



Book Reviews

Jean Masseron, *Petroleum Economics* (Paris: Éditions Technip., 1990), 519 pages.

Most writers on petroleum find crude oil production enough of a challenge to seize their entire attention. This book seeks to cover all of petroleum -- oil from production to sales, natural gas, and petrochemicals. The result is a guide that for a long time has been the most useful single source of essential information on petroleum.

As is made clear only after you get past the title page, Masseron had four collaborators on the book. François Bonis-Charancle wrote the section on demand and marketing of petroleum products. Jacques Cheli did petrochemicals. Jean-Luc Karnik and Michel Valais covered natural gas. Masseron himself provided the introductory and concluding sections and the sections on crude oil markets, transportation and refining. The book was originally available only in French, but at some stage (possibly with this edition), an English version was added.

The economics are predominantly applied. Attention is on technologies, industry and government practice, and available data on quantities and costs. The emphasis on breadth results in considerable variation in the adequacy of the treatment. The strongest sections are those on oil refining, transportation, and marketing. The natural gas and petrochemical sections are good introductions; the crude oil section is too terse. Given the state of the literature noted initially and the already substantial size of the book, these seem reasonable choices. Emphasis is placed on issues where good additional material is hard to find. The main criticism that might be levied is that the bibliography provided is too scanty to guide neophytes.

The discussion starts with a 48-page overview that first rushes through the treatment of past and prospective consumption trends, investment levels, the uncertainty of drilling success, the role of transportation and refining, and the nature of the oil companies. Not surprisingly, this proves too cursory even as an introduction. Then roughly in the middle Masseron introduces the rise of OPEC and devotes the rest of the chapter to a good summary of OPEC-company relations and oil shocks.

The crude oil section is subdivided into a market chapter, a cost chapter, and a tax and legal aspect chapter. The first of these again tries to cover too much with widely variable success. It begins with three pages on the all-too-familiar shift from Texas Gulf pricing, and then turns to successive surveys of policy practices in the USA, Western Europe, CPEs, and OPEC, reserves, and pricing. The best discussions are those on pricing and OPEC, but even they are too limited. The basic concepts and problems are well explained, but too much is left hanging. As short as it is, the cost survey gives

a good overview. The legal and tax discussion provides clear explanations of several of the regimes that have been in force. The role of national oil companies is slighted.

The tanker chapter of the transportation section manages well to cover the availability of tankers and port facilities, the distances on major routes, the costs of construction and operation, and rates and how they are set. The pipeline chapter describes the major pipelines and the cost situation.

The refining section begins with a terse but solid explanation of how crude oil characteristics, demands for different products and refining technology interact. This is followed by discussion of the size and costs of the refining sector. The cost discussion carefully treats the key influences. A misnamed legal chapter superficially treats law and then has an interesting introduction to the use of linear programming to optimize operations.

The marketing section is subdivided among consumption trends, distribution techniques and marketing practices. The consumption section seeks to explain the nature of the various products, their roles and how they have evolved, the role of individual oil companies, price setting, and the pollution impacts. The device of showing rates of change between 1978 and 1988 proves a good way to convey a great deal in a short space. The pollution survey is a good introduction; the price and tax discussions are at best useful starts. The other chapters are a bit too terse and selective. The distribution chapter covers in 24 pages a sample of regulatory influences, the types of arrangements between refiners and distributors, transportation patterns, and service station costs. The even shorter marketing chapter works better by focusing on branded versus unbranded gasoline.

Cheli is amazingly successful in conveying the basic issues about petrochemicals in less than 40 pages. He focuses on what is important -- the wide range of products and their uses, the high growth rates experienced, the changing identity of the producers, the effect of oil prices, and the possibilities of shifts back to coal-based production.

Somewhat surprisingly, the natural gas section is only slightly longer than the petrochemical one. Again, we get a good primer that covers production, reserve prospects, transportation technology, possible markets, pricing, and prospects. Given the lack of a good comprehensive recent analytic review of natural gas, someone should do more but that may require another separate book (each of the several good available studies of natural gas unfortunately is deficient in some area).

The book concludes with reflections on energy prospects in which the whole seems less than the sum of its parts. Masseron presents a series of generally sensible observations on reserves of different fuels, costs, problems of introducing new fuels, balance of payment impacts, and the role of oil companies. He concludes by proposing accords to stabilize oil prices, stockpiling, and conservation policies. These are typically European proposals. The familiar objections on the basis of merit need not be reiterated here. The key complaint is that nothing in the prior discussion leads to these conclusions.

The faults are inevitable in a book of such ambition. Those seeking a good crash course in the nature of the hydrocarbon industries are well-served. At least for the next few years, those who still teach energy economics will find the book a good way to provide the institutional detail otherwise so hard to find. The authors are urged to keep up their efforts and provide the updating when needed.

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Laura E. Hein, *Fuelling Growth: The Energy Revolution and Economic Policy in Postwar Japan* (Cambridge: Harvard University Council on East Asian Studies), 423 pages.

A depressing aspect of examining the energy literature is continually encountering new, but not particularly fresh, examinations of very old developments. Professor Hein's study is another example. Her discussion covers ground treated in 1987 by Samuels (*The Business of the Japanese State: Energy Markets in Comparative and Historical Perspective*). In particular, both deal with government involvement in coal, electricity, and petroleum. Samuels's sweep is greater. He views developments from the nineteenth century into at least the 1970s and makes comparisons with other countries.

Hein has a deliberately narrow concept of postwar -- the years to 1960 in which the occupation was still a significant influence. She briefly views pre-World War II experience but is silent about subsequent developments. Both books are more narrow than ideal. Samuels was overly preoccupied with the unwillingness of the Japanese to imitate European nationalization policies; Hein is only concerned with the overall political struggles in the period covered.

In particular, the book is an examination of the interactions among the many participants influencing Japanese energy developments. These included the officials of the "allied" occupation, the government, energy industry executives, trade unions, and executives of energy-using companies.

The book begins with an overview of the Japanese situation in the decade and a half after World War II. A 24-page discussion is provided of prewar developments. The next chapter treats the outlook and initial activities in energy by the occupation. Then the efforts of unions to assert more control is examined. Chapter 5 then shows that discussions in 1946-48 of how best to control coal did not eliminate private control. The next three chapters treat the theory and practice of energy rationalization. The first of these chapters examines the weaknesses of the whole economy that had to be corrected. The

next treats developments in coal, electricity and oil. The third first considers U.S. pressures on Japanese economic policy and then examines later coal developments. Chapter 8 is devoted to reorganization of the electric power industry. The final two chapters return to coal-oil questions.

Much of interest appears. The role of the occupation is made evident. With remarkable (or perhaps excessive) restraint, she recalls how the Japan of the period was heavily reliant on U.S. technology. The role of unions is a particular concern. She traces their efforts to encourage new approaches to management and the ultimate vigorous efforts to eliminate communist influence.

This is very much a precliometric historian's exercise in economic history. In things big and small, Professor Hein provides an analysis that is frustrating to those with an economic approach to the issues. This is most critical with the decline of coal; a nonanalytic treatment of the rise of oil and electric power is less problematic. Thus, at the nit-pick level her discussion of economic rents states that they are "known to economists as 'marginal rents' or 'monopoly rents' ..." (p. 37).

These are symptoms of a broader failure to understand what was involved in the decline of coal. This certainly was not for neglect of relevant material. She presents data on deteriorating mining conditions; her bibliography lists my examination of the parallel case in Europe (*The Evolution of Energy Policy in Western Europe: The Reluctant Retreat from Coal*, 1970). Her discussion shows no evidence that she realized that what was involved was another futile effort to save an industry dying because of uncompetitive costs.

She appears critical of the coal industry for not investing more and oblivious to the possibility that the investments probably would have been unprofitable. She claims that the role of depletion and prices "does not sufficiently explain the shift" (p. 302). She immediately adds, "It was the historic rise of petroleum-based technologies in a wide range of fields that did the most damage to the Japanese coal industry" (ibid.). She shows no recognition of the role of price in stimulating the creation and adoption of these technologies and even lists as examples transportation and storage developments that arise from the economic advantages of oil. No awareness is shown that cheaper coal was widely available elsewhere.

More broadly, Professor Hein continually talks of a Japanese search for self-sufficiency. What apparently is meant is ceasing dependence on foreign loans. Little awareness is shown that a term associated with autarky is being used to describe an effort to become a major participant in international trade.

The book presents her Ph.D. thesis and proves another case in which what is appropriate for a thesis is undesirable in a book. The discussion stops in 1960. Given the extensive subsequent changes including many critical to Japan such as the rise of extensive Pacific rim coal trade, the Japanese nuclear program, LNG imports, and the abandonment of coal production, the reader deserved at least a short concluding section.

All in all, this is a book only for those interested in the narrow, long-completed developments treated.

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Sam H. Schurr, Calvin C. Burwell, Warren D. Devine, Jr. and Sidney Sonenblum, *Electricity and the American Economy* (New York: Greenwood Press, 1990), 443 pages.

The oil shock of 1973 forced many analysts to recognize that little was known about how different forms of energy were used in the U.S. economy (or elsewhere). One standard concern was forecasting electricity consumption in various years. Primary references at that time were several works coauthored by Sam Schurr. Schurr's work, as well as the work of many others of the time, tended to stress aggregate measures. In one of his most significant contributions, he coauthored a volume which reaches beyond the aggregates into the interaction of technology and the economy through electricity. The book succeeds well in explaining many of those interactions, but falls short in relating those interactions to more aggregate measures of economic performance or electricity use. Given the former, every energy economist should read this book. The latter suggests an important research agenda. Wisely, the book does not predict U.S. electricity use but identifies the critical issues.

The first three parts, by Burwell and Devine, focus on the technologies of electricity use, its role in organizing production (Part 1), its role in manufacturing processes (Part 2), and its role in other parts of the economy (Part 3). The first two parts illustrate the intricate nature of factory organization, the substitution of electric drive and power for other forms, the evolution of industrial processes, and how they were influenced by electricity. These parts make important reading, particularly for economists who run regressions without knowing how (and why) electricity is used.

In transport, which accounts for only a small share of electricity in most countries (and where electricity claims only a small share of total delivered energy), the authors provide an interesting treatment of the rise and fall of collective, electrified transport. They limit their comments on electrified individual transportation -- a wise choice given the uncertain prospects because of the disappointing performance of conventional lead-acid batteries.

The treatment of the residential sector by Burwell and Blaire Swezey is more shallow. The authors provide details about the ownership of major

electric appliances (though little on the gas or kerosene ones). Unfortunately, a breakdown of total household electricity sales by use is provided for only one year. Important comments are made about the changes in the characteristics of key appliances but the impacts on electricity use are not quantified. The sector is treated so inadequately that omission may have been preferable.

Part 4 attempts to evaluate the macro trends evident from historical data. The first chapter, by Sonenblum, provides insight on the historical periods (1890s through 1920, 1920 to 1948, and 1973 to 1985). The second chapter attempts to relate electricity use to energy conservation. The results are not satisfying. The manipulations are all overly aggregative and neglect changes in the composition of demand. For example, Schurr notes that during the 1980s the most important new capital in industry, computers, was accompanied by "microscopic" increases in electricity use. Intrasectoral shifts are only mentioned implicitly in the chapter on residential electricity use when shares of homes using electricity from different processes is discussed. The book also reviews price and other economic trends in the aggregate. Here the authors wisely shy away from new statistical work, citing others to show the range of uncertainty in the price elasticities of electricity use in each sector.

Others have calculated how much U.S. residential electricity use increased over time because of the increase in the share of homes with space heating, water heating, or cooking based on electricity (see Schipper, L. et al., 1990, *Annual Review of Energy*, Vol. 15, p. 455). The authors do mention changes in the shares of gross product originating in different sectors, but fail to attempt quantification of sectoral change effects using, for example, Divisia or Laspeyres indices (Howarth et al., April 1991, *Energy Economics*, in press). The authors do accomplish part of this task by breaking apart such components of overall economic growth as productivity and labour.

The book suffers from inadequately utilizing the valuable information found in the technical chapters. This inability to capture the micro-macro link could be overcome by further research. The chapter on manufacturing made a good start on this task.

The dynamics of the substitution of electricity for fuels were viewed both from a technological and an economic point of view. The book explains well the micro considerations for important industries, but not for homes and buildings.

The analysis in chapter 13 of the details of "conservation" before and after 1973, showing how the rising share of electricity drives down the overall ratio of energy to GNP, is deficient. It fails to examine the contribution to the drop in the energy-GNP ratio of fuel saving and of the substitution of electricity for fuel that caused a drop in primary energy use.

An analysis of the service sector, which leads growth in electricity sales in most countries, is now possible because utilities worldwide complete surveys and submetering experiments aimed at demand-size management.

The question of the potential for electricity conservation, hotly discussed in many forums (cf. *Scientific American*, September 1990) is in part

a debate over the rate of change of electricity use and efficiency. The book notes correctly that due to technological progress electricity-use efficiency has been increasing steadily for over a century. Can the rate of increase be accelerated substantially through conservation programs or R&D, or will only higher electricity prices, which may slow the growth in productivity, accelerate efficiency?

In spite of its limitations, *Electricity* yields important lessons. First, the evolution of electricity use is part of an extremely complex process; the changes have contributed enormously to increased U.S. productivity. Second, "electricity saving has been occurring all along." Additionally, increased electricity use has contributed to primary energy savings in the U.S. economy. To this, I would add my own conclusion: only a disaggregated approach adequately explains the interactions of electricity with other energy forms and with the total economy. These lessons will prove important in future debates over energy, economy and the environment, making *Electricity* required reading for any student of 21st-century energy economics.

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