but comprehensive and is written by world experts. It is provided with a wealth of apposite and readily understood graphs, tables and references. It has four chapters on measles, five on rubella and five on general immunisation policy issues with a foreword by Gruenberg who has been a very good editor of a multi-author book; but I wondered who wrote chapter 1 on the *Epidemiology of Measles and its Complications* which has 20 pages one quarter of which are taken up by diagrams and tables but has eight authors!

I can heartily recommend this book to all health workers and to administrators and politicians who will be given a clear exposition of the problems relating to the control of measles and rubella and of the interaction between clinicians, laboratory workers, epidemiologists, other health workers and the politicians which is necessary to make immunisation for all children in the world at least an aim, if not a reality, by the year 1990.

GEORGE DICK

The Neurobiology of Gangliosides. Edited by Alfredo Gorio and Bernard Haber. (Pp 396; £37.00.) New York: Alan R Liss Inc, 1985.

Regeneration and plasticity of the nervous system is not a generally recognised phenomenon particularly within the brain. Neuronal membranes contain high concentrations of nerve growth factors known as gangliosides but these are not thought to act once maturation of the nervous system has occurred. However, the *Neurobiology of Gangliosides* contains a series of papers detailing the ability of these substances to stimulate neuronal growth and sprouting and to be of use in the regeneration of damaged brain areas.

Initial chapters deal with the biosynthesis, isolation and characterisation of gangliosides. Subsequent contributions show the ability of ganglioside preparations to stimulate neuronal growth and repair in a variety of cell lines. This is followed by details of the biophysical interaction between gangliosides and membranes. All of these parts of the volume are highly specialised and serve to introduce the applications of gangliosides to central nervous system repair.

One component of the ganglioside mixture extracted from neuronal membranes namely, the monosialoganglioside GM-1 appears particularly useful in brain regeneration. GM-1 applied exogenously may be incorporated into neuronal membranes and

induce neurite growth. This material features in later chapters as capable on peripheral administration of inducing neurochemical and behavioural restoration of deficits induced by experimental lesions of the brain. Indeed, a double blind study of the effects of GM-1 in stroke are contained in a later chapter suggesting beneficial effects.

It seems difficult at first sight to accept that the peripheral administration of gangliosides can induce a regeneration of the adult central nervous system. However, the evidence is compelling, but readers must judge for themselves. Overall, an interesting but specialised volume to be recommended to those involved in this field.

P JENNER

Magnetic Resonance Imaging (Principles and Applications). By: DM Kean and MA Smith. (Pp 164; £27.50.) London: William Heinemann Medical Books Ltd, 1986.

In the six years since the first Magnetic Resonance Imaging (MRI) studies of the head there have been dramatic improvements in the technique for imaging the body in general and the CNS in particular. The number of MRI facilities continues to grow and as it does so this will alter the practice of clinical investigations as well as remaining a research instrument.

This book provides a useful introduction to clinical MRI and covers the fundamental principles of Nuclear Magnetic Resonance (NMR) and the constituent parts of the MRI system. The format of the book is straightforward and the order logical with each chapter following on from the one before, beginning with the physical principles, covering the machinery and instrumentation and finally the clinical imaging and its application. More than half the text is concerned with general principles and the second half addresses more specific aspects of imaging in various parts of the body.

Although the theory of NMR is not difficult to grasp at a basic level the principles involved in the manipulation of the NMR signal for image production are complex for those untrained in physics. In particular two dimensional Fourier transformation, frequency encoding and phase encoding of a sample may be new areas for the clinician and these are explained usefully and clearly by means of text and diagram.

Some of the most difficult aspects of MRI

for the uninitiated are the mechanisms of generation signal and contrast in the image. Contrast and relative signal intensity from the various parts of the image are difficult to predict because there are several parameters which determine the signal intensity: most notably the proton density and the relaxation times T_1 and T_2 of the protons in any given area. Furthermore, there are several possible imaging sequences, the most widely used being saturation recovery, inversion recovery and spin echo. The appearance of the image (relative signal intensity from the various areas within the image) is different for each of these as they have different dependence on the three main imaging parameters. The inversion recovery sequence is usually made T_1 dependent and the spin echo is usually more T_2 dependent although all of the imaging parameters will contribute to the signal intensity in each of the three sequences. The relative signal intensity from a given area with any one of these sequences can be markedly altered by altering the timing intervals within a given pulse sequence. This book goes some of the way to explain these concepts and enabling some predictions to be made about the optimal pulse timing intervals for imaging various tissues. The issue is, however, complicated further in that the optimal pulse timing intervals will vary between systems operating at different magnetic field strengths. The book partly explains these problems of clinical imaging but unlike many of the aspects the book covers this particular angle would benefit by further examples of clinical images.

Although most of the introductory texts on MRI include sections on the equipment and the magnets this is often superfluous to the needs of the clinician and of much less interest than the images themselves and this point is certainly not laboured in this book which is very much to its advantage. Similarly, only the clinically relevant aspects of site planning and of the MRI environment are discussed with particular reference to imaging artefact and the safety of patients and personnel effects.

Clinical imaging of the nervous system is discussed as this was one of the first areas in which MRI was found to be useful. MRI possess certain technical advantages over CT x-ray scanning, in particular the absence of known bio-hazard, the ability to obtain direct coronal and sagittal images and the absence of bone artefact make it particularly suitable for imaging the CNS. It is in the areas in which CT scanning has had the most difficulty that MRI is the most useful. In demyelinating disease, lesions in the poste-