

son whose own career has been highly productive and successful. They should enjoy the story of the young NIH fellow (Harvey Alter) whom the author acknowledges was the first to see the fine line on the Ouchterlony plate that identified the precipitated Australia antigen. Later, after HBV infection had been controlled, Alter would be responsible for a critical series of studies of patients with post-transfusional hepatitis (non-A, non-B hepatitis) that proved pivotal in characterizing the hepatitis C virus. HBV-infected patients and their families can read the story of one of the most magnificent medical discoveries of the twentieth century and of the progress that continues to be made.

## Understanding Marijuana: A New Look at the Scientific Evidence

by Mitch Earleywine  
Oxford University Press, \$29.95,  
344 pp., 2002

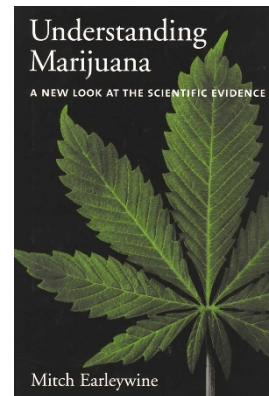
REVIEWED BY KEN MACKIE  
University of Washington,  
Seattle, Washington, USA

There has been a recent resurgence of interest in cannabis among the general public. This has chiefly been stimulated by possible medicinal uses, but curiosity also persists about the cost-benefit ratio of its legalization. This increased public interest has been paralleled by substantial advances in understanding the neurobiological basis of the actions of cannabis and endogenous cannabinoids. Unfortunately, our increased scientific knowledge of cannabinoid biology is not reflected in public policy decisions, at least in the United States. How can the interested lay person access this wealth of knowledge to make informed decisions? *Understanding Marijuana: a New Look at the Scientific Evidence*, by Mitch Earleywine, is the latest of several books aimed at presenting cannabis research to a broad audience.

*Understanding Marijuana* is divided into twelve chapters, each dealing with

a particular facet of cannabis biology or a social question or issue. In his choice and weighting of these chapters, the author's background as a psychologist is evident. He is thorough in handling the topic of each chapter and critically evaluating individual studies. Several memorable books in the cannabis field have been written with a definite 'pro' or 'anti' bias; Earleywine's tome is notable for its evenhanded treatment of the subject. The book is written such that each chapter stands on its own. This makes the book well-suited for casual reading or for reviewing a particular topic. Earleywine does a thorough job of explaining the statistical limitations (for example, power) inherent in many of the published cannabis studies, in terms that are understandable to the general public. However, the reader well versed in statistics and study design will find the statistical refresher in most chapters to be repetitive when reading several chapters consecutively.

I feel the most appealing chapters are those on the 'gateway theory', the effects of cannabis on memory, the subjective effects of marijuana, social problems, and treatment for marijuana problems. These chapters do an especially fine job of explaining the limitations and possible interpretations of the many studies in this field. This approach will be quite helpful for individuals who are not behaviorists but would like to understand these studies. One minor deficit of the 'gateway theory' chapter is that although the author argues cogently that there is currently little support from human studies for the theory that cannabis use leads to opiate dependence, there is a substantial body of evidence from animal studies suggesting interactions between the endogenous opioid and endogenous cannabinoid systems. An assessment of these studies would have been appropriate here, as they are often mentioned in the context of the gateway theory. Also interesting is the discussion of treatment for problem marijuana use. This is an emerging field that has not received much attention but that is still quite important, irrespective of how one feels about the medical use or legalization of cannabis.



The most disappointing portion of the book was the chapter on cannabis pharmacology. Some of the pharmacokinetic concepts were described erroneously (for example, defining half-life as the time taken to break down half the dose of a drug) or inadequately (for example, imprecision in distinguishing between metabolism, degradation and excretion when discussing half-lives). The other fault of this chapter is the exclusion of much interesting work that has been published over the last few years on the role of endogenous and exogenous cannabinoids in the modulation of neurotransmission. The results of these studies will undoubtedly help us interpret the human studies so well discussed in this book. This omission is also unfortunate, because a solid, up-to-date section here would have set this book apart from the others in the field.

Who would benefit from reading this book? I think that any scientist interested in learning about the effects of cannabis on human behavior will find this book invaluable. Its comprehensiveness in this regard and its fair treatment of the material are refreshing. Aficionados might chafe at the layman's description of statistical issues, but these can be skipped over. Although the chapters on the health effects of recreational and medical marijuana use are solid, readers desiring a more comprehensive treatment of this important topic should consider *Marijuana and Medicine: Assessing the Scientific Base*, published by the National Academies Press (Washington, DC). Those looking for a detailed discussion of the pharmacology of cannabis and cannabinoids will be better served by Leslie Iverson's *The Science of Marijuana* (Oxford University Press). In summary, Earleywine's contribution will be useful to researchers wanting an overview of the effects of cannabis on behavior and an assessment of the related public policy concerns. It will also appeal to members of the general public desiring an unbiased and thorough assessment of cannabis and its varied actions.