D. B. was unable to detect light in the left half of both eyes. Although his defect improved considerably, he was left with a chronic scotoma that occupied mainly the left lower quadrant. It was in this visual field that Weiskrantz performed experiments, described in Part II, which led him to advocate blindsight. Subjects like D. B. deny the ability to see in a 'destriated' field, and are diagnosed as blind in that region according to classical prejudice. However, according to Weiskrantz, only awareness but not detection of visual inputs depends on striate function. The key to demonstrating preserved visual ability in blindsight subjects is an experimental design that incorporates forced-choice pardigms. It is not sufficient to ask 'do you see it?' because the answer is always 'no'. Statistical analysis of forced-choice responses (especially on tasks of visuospatial localization) reveals a performance above chance that can only result from covert discrimination in our ancient mammalian visual brain.

The main criticisms of blindsight reviewed in Part III have concerned psychophysical methodology and anatomical verification. In 1983, Campion and colleagues made the psychophysical argument that artifactual light scatter can lead to detection, localization or discrimination of stimuli that are actually mediated by normal vision. A stray light hypothesis, however, does not include blindsight. Similarly, it is important to verify true fixation as objectively as possible during blindsight experiments (e.g. by using electro-oculography) to minimize the potential that the good field does not 'cheat' for the bad.

Anatomical documentation of visual system lesions is crucial to the argument of blindsight. The best opportunity for *in-vivo* verification of occipital lesions currently demands computerized tomography and magnetic resonance imaging with three-dimensional reconstructions. These modern techniques are more accurate than estimations obtained from the bloody field of surgery, but they have not been possible in D. B. Also, it is important to consider that D. B. suffered with a vascular malformation. Since these are often congenital, it is possible that the underlying visual brain in D. B. never developed normally and that his results do not reflect a standard visual organization.

Blindsight is a comprehensive review of an intriguing topic by a leading investigator in the field. While the debate continues, *Blindsight* is a convenient sourcebook for multidisciplinary investigators and students with open minds.

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Comparative Neurobiology of the Basal Ganglia

by André Parent, John Wiley & Sons, 1986. £57.50 (xiv + 335 pages) ISBN 0 471 80348 0

A great deal of progress has been made over the last 20 years in understanding the organization of the basal ganglia. This research has led to greater insight into the circuitry and neurochemical features of the basal ganglia and has greatly advanced, though not yet entirely clarified, the understanding of its functions. In addition, much has been revealed about the organization of the basal ganglia (in fact, of the entire telencephalon) in non-mammals, which has fundamentally invalidated the classical ideas about the evolution of these structures (such as those presented in *The Comparative Anatomy of the Nervous System of Vertebrates, including Man* by Ariens-Kappers, Huber and Crosby). Although many books and review articles have been published on the basal ganglia in mammals and there have been a few reviews on the organization of the basal ganglia in some groups of non-mammalian vertebrates, this is the first modern work (that I know of) that attempts to present a thorough overview of what is known about the basal ganglia in members of each vertebrate class.

This is clearly a major undertaking, since the field of basal ganglia research has grown enormously in recent years, resulting in a large body of information for an author to digest and summarize. A further challenge in this endeavor is that it requires an understanding of brain organization in many different mammalian and non-mammalian species. Although many basic features of basal ganglia organization are similar across vertebrates, cytoarchitectonic and terminological differences can pose difficulties in mastering the literature on the diverse vertebrate species. Parent is, however, well-suited to be the author of a book such as this. Early in his career he used catecholamine histofluorescence procedures and pathway tracing techniques to study brain organization in a wide variety of non-mammalian vertebrates. With this work, he (and Harvey Karten, who independently carried out similar studies) played a major role in helping to identify correctly the location of the basal ganglia in birds, reptiles and amphibians. More recently, Parent has been investigating the histochemistry and connectivity of the basal ganglia in a number of different mammalian groups, including rats, cats and monkeys. Thus, he is in a position to speak authoritatively about basal ganglia organization in a wide variety of vertebrates. It is therefore not surprising to see that the scholarship and clarity of the book reflect this expertise. Parent has marshalled a vast amount of information into a very readable book.

The book is divided into two parts. First, after a brief chapter describing basal ganglia terminology, vertebrate phylogeny and the older ideas on basal ganglia evolution, the four succeeding chapters describe what is known about basal ganglia organization in fish, amphibians, reptiles and birds, respectively. Each of these chapters details current findings on the locations, connections, histochemistry and (less thoroughly) the functions of the basal ganglia and its family of related cell groups such as the substantia nigra, the subthalamic nucleus, etc. Included among the histochemical data is information on the neurotransmitters and neuropeptides in the basal ganglia in these non-mammalian groups. Although the presentation shows that there are gaps in our knowledge, particularly for fish, it is nonetheless obvious that substantial progress has been made (particularly in birds and reptiles),

and the gaps serve to point the way for future research.

The second part begins with a brief overview chapter on the comparative aspects of mammalian basal ganglia organization and the succeeding four chapters review the anatomy and histochemistry of the striatum, pallidum, substantia nigra and limbic basal ganglia (i.e. ventral striatum and ventral pallidum), respectively. Given the enormous amount of information available on the mammalian basal ganglia, however, a comprehensive treatment of the literature is not possible. Nonetheless, these chapters are useful, informative and up-to-date. As in the chapters on the basal ganglia in non-mammals, the functional aspects of basal ganglia organization are not as thoroughly treated as the anatomical. To some extent, this appears to be a reasonable choice on Parent's part, given his greater expertise in anatomy and given how many features of basal ganglia function are unknown or disputed. Nonetheless, the title of the book ('Neurobiology' not 'Neuroanatomy') does lead one to expect a more extensive treatment of what the new data on basal ganglia anatomy tells us about the role the basal ganglia plays in, for example, movement control.

A somewhat more important criticism is that no effort is made to synthesize the mammalian and non-mammalian data into any summary of the trends or characteristics of basal ganglia evolution. Although we are clearly shown that the evolution of the telencephalon did not entail the sequential addition of new parts during phylogeny (as once was thought), we are not presented with any revised account of the evolution of the forebrain. It is possible that Parent wished to avoid any hint of speculation, but it would have been interesting and informative to read his thoughts. In the preface he states that his goal is to assemble the non-mammalian and mammalian data together into a single source and thereby broaden the comparative perspectives of researchers that work on both mammals and non-mammals. The book certainly should achieve this goal and it should also have a considerable impact on thinking about basal ganglia evolution, but it would have been stronger and more stimulating if there were a final overview chapter.

Books Received

Review copies of the following books have been received. Books that have been reviewed in full in *TINS* are not included. The appearance of a book in this list does not preclude the possibility of it being reviewed in the future.

Sarah L. Friedman, Kenneth A. Klivington and Rita W. Peterson (eds) *The Brain, Cognition and Education* Academic Press, 1986. $34.95/£29.50 (xiii + 385 pages) ISBN 0 12 268330 7

Sid Gilman and Sarah Winans Newman *Manter and Gatz's Essentials of Clinical Neuroanatomy and Neurophysiology* (7th edn) F. A. Davis, 1986. $16.95 (xvi + 256 pages) ISBN 0 8036 4156 7

Gerald Goldstein and Ralph E. Tarter (eds) *Advances in Clinical Neuropsychology* (Vol. 3) Plenum Press, 1986. $45.00 (viii + 328 pages) ISBN 0 306 42290 5

Sten Grillner, Paul S. G. Stein, Douglas G. Stuart, Hans Forssberg and Richard M. Herman (eds) *Neurobiology of Vertebrate Locomotion* (Wenner-Glen Center International Symposium Series, Vol. 45) Macmillan, 1986. £70.00 (xvii + 735 pages) ISBN 0 333 42909 5

Israel Hann (ed.) *Dynamics of Cholinergic Function* Plenum Press, 1986. $145.00 (xviii + 1273 pages) ISBN 0 306 42384 7

Harold J. Hoffman and Fred Epstein (eds) *Disorders of the Developing Nervous System: Diagnosis and Treatment* Blackwell Scientific Publications, 1986. £105.00 (xvii + 840 pages) ISBN 0 86542 023 8

T. Hökfelt, K. Fuxe and B. Pernow (eds) *Coexistence of Neuronal Messengers: A New Principle in Chemical Transmission* Elsevier, 1986. $131.00/Dfl 295.00 (xviii + 411) ISBN 0 444 80762 4

Robert L. Isaacson and Karl H. Pribram (eds) *The Hippocampus* (Vol. 3) Plenum Press, 1986. $59.50 (xviii + 438 pages) ISBN 0 306 42156 9

Robert L. Isaacson and Karl H. Pribram (eds) *The Hippocampus* (Vol. 4) Plenum Press, 1986. $57.50 (xxiv + 374 pages) ISBN 0 306 42198 4

Edward G. Jones and Alan Peters (eds) *Cerebral Cortex* (Vol. 5: Sensory-Motor Areas and Aspects of Cortical Connectivity) Plenum Press, 1986. $75.00 (xviii + 510 pages) ISBN 0 306 42174 7

Morris N. Kotler and Robert M. Steiner (eds) *Cardiac Imaging: New Technologies and Clinical Applications* F. A. Davis, 1986. $99.00 (xxi + 454 pages) ISBN 0 8036 5442 1

Ramon Latorre (ed) *Ionic Channels in Cells and Model Systems* Plenum Press, 1986. $69.50 (xxiii + 437 pages) ISBN 0 306 42194 1

George R. Lenz, Suzanne M. Evans, D. Eric Walter and A. J. Hopfinger *Opiates* Academic Press, 1986. £79.00/$95.00 (xi + 560 pages) ISBN 0 12 443830 X

C. K. Lim (ed.) *HPLC of Small Molecules: A Practical Approach* IRL Press, 1986. £17.00/$31.00 (xviii + 333 pages) ISBN 0 947946 77 2

Gerald E. Loeb and Carl Gans *Electromyography for Experimentalists* University of Chicago Press, 1986. £18.75 pbk/£50.95 hbk (xx + 373 pages) ISBN 0 226 49015 7 pbk/0 226 49014 9 hbk

Bernard Lown, Albert Malliani and Marco Prosdocimi (eds) *Neural Mechanisms and Cardiovascular Disease* (Fidia Research Series, Vol. 5) Liviana Press/Springer-Verlag, 1986. $95.00 (xii + 642 pages) ISBN 88 7675 458 X

Sanford P. Markey, Neal Castagnoli, Jr, Anthony J. Trevor and Irwin J. Kopin (eds) *MPTP: A Neurotoxin Producing a Parkinsonian Syndrome* Academic Press, 1986. $55.00/£46.00 (xiii + 722 pages) ISBN 0 12 472570 8

Joe L. Martinez and Raymond P. Kesner (eds) *Learning Memory: A Biological View* Academic Press, 1986. $49.50 hbk/$24.50 pbk (xvii + 452 pages) ISBN 0 12 474990 9 hbk/0 12 474991 7 pbk

George Mchedlishvili *Arterial Behaviour and Blood Circulation in the Brain* Plenum Press, 1986. $75.00 (xvi + 338 pages) ISBN 0 306 10985 9