Chapter 1

Development of Neurology and Neuropathology

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Advances in neuropathology have, for the most part, followed the introduction and exploitation of anatomical, histological and, more recently, biochemical techniques. Neuropathology developed more or less independently from clinical neurology but the two disciplines are, in many respects, interdependent and changing concepts in the one have often led to advances in the other. Progress in clinical neurology was limited at first by the absence of a clear concept of the function of the nervous system and its constituent parts. The various ideas of nervous function developed in successive cultures have gradually led to a more generally accepted classification of neurological disorders, and of the functional deficits caused by disease of the nervous system. In the modern era, understanding of neurological disorders has been derived not from philosophy, as in earlier times, but from the natural sciences. Something of the difficulties experienced in previous centuries in neurology may be made more apparent by a consideration of the acknowledged problems in the contemporary classification of psychiatric disorders.

Early concepts of neurological structure and function

Although dissections of animal brains were performed by Aristotle (384–322 BC), Galen (129–199 AD) and other Greek philosopher-biologists, anatomical studies on human brains were rare until the Renaissance in Europe. Andreas Vesalius (1514–1564) wrote one of the first comprehensive anatomical studies of the human brain in his book, De Humani Corporis Fabrica, published in Basle in 1543 (Fig. 1.1). Little was known of the physiological significance of many of the structures within the brain at the time and most anatomical terms for various parts of the brain were related more to their shape and their implied connection with Greek or Roman mythology than to their functional significance. For example, the hippocampus may well have resembled the shape of a Roman horse-racing field to some, or the horn of plenty (Ammon's horn) to others. Similarly, the names of the caudate nucleus and the lentiform nucleus are based upon their shape and not upon any functional correlates. Confusion inevitably arises when the same tract passes through several differently named structures: for example, the corticospinal fibres pass through the internal capsule, the cerebral peduncles and the pyramids in various parts of their course.

In the Arab world, studies of human anatomy were accompanied by the investigation of brain anatomy by dissection, an approach which, unlike that in Europe during the same period, from about 900 to 1400 AD, was not dominated by rigid Galenic doctrines. For example, the optic chiasm, the cerebral ventricles and the membranous coverings of the brain were illustrated in Islamic writings as early as the 11th century. Indeed, the cerebral
Fig. 1.1. The cerebral convolutions displayed by dissection, and drawn by Vesalius (1543) in *De Humani Corporis Fabrica*. The drawing is the first firmly representational illustration of the cerebral convolutions. Previously, drawings of the brain were greatly influenced by the established views of the artist as to the function of the brain. (Reproduced by kind permission of the Librarian of The Royal College of Physicians.)

convolutions were known to the ancient Egyptians, although they were not generally recognised until Vesalius' work in the 16th century, and the cerebral ventricles were known to the ancient Greeks.

The 17th century was a period of renewed freedom of thought and marks the foundation of modern studies of the brain. Descartes in his book *De Homine* (1662) evolved a theory of brain function which led to the development of the concept of reflex action, first clearly expressed by Marshall Hall (1790–1851), and later extended in a series of studies, fundamental to modern neurology and neurophysiology, by Sherrington (1857–1952). Descartes, however, thought of the ventricles as key structures between the sense organs and the pineal gland, a concept that owed its origins to the medieval view of the ventricles as the seat of the soul. Sylvius (1614–1672), in the course of his anatomical work on the cerebral convolutions, proposed that the cerebral hemispheres themselves were the major functional unit of the brain. Thomas Willis extended this concept in his *Cerebri Anatome* (1664), a book with anatomical illustrations by Christopher Wren, to include sensory, motor and memory functions of the brain. Willis, himself a practising physician, described the anastomotic circle of vessels at the base of the brain and the clinical features of stroke and of other disorders, including epidemic fevers, asthma and diabetes mellitus.

These early attempts to correlate structure and function in the brain were followed by more detailed descriptions of cerebral anatomy, for example, by Steno (1638–1686), Santorini (1681–1737) and by Soemmering (1755–1830), who introduced the classification of the cranial nerves used today. However, recognition of the constancy of the pattern of the cerebral gyri and thus the application