social conditions. Indeed, growing nationalist activities in the twentieth century led the government of India to operate its medical policies with and through this plural structure up to independence. Others might wish to paint a different picture in which Western medicine and the European model was both more dominant and more contested, yet Bala offers considerable food for thought and new ideas to test in the future.

The constraint on size means that this study is not as empirically strong as it might have been. Also, at several points it relies on a dated, if not inaccurate, picture of the professional, cognitive and practical development of medicine in Britain. For example, the impact of the public health movement within medicine is overstated, and the important recent work on the ideological rather than practical roles of science in medicine has not been taken on board. That said, Bala does provide further comparative support for those historians who have stressed the importance of the wider social, economic and political context in shaping the social organization of medical practice. In addition, her study takes the history of professionalization into the twentieth century and discusses the influence of the growing industrialization of medicine on education, organization and practice.

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GORDON M. SHEPHERD, *Foundations of the neuron doctrine*, History of Neuroscience series, Oxford University Press, 1991, pp. ix, 338, illus., £35.00 (0–19–506491–7).

The brain and spinal cord are made up of nerve cells, supporting tissue, and blood vessels. The essential component of the nervous system is the neuron or nerve cell. Vision and movement, thought and feelings are ultimately based on the action of nerve cells. Nerve cells communicate with one another by fibre-like processes; axons and dendrites, which take their origin from nerve cells.

The idea that the nervous system is composed of individual elements whose processes touch, but do not fuse is called the neuron doctrine. The neuron doctrine was put forward in its final form at the end of the nineteenth century, but the evidence for it was accumulated in over half a century of anatomical, histological, and physiological research. The neuron doctorine has been the basis for all further study of the structure and function of the nervous system, and the nature of neurological disease.

Despite its fundamental importance, the history of the neuron doctrine has received relatively little attention. The most important volume prior to the present one was that of Edwin Clarke and C. D. O'Malley, *The human brain and spinal cord*. Clarke and O'Malley's book contains excerpts from the literature translated into English with critical comments on each. The book presents in an orderly way the evidence that led up to the neuron doctrine. Gordon Shepherd picks up where Clarke and O'Malley left off. Unlike Clarke and O'Malley, who dealt with a much wider range of topics, Shepherd focuses entirely on the neuron doctrine. His format is similar to that of Clarke and O'Malley in that he presents the work of several authors in translation along with a narrative text and appropriate figures. But Shepherd includes many authors not covered by Clarke and O'Malley. In addition to the obvious giants among the histologists, Camillo Golgi and Santiago Ramón y Cajal, Shepherd presents excerpts from the important contributions of Franz Leydig, Sigmund Freud, Fridtjof Nansen, and Michael von Lenhossek among others. The excerpts from original articles and Shepherd's scholarly comment give a balanced and orderly history of the evidence for the neuron doctrine from the earliest discoveries to its final triumph in the hands of the Spanish histologist Ramón y Cajal.

Cajal's brilliant experimentation, his lucid prose, and his orderly and systematic treatment of the entire nervous system, make him stand far above all of his contemporaries as the true founder of the neuron doctrine. But, as Cajal recognized, there were prior contributions from other workers. For example despite Golgi's clinging to a discredited theory in his later years, his experimental contributions were of fundamental importance for the emergence of the neuron doctrine.

The neuron doctrine was at first deeply controversial. In the last half of the nineteenth century many histologists supported an alternative reticular theory of neuronal organization. According to this view nerve cells are not individual elements, but part of a massive net—a reticulum—whose elements fuse. Shepherd's treatment of the reticular theorists is particularly helpful. The book makes it clear that there were in fact two radically different reticular theories. There were those, like Joseph

Gerlach, who believed in a fusion among dendrites. Others, like Golgi, believed that the basic reticulum was made up of axon collaterals. According to Golgi, the nerve cell itself, like its dendrites, was not an essential element in neuronal organization, they had solely nutritive functions.

The book is of interest and importance for anyone interested in the history of the nervous system. At only a few points the text might tax the understanding of the non-neuroscientist. For example the discussion of gap junctions towards the end of the book would be difficult for someone without some relevant background in anatomy or physiology.

Shepherd's text emphasizes one of the pleasures of study of the nervous system; its international character. In addition to the Germans, Austrians, and Swiss, the Czech, Purkyne, the Italian, Golgi, and above all the brilliant Spanish histologist Santiago Ramón y Cajal contributed to this great series of discoveries upon which the neuron doctrine is based. The book is essential for every library which covers the history of biology or medicine, and a pleasure for those of us interested in the nervous system.

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NANCY LEYS STEPAN, *"The Hour of Eugenics": race, gender, and nation in Latin America*, Ithaca and London, Cornell University Press, 1991, pp. x, 210, $31.50 (0–8014–2569–7).

In a thoughtful and carefully researched book, Nancy Stephan examines the political, cultural, and scientific roles of eugenics in Brazil, Argentina, and Mexico from the 1910s through the 1940s. While Stepan employs European and North American examples for comparative purposes, her move to a new context greatly enriches our understanding of the social and ideological force of the theory of eugenics. By exploring the part played by eugenists in discussions on race, national identity, and the role of women, Stepan meticulously demonstrates that eugenics in Latin America was not merely an absorption of the theories and activities of European eugenists but an innovative adaptation of ideas on human breeding to a distinct setting. While eugenics was tied to the ideas of Mendelian inheritance in Anglo-Saxon countries, the neo-Lamarckian concept of the heritability of acquired characteristics continued to influence French and Latin American scientists well into the twentieth century. Thus, manipulation of the environment played a far larger role than concern about individuals' genes, and good sanitation and living conditions were believed essential to improving the human stock of Latin America.

In most Latin American countries the potency of the Catholic Church precluded the use of sterilization techniques to outbreed persons with undesirable qualities. Instead, "matrimonial eugenics", with its emphasis on puericulture—the scientific improvement of the circumstances surrounding conception and childhood development—played a leading part. Stepan suggests that because Latin American eugenics involved non-invasive regulation over marriage and reproduction, it has been overlooked by historians as a sideshow to the negative eugenics of the U.S. and Nazi Germany. Yet an alternate form of negative eugenics—the regulation of marriages through prenuptial medical certificates—was a key component of the conscious shaping of modern Latin Americans. Eugenic practices did not promote a uniform racial ideal but bent to nationalist requirements. In Argentina eugenists pushed for a pure, Europeanized race. Elites in Brazil also fostered immigration to increase the white population, but there the mixing, or "whitening", of races was viewed positively. In revolutionary Mexico the strength of *mestizaje*—the fusion of all races—was hailed.

The author skilfully shows the ideological dualities resulting from eugenic practices. Eugenists defined women primarily through their child-bearing function, believed by many to be an inherently anti-feminist project. Yet numerous reformers, including women eugenists, believed that eugenics' focus on sex education and maternal and child care satisfied progressive aims. These debates reveal the flexibility of scientific ideas in the formation of social policy and political beliefs. At the turn of the century, immigration to Argentina was encouraged in the name of eugenic Europeanization of its people. Several decades later, as the economy soured, working-class European newcomers could be re-defined as a negative, low class influence on the Argentinian people.