should stimulate a healthy debate. A significant portion of society's concerns is entrusted to those of us in the academic business. Even from an unselfish point of view our future is a matter of no small importance.

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The Legal System as Social

An Invitation to Law and Social Science. Desert, Disputes, and Distribution. RICHARD LEMPERT and JOSEPH SANDERS. Longman, New York, 1986. xvi, 528 pp., illus. $39.50; paper, $21.95.

Over the past several decades a vigorous field of interdisciplinary scholarship on "law and society" has emerged. In contrast to traditional legal scholarship, which treats law as a logically self-contained body of normative rules, law and society scholars operate on the premises that law is derived from social and cultural forces, that the processes and impact of law are intimately tied to the social, psychological, and cultural milieu, and that these qualities of law can be empirically described. In short the legal system is an open system and it can be analyzed in nonnormative terms.

In *An Invitation to Law and Social Science* Richard Lempert and Joseph Sanders, both of whom hold degrees in law and in sociology, have two goals. The first is to introduce advanced undergraduates, graduate students, and law students to the field of law and society. The second is to synthesize existing theory and research. It is an important book, not only because it is successful in its attempt to build new theoretical structures but because it demonstrates the potential that law and society scholarship has for understanding the legal system.

After an introductory chapter the book is divided into three parts, each of which deals with a different legal problem. Part 1 is concerned with the process of determining responsibility for behavior. Its opening chapter examines different meanings of moral and legal responsibility and the excuses that may be allowed to avoid responsibility. The concept of "rule logics" is introduced to help categorize the types of responsibility rules and allow us to view responsibility as a variable. The thrust of this chapter is that responsibility involves more than just behavior; rather, it entails agency and purpose and has social as well as legal meaning. The next two chapters are directed to the problems of evidence that must be overcome to prove that someone should be held legally responsible. Chapter 3 discusses how adjudicative processes differ with respect to the scope of the inquiry into the relevant evidence and the extent to which the adjudicator considers the mental state of the person whose actions are being judged. Chapter 4 develops the notion of "case logics" to describe ideal ways in which legal cases are processed. "Deep" case logics are used when the adjudicator searches for the actor's point of view in attempting to understand the behavior under consideration. "Shallow" case logics ignore the actor's viewpoint in deference to whether the behavior falls into some preestablished category. Different types of social organizations produce different proclivities toward types of case logics. Even though the formal law may dictate a search for the actor's viewpoint, bureaucratic demands may encourage a shallow search for meaning. The insights of the preceding chapters are then applied to two areas of tort law, workers' compensation and automobile accidents, in which there have been significant changes in liability (responsibility) rules. These examples demonstrate the close connections between social processes and decisions about legal responsibility.

Part 2 is concerned with dispute resolution. Responsibility is again a salient concept, but its role in this context is much less one involving morality than one expediting the resolution of particular disputes. Different forms of legal tribunals place different emphases on responsibility, that is, in the extent to which they allocate fault between disputing parties. Taking a dispute to a legal forum causes the parties involved to relinquish much of the control over it because substantive and procedural rules of the forum impose a definition of what is in conflict and dictate the number and form of possible solutions. Part 2 examines how disputes are processed under various circumstances and why. Chapter 6 analyzes disputes from a game theory perspective that is helpful in understanding why cases go to trial or are settled beforehand. The fairness of settlements is also dissected. Chapter 7 considers alternative styles of dispute processing between and within cultures. Chapter 8 is concerned with attempts to change the way disputes are processed when social and institutional developments render traditional methods inadequate. The small claims court and the juvenile justice system are singled out to show the limits of law as an agent of dispute resolution.

Part 3 considers law from a macro perspective, namely as a system that distributes the goods and other resources of society. Its concern is with social justice rather than the matters of individual justice that were the subjects of parts 1 and 2. Chapter 9 discusses models of social justice with particular emphasis on the theory developed by the philosopher John Rawls. The purpose is to develop standards by which different allocative systems, endorsed and enforced by law, can be evaluated. In chapter 10 the insights of chapter 9 are applied to an analysis of the role that business corporations and labor unions play in society. The close relation between law, power, and social justice is highlighted. Conflicts between individual and group rights are analyzed, as is the influence of social forces on the shaping of labor and business laws. The failure of law to check excess corporate power is also considered. Chapter 11 is devoted to an analysis of law and racial equality. The civil rights movements of the 1960's was characterized by an attempt to use law to advance social and economic equality through equal opportunity. The varying degrees of success of this enterprise are discussed, along with the unwillingness—and inability—of courts to implement social ideals in full measure. Then chapter 12 turns to the issue of law as an autonomous force. Autonomy is at best partial because of the constraints of social and political forces. Chapter 13 addresses the law-making process and the conflicts that confront attempts to use law to achieve social equality. A final chapter summarizes the themes developed in the book.

An Invitation to Law and Social Science convincingly illustrates how inseparably the legal system is tied to other social structures and how these relationships produce different qualities of justice. It is selective in the topics that are considered. However, the intent of the authors is not to discuss every subject in this diverse field but rather to develop a perspective for empirical inquiry into the relationship between law and society—and they have succeeded very well in this task. The book frequently requires work and concentration on the part of the reader, but students and mature scholars alike will be rewarded for their efforts.

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Applications of Group Theory

Group Structure of Gauge Theories. L. O'RAIFEARTAIGH. Cambridge University Press, New York, 1986. x, 172 pp., illus. $34.50. Cambridge Monographs on Mathematical Physics.

The author, perhaps most famous for the O'Raifeartaigh method of supersymmetry breaking, is one of the leading experts on

group theory and its applications to the modern gauge theories of elementary particle physics, which form the subject matter of this monograph. It is an important subject, since the gauge symmetries, based on continuous groups called Lie groups, are central to our understanding of the structure of matter and its interactions. The first half of the book, entitled Group Structure, is an introduction to Lie groups and their representations. The material is fairly standard. The author starts with the definition of a group and takes us up to Dynkin diagrams and to global group structure. The great virtues of this half of the book lie in its conciseness and mathematical detail. Even physicists familiar with the subject will probably profit from it.

The second half of the book, entitled Gauge Theory, illuminates the group-theoretical structure of the gauge theories of electroweak, strong, and grand unified interactions. Again much of the content is standard. However, most of the material in the last few chapters on orbit structure, the minimization of Higgs potentials, and symmetry-breaking patterns has not appeared before in book form.

The pedagogical value of the book is greatly enhanced by an extensive set of references to original papers and review literature (sometimes the references in the text do not adequately distinguish the two), a well-selected set of suggestions for further reading, and a seven-page glossary. The author has made a deliberate attempt to avoid extensive overlap with existing books and reviews. As a result the reader will not find much discussion of certain group-theoretic aspects of gauge theory such as homotopy theory and topological solutions, gauge-fixing, renormalization theory and BRS symmetry, and supersymmetry. The author has chosen to narrow, so as to sharpen, his focus. In this he has been successful. The writing is crisp and precise.

The book does contain a few careless errors. The most serious, since it makes the subsequent discussion hard to follow, is a statement about how fermions are assigned to representations of a grand unified group (p. 118). The others are relatively minor. The explanations are generally clear (an exception is the section on the running and unification of the gauge couplings in unified theories).

Altogether, the book is a welcome addition to the literature in this field, by a real expert, and will repay the closest study. It is especially an excellent book for graduate students in physics.

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Ices

Ices in the Solar System. JÜRGEN KLINGER, DANIEL BENEST, AUDOUIN DOLLFUS, and ROMAN SMOLUCHOWSKI, Eds. Reidel, Dordrecht, 1985 (U.S. distributor, Kluwer, Hingham, MA). xviii, 954 pp., illus. $99. NATO Advanced Science Institutes, Series C, vol. 156. From a workshop, Nice, Jan. 1984.

The significance of ices in terrestrial and planetary systems amply justifies the size of this large volume. Ice, in the mineralogically correct sense of frozen water, is the basic component of permafrost, which covers as much as a quarter of Earth's land surface, and the phase relationships of the water-ice system and the rheology of ice are basic parameters of the behavior of the glaciers and ice sheets that have dominated much of the higher-latitude regions.

Ices in the more general sense, including frozen volatiles such as H_2O, CO_2, CH_4, NH_3, and various hydrates of these and less abundant ices, play central roles in the evolutionary history, present state, engineering properties, and even economic potential of terrestrial systems. The recent discovery of extensive natural gas clathrates (solid methane hydrates) in the permafrost regions of Siberia, Alaska, and northern Canada and in marine sediments is potentially of major economic importance. In the solar system beyond the orbit of Earth, ices also play a major role. In the satellites of the outer solar system they are often more abundant than the silicates and metals that constitute the bulk of the terrestrial planets. A knowledge of the special properties of these ices is thus important in understanding the history and current state of the majority of solar system bodies.

This book is the proceedings of a workshop that brought together many of the leading authorities on the subject. It is composed of five major sections: Physics and Remote Sensing of Ices (physical properties, pressure-temperature phase behavior, optical and spectral properties, the nature of clathrates); Cosmochemistry of Ices and Interplanetary Particles (nature of interstellar and interplanetary grains, modifications of ices by charged particle bombardment); The Icy Nuclei of Comets; Ices on Mars; and Rings, Icy Satellites, and Pluto. Each section consists of six to 16 papers that range from detailed descriptions of well-characterized physical and chemical systems to the most current interpretations and theories of the nature and processes of these icy planetary bodies. In content and readability they range from acceptable to outstanding.

The scope of the book goes much beyond ices to include aspects of the formation of the solar system and the evolution of a number of planetary bodies. The reader is introduced to some fascinating worlds: Titan and its hydrocarbon ocean, Mars and its alternating polar caps, the vagaries of cometary behavior, Uranus and its coal black rings, and many others. Future work may well disprove some or all of the models presented. But past experience in planetary exploration suggests that we underestimate the complexity and strangeness of bodies in the solar system at least as often as we overestimate them. The reader gets a good flavor of this complexity in these papers.

The book was completed before the recent Voyager 2 Uranus encounter and the flyby of Comet Halley by the European, Soviet, and Japanese spacecraft. Thus the discussions of the rings and satellites of Uranus and of cometary nuclei are of necessity less than complete. With the present hiatus in U.S. missions there is not likely to be any equivalent increment in our knowledge of the solar system for nearly a decade. This book will thus remain a good summary of the state of the art for a number of years.

The text was reproduced from camera-ready copy supplied by the authors and varies significantly in type face and proofreading quality. The transposition of the text on pp. 68 and 69 is the only significant production flaw I noted.

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Reprints of Books Previously Reviewed

Ice Ages. Solving the Mystery. John Imbrie and Katherine Palmer Imbrie. Harvard University Press, Cambridge, MA, 1986. Paper, $7.95. *Reviewed* **204**, 751 (1979).

Laboratory Life. The Construction of Scientific Facts. Bruno Latour and Steve Woolgar. Princeton University Press, Princeton, NJ, 1986. Paper, $12.50. With new postscript and subtitle. *Reviewed* **206**, 824 (1979).

Occult and Scientific Mentalities in the Renaissance. Brian Vickers, Ed. Cambridge University Press, New York, 1986. Paper, $15.95. *Reviewed* **226**, 1185 (1984).

Books Received

Acid Deposition. Environmental, Economic, and Policy Issues. Donald D. Adams and Walter P. Page, Eds. Plenum, New York, 1986. xii, 560 pp., illus. $79.50. Based on a conference, Plattsburgh, NY, June 1983.

Adaptational Biology. Molecules to Organisms. C. Ladd Prosser. Wiley-Interscience, New York, 1986. xii, 784 pp., illus. $99.50; paper, $49.50.

Adaptive and Learning Systems. Theory and Applications. Kumpati S. Narendra, Ed. Plenum, New York, 1986. viii, 418 pp., illus. $65. From a workshop, New Haven, CT, May 1985.

The Adrenal Gland and Hypertension. F. Mantero *et al.*, Eds. Raven, New York, 1986. xviii, 465 pp., illus. $63.50. Serono Symposia Publications, vol. 27.

Advances in Forensic Haemogenetics 1. B. Brink-