The price is reasonable. The journal offers scope for letters, articles, reviews and reports. Graphics and colour plates are, not unexpectedly, of high-gloss quality. To some it may seem odd that a journal on a discipline so cheerfully close to science fiction is still published as hard copy: but it is paired with an on-line electronic bulletin board called "ALIFE". Let us hope that the implicit challenge to computer hackers and virus breeders will remain resistible. □

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Inner visions

James V. Haxby

Human Brain Mapping: A Journal Devoted to Functional Neuroanatomy and Neuroimaging. Editor-in-chief Peter T. Fox. *Wiley-Liss. 4/yr. USA $190, Canada and Mexico $230, elsewhere $245 (institutional); USA $80, elsewhere $90 (personal).*

INTEREST in research into the functional organization of the human brain has been heightened over the past decade by the use of high-resolution, three-dimensional brain-imaging methods for measuring local haemodynamic changes reflecting patterns of neural activity. These methods can be used to map higher cognitive functions of the intact

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IMAGE UNAVAILABLE FOR COPYRIGHT REASONS

Mind matter: MRI of an adult human brain.

human brain, such as language and memory, as well as sensory and motor functions. Because of the development of new functional brain-imaging methods accessible to more and more neuroscientists, and the rehabilitation of other methods for measuring brain function to compensate for some of the inherent shortcomings of these imaging techniques, we are on the brink of an explosive growth in human brain-mapping research. Workers in this endeavour come from diverse areas in medicine, psychology and the information sciences. The health of the new field was evident at the first annual Brain Map Meeting, held last June in Paris as a satellite of the International Society for Cerebral Blood Flow and Metabolism Meeting, which attracted more than 800 participants.

Human Brain Mapping, which was launched in 1993, has the potential to provide an integrated forum for this rapidly developing interdisciplinary field. Although the most innovative and groundbreaking work will probably continue to appear in leading general science and neuroscience journals, *Human Brain Mapping* promises to provide a home for reports now scattered among dozens of journals in psychology, neurology, psychiatry and physiology.

Unlike many new journals, *Human Brain Mapping* will make it easier for investigators to find reports of relevant research by workers in different disciplines. The need for such a journal is apparent, and already another journal, *NeuroImage*, has altered its editorial policy to become a second, integrated forum for brain-mapping research, and promises to augment interdisciplinary communication further by including reports on brain mapping in nonhuman species.

Until recently, the method of choice for this work has been positron emission tomography (PET). Because of the cost and complexity of this method, research has been limited to a handful of well-funded and productive centres. The recent development of magnetic resonance imaging (MRI) methods for measuring haemodynamic changes promises to open up the field. Functional MRI allows neuroscientists to engage in human brain-mapping research using scanners already installed for clinical imaging, and so require a fraction of both the cost and the staff necessary for PET studies. Although functional MRI is still dauntingly difficult to master, it will enable many more centres to engage in functional brain-imaging research. The first fruits of this methodological advance are just starting to appear in the literature.

Further expansion in human brain-mapping research comes from the rehabilitation of other methods of noninvasive study of human brain function, such as electro- and magnetoencephalography. These methods have been plagued by problems in identifying the location of structures that generate signals, but they clearly offer temporal resolution on a timescale more appropriate for mapping sequential events in the human brain. It is hoped that these methods can be successfully integrated.

The early issues of *Human Brain Mapping* have included reports using all these methods, as well as reports of mapping research on postmortem human brains and of new methods of analysis. The large format and high-quality reproduction allow the dramatic colour images — a hallmark of the field — to be shown to magnificent effect. Stunning cover illustrations also make this an eye-catching journal for the office and coffee-table. □

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Neurobiological networks

Jack Cowan

Journal of Computational Neuroscience. Editors John Rinzel, James M. Bower, Eve Marder, Idan Segev, Charles Wilson and John P. Miller. *Kluwer. 4/yr. Dfl474, $270 (institutional); Dfl165, $75 (personal).*

WORK on neural models and networks started effectively in the 1930s. At that time, the only specialized journal partly

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Neural integration: nerve cell on silicon chip.

devoted to these topics was *Bulletin of Mathematical Biology*, founded by N. Rashevsky of the University of Chicago. It was in this journal that McCulloch and Pitts published their famous 1943 paper making the connection between neural networks and logic. After the Second World War, there was a clearly recognized need for other outlets, triggered in part by developments in cybernetics applied to brain research. The result was another journal, *Kybernetik*, which appeared in 1961 and was later renamed by Springer as *Biological Cybernetics* to appeal more to Anglo-Saxon librarians. Its chief editor was W. Reichardt. For several years this was the principal specialized journal for theoretical and computational neuroscience.

But in the early 1980s, developments in the theory of neural networks, particularly John Hopfield's work on symmetric weight networks, and especially the so-called 'backpropagation' network built by David Rumelhart, Geoffrey Hinton and Ron Williams, led to an avalanche of new work, and computational neuroscience and artificial neural networks came into focus as a distinct field. Not surprisingly, several different specializations have