and Third World camps and notwithstanding the increasingly divergent interests of the U.S.A. on the one hand and Western Europe (and its Japanese sleeping-partner) on the other.

In detail, Part 1 focuses on the concepts of regime and hegemony and goes on to provide an historical narrative of the succession of shipping regimes, beginning with the Dutch system of the seventeenth century. Great play is made of the eventual crystallization of two opposing views: the privatization versus the governmental. The former eschews state interference and rests on the operations of "conferences" or cartels of colluding shipowners. It was pioneered by the British, championed by the Europeans in general and has gained new adherents in the Japanese. The latter view, in contradistinction, espouses government intervention. That intervention requires regulation at the very least (e.g., U.S. Department of Justice battles against the European conferences on behalf of American shippers or Latin American insistence that its shipowners be allowed to participate in theretofore "closed" conferences). More usually, however, fully-fledged government involvement entails the establishment of "national champion" shipping lines together with a whole panoply of subsidies and promotional measures aimed at boosting the marine industries. In the U.S. instance this is best illustrated by the terms of the 1936 Merchant Marine Act allowing both for construction-differential subsidies to the shipyards (to make their products cost-competitive) and operational-differential subsidies to the shipping lines (to make their services price-competitive with foreign lines). Such protectionist philosophies have been expropriated by the Third World and are best expressed through the UNCTAD Code of Conduct for Liner Conferences of 1965 which has demanded and, for the most part, succeeded in wresting from Western (mostly European) shipping companies a goodly proportion of the carrying trade originating in the LDCs. Ironically, greater shares of cargoes on government insistence along with protection afforded to "national champions" may work against efficiency. In the U.S. post-World War I case, government "aid resulted in a vicious cycle of subsidy-inefficiency-further subsidy, and this cycle became a permanent feature of United States shipping and shipbuilding" (pp. 67-8). However, a significant sector of U.S. shipping sidestepped the inefficiency of national-flag liner operations by promoting flag-of-convenience (Liberia and Panama) non-liner shipping. Spearheaded by the multinational corporations, such bulk and tanker operations benefited from cheap, nonunionized labor, low taxes and guaranteed employment stemming from the MNCs having control of materials supplies in the Third World and processing facilities in the advanced-industrial countries. Part 2 of the book fleshes out these themes, highlighting the structural weakness of U.S. shipping deriving from crippling labor costs. Pursuance of flags-of-convenience was one means of overcoming the restraint while promotion of containerization was another. The first served to provide the U.S.A. with the largest "unofficial" fleet in the non-liner trades whereas containerization gave it a competitive edge in some of the liner trades; that is, the "official" U.S.-flag fleet was subject to some revival. The Europeans, their maritime supremacy challenged on both counts, have been scrambling to adjust to these aspects of American hegemony. The Third World and the Soviet bloc have equally played their part in undercutting European supremacy but have not effectively blunted the American shipping hegemony.

This is a story well told by Cafruny and he makes a convincing case for a hegemonic underpinning of world shipping in which American interests continue to triumph. The recent demise of U.S. Lines, however, suggests that he may have overstated the effectiveness of American shipping policy (or, as he has it, disparate measures amalgamating through the 1984 Shipping Act into a coherent policy package) especially when confronted by highly efficient Japanese and Taiwanese lines. In fact, the relatively cavalier treatment of Japan—the

principal maritime nation in trading companies (Sogo Shosha), liner shipping and shipbuilding—is admissible given the historical focus of the work but, if expanded, would have rounded the book out and perhaps pointed to an impending usurper of American shipping hegemony. Moreover, a greater attention to economic considerations—the reasons for structural weaknesses in U.S. shipping and explicit account of trade cycles on shipping fortunes, for example—would not have gone amiss. On the whole, however, Cafruny deals ably with a wide-ranging topic of vital concern not just to U.S. trade interests, but to all parties concerned with global patterns of trade and institutional attempts to mold them. In this respect, it is an essential book for regional scientists.

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REGIONS: THE ECONOMICS AND POLITICS OF TERRITORY by Ann R. Markusen. Rowman & Littlefield, 1987, pp. 304. Cloth, \$37.50.

An organized body of theory progresses through introspection and external confrontation. Markusen's book acquires significance in this respect since it captures both of these processes: first, by attempting to extend beyond the rigid framework of historical materialism (Marxist political economy), and second, by drawing attention to perceived weaknesses in other research methods, especially regional science.

In a broader context, Markusen is riding the wave of the "new left": a cadre of Marxist/structuralist scholars armed with revised interpretations of the international division of labor and managerial capitalism, frequently derived from empirical analyses of urban, interregional, and international economic and social relations. Drawing upon these and other concepts surfacing from the "new left," Markusen turns to the territorial dynamism expressed in regionalism.

In Regions: The Economics and Politics of Territory Markusen attempts to explain and describe the processes and mechanisms underlying regionalization in the United States. She suggests that regionalization represents the essence of geographic distinction, emerging from internal/external territorial conflict waged in economic and political arenas, and reified by cultural differentiation. In this regard regions are distinguished from urban areas and nation states which, according to Markusen, are less successful in typifying "the meeting ground of humanity and nature" (p. 18).

Markusen views her analytic framework, centered on historical materialism, as a major research contribution. The use of historical materialism is justified by arguing that the emphasis on historical interpretation and material (economic) conflict provides the most suitable framework of analysis. However, she extends beyond the rigidities of historical materialism, drawing upon a range of political, anthropological, and economic thought, and her integration of cultural distinctions as potent forces influencing the dynamics of territorialism is a notable deviation from most Marxist analyses.

Ten theses, presented in the opening chapter, articulate Markusen's view of the causal factors inciting and perpetuating regionalism. These theses are organized around internal and external influences that coactively distinguish and represent regional interests. Internal influences stress the role of economic, political and cultural forces in forming regional behavior, while external factors

focus on differential regional growth and decline and interregional conflicts stemming from the federalist system of government.

According to Markusen, the theses represent inductive generalizations derived from three empirical studies presented in the book. These studies center on historical epochs influential in shaping the regional composition of the United States. The first explores regional conflict and confrontation between Native Americans and colonizing Europeans during the seventeenth, eighteenth and nineteenth centuries. The Civil War era, marked by conflicting modes of production (slave labor in the South versus capitalist wage labor in the North) and divergent political orientations, serves as the second case study. Regional shifts occurring during the 1970s and 1980s are the bases of the last study. Here, conflicts arising from the spatial variation of natural resource endowments, the mobility of capital and labor, and military spending concentrated within the rim-region (east and west coasts and the southern tier of states) are identified as key factors perpetuating regionalism.

In the final chapter the results of the book are synthesized and directions of future regional trends are identified. A concluding appendix reviews the strengths and weaknesses of other disciplines active in regional analysis, and the critique of regional science may be of interest.

My first criticism of the book concerns the weakness in her research method. The relevance and merit of *Regions* is constrained foremost by the interpretative bases of historical materialism, where preconceived dictums are imposed upon historical events to reach conclusions established a priori. This is most apparent in Markusen's "inductive" formulation of theses from case studies, since outcomes (theses) are ascribed more to the framework of analysis than actual historical events. This problem is pervasive in many studies emerging from the "new left," where empirical analyses are used in support of theory. Thus, Markusen's theses are more appropriately attributed to an "idealized truth" that may—or may not—capture the processes of regionalization.

Second, Markusen has been rather selective in her choice of case studies, choosing to ignore major historical events and large segments of time in her analysis. We are left with the impression that regionalization is a discontinuous process, centered only around specific historical events. Although she explains why other "case studies," particularly the "Populist movement" of the late eighteenth and the "New Deal" era, are overlooked, the book would acquire greater substance by explicitly accounting for the historical ebbs and tides of regionalism. Indeed, the question, arises whether historical incongruities have been downplayed in support of Markusen's views.

Third, Markusen's critique of regional science begs the essential argument of historical materialism versus regional science as an appropriate research method. Markusen (as with most Marxist and structuralists) glosses over the essential distinguishing qualities of regional science and, instead, incessantly drones over criticisms that have become commonplace. That regional science offers a more flexible analytic framework, and affords scholars the ability to extend knowledge outward from a codified theoretical basis is overlooked. In contrast, historical materialism is preoccupied with internalizing the events that mark our lives with the rigid structure of Marxist thought.

These differences in research method are most visible in the wide range of analytic methods and theoretical bases applied by regional scientists on the one hand, and the recent attempts of Marxist/structuralists to break their imposed patterns of analysis on the other. Through her efforts to develop a wider research framework, Markusen provides the best testament of the

inflexibility of historical materialism. Only in this regard is her book meaningful.

Lastly, the organization of the book's ten chapters is awkward, with discussions of research method, definitions, and expansion of the economic, political, and cultural aspects of regionalization appearing primarily in chapters two, three, and seven, but also surfacing sporadically throughout the book, while the remaining chapters deal with the three case studies. The book also suffers from a lack of summary tables, maps, and figures, all of which could have been employed to more effectively elucidate arguments.

In closing, Markusen has provided a thoughtful work, and her scholarly efforts merit consideration, although the book is not recommended as essential reading for regional scientists.

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NUCLEAR POWER: SITING AND SAFETY by Stan Openshaw. Routledge & Kegan Paul, 1986, pp. xiv, 349. Cloth, \$39.95.

The body politic of nuclear power had one arm amputated at Three Mile Island and one leg severed at Chernobyl. The significance of these events, today at least, lies in the fact that the industry has not expired completely despite these accidents. Here, in Nuclear Power, Openshaw seeks to dispense some remedies for the industry's ills, suggesting new ways to handle and manage nuclear power in future applications, insofar as any one authority can. He contends that a far simpler approach is available, one that seeks to minimize health consequences from worst-case accidents, regardless of however rare such events may seem to be. The issues raised here, thoughtful in their own right, deserve close consideration both in view of the Chernobyl disaster and the political mishandlings of things nuclear.

Early on, Openshaw also provides some helpful information on energy patterns in the world, especially the U.K., and explores the range of government actions, utility responsibilities and complex ramifications for siting in light of these energy developments. The author offers in this section a first-rate description of risk in general and nuclear power risks in particular and investigates several of the dilemmas in nuclear power regulation and risk analysis today, though without including mention of several classics in risk analysis and management. The author also details in later chapters the planning and policies used by the U.K. Central Electricity Generating Board (CEGB), among other U.K. operating bodies; various siting strategies from three case studies—Sizewell, Hartlepool and Druridge Bay—underscore many of the author's points. The middle part of the book details comparisons between the U.K. and the U.S., where the author concludes the U.S. approach is the lesser of two evils.

The chief and most acute part of the book is devoted to making the case for more reactor and waste repository siting considerations in nuclear power matters, where siting offers additional, design-independent margins of safety. These "optimally safe and maximally acceptable" sites derived through Openshaw's approach would not only minimize health risks, but would actually protect the industry against negative changes in public opinion. Indeed, so the author claims, by deliberately exploiting only the remotest geographical sites for new developments, long-term public acceptance of nuclear power might be

greatly improved or its future assured; any other course of action, Openshaw maintains, constitute an unwarranted gamble with public funds and future standards of living.

The bulk of this argument is geographical: location as an additional, reactor-independent, augmentative safety measure for nuclear power safety. Openshaw makes this case because of the general failure, first, to appreciate the extent that location is critical in measuring the safety (or danger) potential of nuclear sites and, second, the failure to realize that location also affects the level of present and future acceptability of nuclear power (p. 316). In short, what makes the geographical point of view necessary is to protect against the reality of future nuclear power mistakes (no matter what measures are taken) and the inability to remove all problems in the engineering design phases (no matter the power of computer-aided design). It is this locational component that will largely determine the consequences of reactor accidents, should—or when—they occur, the author suggests.

Ironically enough, while these considerations are clearly essential in protecting the public, the role of facility siting has been historically the illegitimate child in nuclear power plant economics and nuclear power accident discussions. The current situation exists because three things have been used to resolve the problems of nuclear power mistakes: (1) engineering specifications, (2) emergency plans and, however poorly implemented, (3) siting. The unfortunate upshot for the latter two has been emergency plans based on geographical location frequently omitted from financial discussions, safety considerations and energy policy debates. For instance, the author documents how current conditions fail to safeguard against such possibilities as terrorist attacks, sabotage and human error, and how considerations such as clean up, one of the complex issues of Chernobyl, go unaddressed in current energy policy discussions, no matter the location. In Nuclear Power, the author hopes to prevent these ineffectual beliefs in the complete infallibility of engineered safety measures.

By most measures, while this thoughtful line of reasoning appeals to common sense, a few of Openshaw's assumptions are open to debate. For one, the main assumption in this book is that nuclear power will increasingly provide the world's electricity, not only for the developed world, but for the developing nations of the world. For many public policy officials and environmental researchers, this is an accurate, well-established, albeit frightening assumption. Some discussion of the likelihood of a non-nuclear future would have been welcomed nevertheless, given the tragedy of Chernobyl and the advent of super-conductivity. It may be, contrary to the author's claim otherwise (p. 9), that during the next few decades a large number of very expensive, very large, major energy facilities are not going to be built.

For another, the author calls for implementation of the rational model of site selection, or a more realistic site evaluation process, in noting "it is a sad reflection of the current state of site selection research and evaluation in the U.K. that there is not a far greater use of the most advanced computer methods and remote sensing data are not being used" (p. 323). The assumption here, of course, is that the rational model, so defined by Openshaw, provides the best method for siting large-scale facilities. Ironically enough, though, increased injections of the rational scientific siting process may be part of the entire siting problem, as shown in U.S. experience in siting high-level radioactive waste repositories. Lacking here, of course, seems to be proper consideration for the role of politics in siting facilities; the more general problem surfaces in an inherently inflexible idea made worse.

This latter concern arises with respect to the author's call for a supranational basis for high-level radioactive waste repository siting (p. 7). At a smaller scale, the problem here is that by most accounts the possibility of anyone in a country agreeing on a suitable repository site, however defined, is virtually nil. Recent U.S. high-level radioactive waste repository siting experience illustrates that national siting is unlikely (or even impossible, given the methods used) and so the probability of supranational siting must be even less likely; even more serious would be to base a nuclear future on the conclusion that it would be possible. For some, U.S. experience confirms the inherent problems in using a "scientific" process for what is inherently a political and moral problem.

A few of the author's definitions also deserve closer scrutiny. For instance, in the call for possessing public acceptance of nuclear power (p. 278) it was unclear by whom this was to be done: policymakers, utility executives, or both? Also left unaddressed was how the sparse siting scenario would be implemented, in the sense of affecting current policy, and this surely must be one of the most serious omissions in the work. An equally serious complaint, given the purpose of the book, should be leveled over the definition of optimal location, since nowhere in the work was it made clear enough just what this was.

A more fundamental problem emerges, by its very nature, in the call for nuclear power plants sited in "sparse" areas. The fault here lies in that almost all sparse areas are environmentally significant areas, conducive to complaints and protests from environmental and recreational groups. So, when the author calls for geographical isolation, this more often than not means wetlands, open lands and the like will bear the brunt of the sparse siting scar. Admittedly, the author recognizes this problem, but offers no satisfactory resolution of the fundamental issue despite the few lines devoted to the problem. Openshaw's view of the siting process therefore appears highly anthropocentric; his conclusion that the additional marginal costs of nuclear energy from remote sites would be a small premium to pay only reinforces this point. Interestingly enough, a good many citizens, the reviewer included, might be willing to sit in the dark 20 percent of the time to save the trees and other ecological wells of human hope.

In theory, the ideas presented in the book make good sense because, for much of the world, decisions on how to handle nuclear power will be made increasingly over the next 10 to 15 years. And, if some of the problems of the book are set aside, then the risks of nuclear energy in powering the future can be made more responsible as a result of the work presented here. For instance, a geographically realistic and safety-conscious siting strategy may reiterate to policymakers and utility executives, the necessity to take heed of population geography—and common sense—in lessening many of the potential problems inherent in current nuclear energy planning. In practice, though, the unfortunate upshot is that, even with Nuclear Power, the question of which change agents will deliver the desired public acceptance of nuclear power is still unanswered. The chimeric nature of sparse siting can be explained by problems of policy implementation and barriers of political palm-greasing.

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