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Title

Book Review -- Messengers of Paradise: Opiates and the Brain

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Journal

International Journal of Comparative Psychology, 3(4)

ISSN

0889-3675

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Publication Date

1990

DOI

10.46867/C4001W

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Peer reviewed

BOOK REVIEW

Levinthal, Charles F. (1988). *Messengers of paradise: Opiates and the brain.* New York: Anchor Press/Doubleday.

This book begins with a thoughtful history of opium. For the history buff in all of us this chapter provides numerous fascinating insights. We learn that the intense desire for Chinese tea by the English was a factor in promoting the use of opium in China. Godfrey's Cordial, a mixture of opium with sassafras and molasses, was immensely popular in Coventry, England as a medication to quiet noisy children. In fact, it was so popular that at one point in time 12,000 doses were sold weekly in this small English town. Similar events are traced in the United States where such mixtures were marketed in the late 1800's under the name Laudanum by such bulwarks of American society as the Sears, Roebuck catalog. The cost was about six cents an ounce. The development of heroin and other opium derivatives is then traced. The ultimate conclusion that the author has been leading us toward is achieved—some form of opiate receptor exists in the brain and spinal cord and that the body may be producing its own natural opiates.

Having set the stage, we digress (Chapters 2 and 3) from the main theme for a basic review of the evolution, structure, and mechanical processes of the human brain. While this material is presented on a non-technical level it is nevertheless quite informative. Several of the photographs alone make the book a valuable addition. My favorites were the pictures of the Lavery Electric Phrenometer, a 1907 automated machine for phrenological examination; and the brain of Leborgne (also known as "Tan Tan") that propelled Paul Broca to fame and prominence.

Returning to the main thrust of the book, we consider the period 1971-1973 (Chapter 4). It was during this time that the search for the opiate receptor was being conducted in earnest. From the groundbreaking research proposal of Avram Goldstein in 1971 until the simultaneous discovery of the receptor in 1973 by Pert and Snyder at Johns Hopkins, Simon at New York University, and Terenius at Uppsala in Sweden, the author gives us a fascinating view of this research process. Clearly, scientists are people—very competitive people.

Having established the existence of opiate receptors, the search for the opiate-like substance(s) themselves intensified. During the

period 1973-1979 (Chapter 5), 69-year-old Hans Kosterlitz and his younger colleague John Hughes loom as pivotal figures. It was their laboratory in Aberdeen, Scotland that the initial identification of the amino acids comprising the "morphine-like peptide" under study, was made. By December, 1985, the exact amino acid sequence was made known and the name "enkephalin" given by these investigators to this compound. As the author clearly points out, this finding ushered in a whole new research era. Half a decade later more than thousand articles related to endogenous opiates would appear. Having now completed one-half of this book, it was refreshing to note that Levinthal's approach showed no signs of wavering. The book continued to be personable and interesting, yet thoroughly laced with appropriate and accurate scientific examples.

In part 2 Levinthal examines the significance and importance of the endorphins for behavior.

Couched in terms of being steps toward paradise, we are told that the "First Step Toward Paradise" (Chapter 6) involves the analgesic properties of the endorphins and the relationship of such effects to basic survival. The inclusion of a discussion of opiate and non-opiate pain systems and the tentative linking of opiate analgesia with pain avoidance is commendable.

The "Second Step Toward Paradise" (Chapter 7) concerns the role of the endorphins in promoting social contact. Here we are introduced to the intriguing theory that social contact and behavior typically result in the natural release of endorphins, a powerful reinforcer. For those individuals who are unable to experience reinforcement in the natural manner, externally administered opiates (i.e., drug addiction) are clearly an alternate source of such effects. Additionally, Levinthal makes a compelling case for the involvement of the endorphins in autistic behavior and depression. If you have not encountered this material previously, it is both fascinating and thought provoking.

In Chapter 8 we take the "Third Step Toward Paradise." Based upon the research of Lewis and Mishkin that demonstrated a distinct system of Mu-type opiate receptors extending from the amygdala to the inferotemporal cortex and ending in the occipital lobe, it is proposed that endorphins may influence the emotional aspects of our visual perceptions and even our language. The author speculates upon the possible involvement of this system in the "high" or "thrill" that favorite musical experience can bring, prosody, autism, and even obsessive-compulsive disorders. While all of the requisite data are not yet in, it is clear that these are not idle speculation.

The final chapter attempts to bring us "A Glimpse Of Paradise." Whether it be the "flow experience" proposed by psychologist Mihaly Csikszentmihalyi, the "effective surprise" of Jerome Bruner, or any one's most intense and creative experiences, Levinthal suggests the

distinct relationship to the endorphins. This linkage, as are the others described previously, is quite logical and not without substantiation.

In summary, this is a well-written, interesting, and provocative work. Regardless of your own research specialty, you will find the knowledge gained to be well worth the time you invest in reading. Should you desire to go further, the references for each chapter have been carefully and thoroughly documented.

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ACKNOWLEDGEMENT OF REVIEWERS

We wish to thank the following colleagues who reviewed manuscripts submitted for Volumes 1 through 3.

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