and Myanmar. The numerous curious and nature-loving pilgrims who visit the 'Devabhoomi' region every year will also find this book useful in knowing the plants on their pilgrimage path. The book is a must for all institutions, colleges, universities and for those interested in high-altitude flora of the Himalayan region. The authors richly deserve generous compliments by the entire botanical fraternity of the country.

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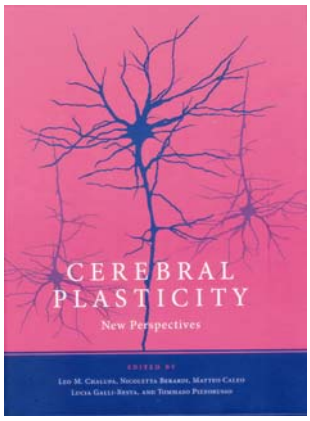


Cerebral Plasticity: New Perspectives. Leo M. Chalupa *et al.* (eds). The MIT Press, 55 Hayward Street, Cambridge, MA02142, USA. 2011. x + 415 pp. Price US$ 60.00/£ 44.95.

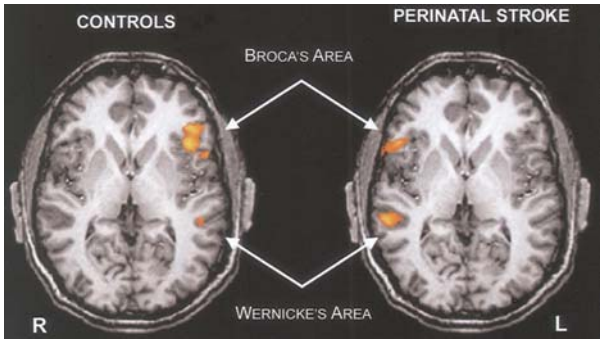
Are we the result of our genes or our environment? This question has fascinated mankind through the ages and it should come as no surprise that this question becomes all the more fascinating when one considers the brain, which is changing constantly through experience. Which aspects of brain then are hard-wired (nature) and which are shaped by the environment (nurture)? The book under review brings together reviews on this controversial yet fundamental question by a number of neuroscientists, in honour of a major figure in brain plasticity, Lamberto Maffei.

These reviews address basic questions about plasticity in the developing brain (where it was first studied), in the adult brain (the extent and dynamics of which is hotly debated even today), the injured brain (where extensive cortical reorganization is observed), and the mechanisms underlying plasticity under all these conditions (which could potentially be very different) – all of these questions remain an active area of research. The implications are profound: an understanding of plasticity can potentially be used to devise novel strategies for repairing injuries to the nervous system and to treat neurodegenerative disorders. Since it is rather impossible to review a book which itself contains reviews, we instead discuss below a few selected chapters from the book to convey a sense of its contents.

In chapter 4, Kim and Sanes address the issue of how we can identify the different types of neurons found in the brain. In invertebrates and some lower vertebrates it is possible to identify individual neurons in a network and study their properties. For example, the adult *Caenorhabditis elegans* nervous system consists of 302 neurons that can be identified reliably from animal to animal. In higher vertebrates, there is no way to reliably identify individual neurons, their inputs and outputs and study their properties as they function in a neural network and relate them to a simple definable behaviour. However, neurons can still be classified into subtypes and the general structure (and consequently, plasticity) of a network can be understood in part using the distribution of subtypes. This excellent and concise review summarizes the methods to mark individual neurons of a given subtype. It begins with the ability to mark single neurons that was first accomplished using the method of Emilio Golgi, the late 19th century Italian physician. From this historical point it traces the various methods that have evolved with the advent of techniques of molecular biology for marking a subset of neurons with a common characteristic. It highlights the interesting ways in which transgenesis and different fluorescent proteins are used in mice where different subtypes of neurons are labelled in different colours. The review uses the retinal system to illustrate how the different subtypes of neurons present in the retina can be identified. It also talks about the identification of a new subtype of neuron in the retina and the characterization of its electrophysiological properties. Further, it highlights the power of modern-day techniques to interfere with the function of specific types of neurons and thereby study how different neurons may be integrated to make a functional circuit. The review concludes with the observation that being able to identify and manipulate specific populations of neurons also gives one a powerful means of assessing how the environment can influence development and plasticity of neuronal connections.

In chapter 13, Li *et al*. describe how orientation selectivity in ferrets develops several weeks after birth only after they open their eyes. As a result, ferrets form a good model system in which the developmental trajectory can be dissociated from visual experience. The authors find that visual experience increases the magnitude of direction selectivity and this by itself can explain the rapid emergence of orientation columns. But how the directional preferences get specified and form the map is not clear. But what is remarkable is that just a few hours of seeing visual motion signals can create direction selectivity!

In chapter 20, Singer builds upon the well-established role of temporal contiguity of pre- and post-synaptic neuronal firing in synaptic plasticity to explore the role of precise timing of spiking activity on cortical processing. Three lines of research are elaborated. First is the discovery of spike-timing-dependent-plasticity (STDP), where the timing difference between the excitatory-post-synaptic-potential (EPSP) and back-propagating dendritic spike in the post-synaptic neuron determines the efficacy and polarity of the change in synaptic strength (essentially adding causality in the original framework of long-term potentiation/depression that is based only on co-variations between pre- and post-synaptic firing). The second line of evidence is based on recent studies suggesting an important role of precise timing of individual spikes in signal processing, in which oscillations in the network at various frequency ranges such as theta (4–10 Hz), beta (16–30 Hz) or gamma (30–80 Hz) provide a mechanism to adjust the precise timing of neuronal activity. This adjustment can synchronize the activity of the neuronal population, or provide an alternate coding scheme based on the position of the spike relative to the underlying oscillation (phase-coding). Finally, Singer reviews the literature suggesting that neurons are optimized for the



Language representation in patients with left perinatal stroke and right hemispheric reorganization of language. Functional magnetic resonance imaging shows the activation of regions of the right hemisphere which are contralateral and homotopic to the regions of the language circuit activated in normal controls (group analysis performed on 8 patients and 10 normal controls).

transmission and detection of coincident activity and cortical networks can exploit the precise temporal relationship among the firing of inter-connected neurons, both for signal processing and induction of dynamic synaptic gain changes. Based on these various lines of evidence, as well as the observed correlations between oscillations and attention/memory related processes, a relationship between synaptic plasticity and oscillatory activity is discussed.

In chapter 21, Rizzolatti *et al*. do not directly deal with issues of cerebral plasticity in the usual sense of its definition; they attempt an evolutionary synthesis to explain the origins of the dual visual stream hypothesis. While the standard model holds that there are essentially two streams of vision – a ventral stream for object perception and a dorsal stream that communicates with different motor effectors, these authors suggest a further bifurcation of the dorsal visual stream. Drawing inference from anatomy, physiology and cognitive neurology, Rizzolati *et al*. proposed that an evolutionary older dorsal stream that served to link vision with actions in invertebrates and lower vertebrates, needed to be elaborated to deal with more sophisticated actions that involved the manipulation of objects. This requires a specialized module in vision for processing object information, the manipulation of which became part of what they call the ventral–dorsal stream, which they suggest involves the inferior parietal lobule and the ventral premotor cortex. A loss of function in this stream is, thus expected, and consistent with clinical findings of a loss of skilled actions (apraxia), although in humans it is confined to the left hemisphere. In contrast, the evolutionary older dorsal–dorsal stream is suggested to involve regions of the superior parietal lobule and the dorsal premotor cortex, the loss of which is consistent with deficits of reaching (optic ataxia). Despite the attractiveness of this model and impressive fit with data from different domains, a few anomalies remain. For example, according to the authors' own definitions the representation of visual space should be better understood as a function of the dorsal–dorsal stream; nevertheless, spatial neglect is most commonly seen in subjects with lesions in the SPL (a part of the ventral dorsal stream). In addition, this hypothesis does not address the highly asymmetric function of the superior parietal lobule subserving the representation of visual space in the right hemisphere, while representing skilled actions in the left hemisphere.

In summary, the book under review will appeal to the specialist who is interested in a distilled understanding of the field, as well as to the student interested in reading a broad range of reviews on plasticity in one place. For the innocent reader looking to settle the debate on nature versus nurture, this book will, as it should, gladly rid him of the futility of seeking binary answers. For while man proposes dichotomies, nature only disposes of them.

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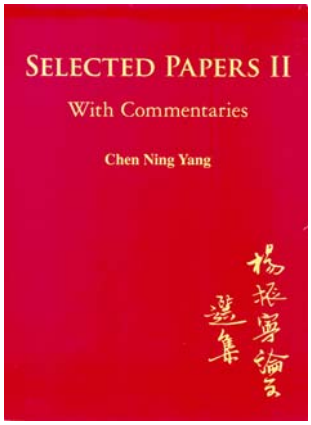

Selected Papers II, With Commentaries. Chen Ning Yang. World Scientific Publishing Co Pte Ltd, 5 Toh Tuck Link, Singapore 5962240. 2013. x + 346 pp. Price: US$ 98.

The present collection brought out by World Scientific, while being a sequel to the collection brought out in 1983, mainly contains articles published after 1980 by one of the greatest living legends of physics, Chen Ning Yang (also known as Frank Yang), Nobel Laureate in physics in 1957 for his discovery along with Tsung Dao Lee of parity violation in weak interactions. Named after him are the Yang's theorem for the decay of particles of certain spin into given daughters, the Yang–Mills theory, the basis of interactions of the strong and weak interactions which are the generalizations of Maxwell's theory of electromagnetism, the Yang–Baxter equations of integrable systems, the Lee–Yang theorem of statistical mechanics, as well as the Wu–Yang monopole. Mathematical objects associated with the quantum inverse scattering equations have now been named Yangian by the mathematician Vladimir Drin'feld. So towering is the stature of the author of these papers, that it is a daunting task to try and cover the articles in this selection.

The task, however, is made easier because many of the articles are about the history of science and its personalities, speeches given, views on the nature of science and mathematics, in addition to scientific works of the author during the past little over three decades, along with the commentaries. The striking feature of the collection is that in the articles, the author reaches out to the reader in a gentle and completely welcoming manner, and impresses the reader with