Sir Charles Bell
Advance Praise for Sir Charles Bell

“With warmth and knowledge, Michael Aminoff provides a well-rounded summary of the life and career of Sir Charles Bell. The reader enters the world of early 19th century London, travels alongside Bell through the scientific and medical avenues of descriptive neuroanatomy, and enters several darker alleys of controversy. The journey unveils provocative historical questions and new insights related to this important, largely-forgotten scientific and medical figure.”
—Christopher G. Goetz, MD, Professor of Neurology, Rush University Medical Center, Chicago, IL

“Had I been asked who Sir Charles Bell was, I would have simply replied, ‘The guy who described Bell’s palsy.’ Now, after reading Michael Aminoff’s book, I realize that Bell’s palsy was a very minor aspect of Bell’s extraordinary accomplishments. He was a surgeon, neurologist, anatomist, prolific writer, and illustrator. Indeed, he was the ultimate polymath. Bell’s book *Idea of a New Anatomy of the Brain* was described as the Magna Carta of neurology. Dr. Aminoff, also a polymath, captures Bell’s true genius in a book that will be enjoyed by all seekers of true brilliance.”
—Robert B. Daroff, MD, Professor and Chair Emeritus of Neurology, Case Western Reserve University School of Medicine, Cleveland, OH

“From a forgotten corner – modern neurology’s birth in the early 19th century – Michael Aminoff restores Charles Bell to our consciousness as a founding father. This is vibrant reading, providing a rich view of this brilliant, driven, and flawed man and his moment in time. Aminoff offers a balanced view of Bell’s foibles as well as his prodigious accomplishments. He deftly shows us how so many of the clinical syndromes, mapped in modern form over the next century, were actually recognized by Bell and his contemporaries. Kudos to Michael Aminoff for bringing Bell out of the shadows of history.”
—Stephen L. Hauser, MD, Director, UCSF Weill Institute for Neurosciences, Professor & Chair, Department of Neurology, University of California San Francisco, San Francisco, CA

“Michael Aminoff is a renowned educator of neurology and neurological sciences. His writing is eclectic and this latest monograph tackles the life, works, and thoughts of Sir Charles Bell. It is by far the most detailed description of Bell ever written, full of fascinating details. Aminoff is a physician-scientist of considerable stature and this had given him the ability to weave Bell’s discoveries into present day thinking and to indicate how observations made by Bell have significant relevance in modern medicine. This monograph delves into England and Europe as experienced by Bell, adding charm and interest for non-physicians. Aminoff is not shy of bringing out Charles Bell’s shortcomings. Despite this I am sure that Sir Charles would thoroughly enjoy this gem, full of wonderful descriptions of his many achievements.”
—Andrew Eisen, MD, FRCPC, Professor Emeritus, Division of Neurology, University of British Columbia, Vancouver, Canada

“This volume will be a pleasure for all of us in search of an important scientific biography that reads like a novel. A reference text in its own right, it is an intimate account of Charles Bell through his life, work, and art, and also a rich cultural history of the times in which he lived. Through extensive research, Michael Aminoff finds the humanity in a brilliant and important, but flawed figure at the birth of neuroscience.”
—Kerry H. Levin, MD, Chairman, Department of Neurology, Cleveland Clinic, Cleveland, OH

“It is difficult to imagine many clinical neurologists who have not heard of Sir Charles Bell or at least of some of the clinical phenomena and neurological disorders that bear his name. In this book, Michael Aminoff makes a compelling case for the importance of studying those who preceded us. He gives insights into a fascinating and prolific man, as well as the backdrop of his times. The crude nature of medical knowledge and treatments at that time highlights just how remarkable were Bell’s insights into the structure and organization of the nervous system. This is a nice piece of work ... a very readable book.”
—A. Jon Stoessl, MD, FRCPC, Professor & Head of Neurology, University of British Columbia, Vancouver, Canada
To Jan, my wife for more than forty years, with love, respect, and gratitude
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In the early nineteenth century, a relatively obscure general surgeon wrote a small, privately published booklet that was so thoughtful and thought-provoking that it has been described by some as the *Magna Carta* of neurology. Why, then, is it unknown today by most neuroscientists, biologists, and clinical neurologists? It is curious that its author, a man whose achievements have come to be likened to those of William Harvey, is also all but forgotten. Does he deserve the indifference of the medical and scientific community, a community that actually owes much to his foresight? Is he forgotten in the same way as so many others whose contributions have led to an expansion of human knowledge, simply because fame is ephemeral? Or is he ignored because—in retrospect—his conduct has been judged by some to have breached the standard of intellectual honesty that is expected of those to whom we look for example? It was questions of this sort that prompted me to study the life and work of Charles Bell. In doing so, I was struck by the multitude of his accomplishments as a clinician, scientist, artist, and educator, and I came to believe that these accomplishments—and his failings—deserve to be better known. This, in turn, prompted me to write the present appraisal of Bell and his work. Present-day scientists and educators, surgeons and artists, would do well to appreciate his achievements and thereby gain a better understanding of the foundations on which they themselves build as well as a greater awareness of the place of an individual in the development of biological concepts and ideas. At the same time, an understanding of the fragility beneath his mask of polished professionalism gives Bell a human dimension—warts and all—to which everyone can relate.

It is perhaps surprising that Bell’s life and work has not been studied in more detail. A number of brief essays and articles have appeared in scholarly journals, but these generally focus on only one aspect or another of his work, are often based on secondary sources, and offer limited insight into his achievements and failings. The full-length biography of him by Gordon-Taylor and Walls that was published in 1958 is now long out of print. Just before this book was completed, I became aware of a new book by Carin Berkowitz, then in press and subsequently published, titled *Charles Bell and the Anatomy of Reform*. However, it focuses especially on the London medical classroom and on Bell’s use of educational materials and institutions to disseminate scientific knowledge. The
present volume is intended to provide a broader account of the life and work of Charles Bell that will—I hope—be of interest to physicians, surgeons, anatomists, physiologists, artists, psychologists, educators, and medical historians, as well as to a certain segment of the lay public. I have been concerned to present not only his achievements and successes but also the less flattering aspects of his character and professional conduct, including his single-minded push to further his own reputation even at the expense of others. It is my hope that I have been able to do so while—at the same time—placing his ideas in their cultural and historical contexts.

Some, especially scientists, may question the necessity of looking to the past in an age of rapid advances in scope and depth of all branches of human knowledge. Indeed, the essayist Clive James, in a memoir on Charles Chaplin, commented that science “lives in a perpetual present,” discarding its own past as it advances, in contrast to the humanities, which accumulate and always retain the past. An understanding of past concepts and endeavors provides an informed framework to modern studies, however, allowing a better perspective on contemporary issues. Advances or changes—whether in the arts or sciences—also gain more meaning when they can be associated with a human face and are understood in the context of the times in which they occurred. To neglect the legacy of thought left by past generations is to squander a potential treasure trove of ideas that may be as relevant today as when they were originally formulated. Sir Andrew Huxley, the Nobel laureate, in his 1982 Florey Lecture (published in Proceedings of the Royal Society of London, Series B, Vol. 216, pp. 253–266) recalled that some chance experimental findings of his might have been obtained much earlier by planned experiments if he had been familiar with the literature of the nineteenth century. Indeed, he wondered how many more important suggestions “are still sitting unknown in the massive literature” of that time.

Given the many facets of Bell’s professional life, it has been difficult to follow a strictly chronological course in this account without confusing the reader, so the book is also arranged thematically. Although I have taken the main events chronologically, I have then followed them through to the end so that each topic is discussed coherently and comprehensively in one place. For example, in discussing his work in relation to the arts, Chapter 4 provides an account of his influential book on the anatomy of expression, first published in 1806, and its consequences over the succeeding years up to the present, whereas Chapter 5 discusses his famous paintings and drawings of the wounded in the Napoleonic Wars in 1808 but also in 1815 (Waterloo). General or anecdotal information about important contemporaries, institutions, concepts of disease, and beliefs is provided in an easily accessible format in footnotes to the text rather than at the
end of the chapter or book. In addition, an extensive bibliography is provided separately at the end of each chapter to allow the reader to pursue topics of particular interest. I have endeavored to place Bell’s contributions in the context of the times but have also discussed subsequent developments in the field to show their relevance at the present time. I hope that this will allow his contributions to receive the consideration that they deserve.

On a number of occasions, I have quoted from Bell’s published correspondence with his brother. I must emphasize, therefore, that this correspondence was published by his widow almost thirty years after his death, and the extent to which his letters have been expurgated or edited is unclear. Furthermore, in preparing the present volume, I have made no attempt to express the value of nineteenth-century goods, services, or incomes in present-day values because any computation depends on which of several different measures (such as the consumer price index, gross domestic product, or unskilled wage rate) is used.

I was a medical student at University College London—the original University of London that Bell helped to found and where he was the most famous of the faculty originally appointed to the medical department—in the late 1950s and early 1960s. I vividly recall spending hours in the dissecting room working over an embalmed human body, and also remember the students from the Slade School of Fine Arts joining us for anatomy classes, just as Bell had once urged. I also worked for almost two years as a registrar in neurology at the Middlesex Hospital, where Bell—more than one hundred and fifty years earlier—had been on the surgical staff for some years. As a neurologist and clinical neurophysiologist for my entire professional career, I refer often to many of the features of the nervous system that Bell described or popularized. It has thus been a particular pleasure to write about him and to read or re-read many of his books and papers.

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and other notes, which unfortunately are missing. Ms. Marianne Smith, college librarian at the Royal College of Surgeons of Edinburgh, sent me information about the Corunna oil paintings at the college. Mr. George Richards, curatorial assistant at the University College London (UCL) Art Museum in London, provided information concerning the paintings held there. Ms. Kate Collins, librarian at the David M. Rubenstein Rare Book & Manuscript Library at Duke University, helped me obtain copies of Bell’s illustrations in their collection. Mr. Jeremy Norman generously gave me access to his private collection of antiquarian books. Mr. Steven Wright, of UCL Library Services, was particularly helpful in giving me access to material held at UCL Special Collections at the college and in the National Archives at Kew, sending me digitized copies for my review. I am most grateful to them all.

I am also grateful for the help I received from my family. My father—Abraham S. Aminoff—died in 1994 but would have derived great pleasure from this book, given his love of history and his interest in the evolution of ideas. It saddens me that he will never see it. My wife, Jan, has been a wonderful companion to me over the forty years of our marriage, has taken great interest in my work, and has helped me in all my writing endeavors. She transcribed for me a number of the letters written by Charles Bell to Lord Brougham, and she read over the penultimate draft of much of the book. I dedicate this volume to her as a mark of my respect, love, and gratitude.

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AN INTRODUCTORY SNAPSHOT

The name of Charles Bell has been given to a nerve, a facial palsy, a clinical sign, an involuntary muscle spasm, a muscle, and a fundamental law of physiology, making it well known to physicians, surgeons, and medical students alike, even though they generally have little knowledge or appreciation of his actual, very solid accomplishments. Bell was revered by some contemporaries for his achievements: Philibert Joseph Roux, chief surgeon of a leading hospital in Paris, dismissed his class of medical students without a lecture immediately after having introduced Bell, with the words “C’est assez, Messieurs; vous avez vu Charles Bell.” To others, however, Bell’s name and brilliance were tarnished by charges of intellectual dishonesty and fraud, behavior that remains difficult to comprehend because Bell had so many real accomplishments to his credit. Thus, when historians focus on his scientific contributions, it is usually in relation to certain of his claims for scientific originality that were subsequently found to be of questionable validity (as discussed in Chapter 7), and his other contributions—important and insightful as they are (see Chapters 8 and 9)—are often quietly ignored. It is therefore important to set the record straight. The achievements and failings of Charles Bell deserve to be better known for—with time—they have faded into obscurity. In this chapter, therefore, Bell is introduced to the reader so that some idea can be gained about the breadth of his accomplishments before his life and work are considered in more detail.

THE SURGEON–SCIENTIST

Charles Bell, a Scottish surgeon–anatomist, lived in the last decades of the eighteenth century and first half of the nineteenth century, spending much of his professional life in London. A successful surgeon and clinician, he also had a real interest in the experimental underpinnings of medicine. Although his original publications in scientific journals are few in number, Bell added much to the sum of knowledge about the nervous system, and his contributions came to be widely recognized even as some of them became the subject of bitter controversy. Indeed, his discoveries concerning the nervous system were at one time likened to those of William Harvey on the circulation of blood, and his small
pamphlet published privately in 1811, detailing his idea of the brain, has been described as the Magna Carta of neurology.

In that and subsequent publications, Bell suggested that the anterior and posterior nerve roots have different functions, showed that the nervous system has certain major divisions that are now taken for granted (the motor and sensory systems and the autonomic nervous system), and attempted to determine the central representation of motor and sensory nerves and thus to show that different parts of the brain have different functions. He also noted that individual peripheral nerves actually contain bundles of nerve fibers with different functions, that nerves conduct only in one direction, that sense organs are specialized to receive only one form of sensory stimulus, and that there is a sixth sense, namely a muscle sense. He even considered the basis for sensation, stressing that “perception is according to the part of the brain to which the nerve is attached.” He suggested, in fact, new ways to look at—and to make sense of—the nervous system at a time when it was “puzzling in the last degree” and considered to be “inscrutable.”

Bell lived during a time when an understanding of the nervous system—of its structure and the manner of its functioning—advanced remarkably to provide a solid foundation for all subsequent developments. He contributed significantly to this advance and received high honors in Britain for his scientific contributions, including the Royal Society Gold Medal (1829) and a knighthood (1831). However, a dispute that developed between Bell and François Magendie in France and Herbert Mayo in London regarding priority in discovering the separate functions of the nerve roots and certain cranial nerves led to charges of plagiarism by him and against him, making it uncertain for some years whether he was victim or villain.

**THE CLINICIAN AND EDUCATOR**

Bell’s clinical acumen was notable. In addition to the facial palsy and its associated features named after him, he provided the first descriptions of several previously unrecognized neurological disorders that are now well known, although he did not always establish them as distinct entities (see Chapter 9). These included the first descriptions of muscular dystrophy, writer’s cramp, numb chin syndrome, myotonia congenita, postinflammatory atlantoaxial dislocation, and several presentations of motor neuron disease. His reflections on various neurological phenomena, such as referred pain and reciprocal inhibition, are remarkable for their prescience.

During the Napoleonic Wars, Bell helped to treat the wounded and, based on his experiences, published *A Dissertation on Gun-Shot Wounds*, which served as a useful manual for military surgeons for years. He also used his artistic talent to
create sketches and paintings of the wounded and the dead that are a dramatic contrast with the usual images and portraits of the glories of war encountered in museums and art galleries (see Chapter 5). They continue to be of interest as works of art and have provided much insight into the nature and treatment of war wounds during the early nineteenth century. For years before the advent of practical photography, they served as teaching aids in the training of doctors, both civilian and military.

Bell’s *Essays on the Anatomy of Expression in Painting* (discussed in Chapter 4) helped to change the way art students are taught, described the anatomical basis of facial expressions, had a long-lasting effect in encouraging new approaches in the visual arts, initiated the scientific study of the physical expression of emotions, and led directly to the work of Charles Darwin—his former student—on facial expressions, published some sixty-six years later.

As an educator and educational reformer (see Chapter 11), Bell founded his own private medical school, subsequently took over the Great Windmill Street School of William Hunter, and eventually helped to found the University of London and the medical school of the Middlesex Hospital in London. Somewhat of an outsider in that great metropolis in the early nineteenth century, his views regarding the reform of education did not help him to make friends but were farsighted and important.

**THE POLYMATH**

Bell achieved much in the arts and sciences, in medicine and medical education. Some may wonder about the multiplicity of his interests and regard him as a dilettante rather than a person to be taken seriously. Others may question how he was able to succeed in so many different areas. His work must be viewed in the context of the man and the social, cultural, and even political times in which he lived. Bell was driven, ambitious, and hardworking, and he used his talents as an artist and illustrator to advance his career as a surgeon—anatomist and teacher. At the same time, he used his medical and scientific background to influence the visual arts by injecting realism into artistic representations of nature and human behavior.

His output as an author of clinical (as opposed to scientific) papers and textbooks was prodigious, with new works or new editions of his earlier works appearing in a steady stream, and this helped to extend his reputation from a local to a national level and then gave him an international standing. Indeed, many of his original scientific and clinical findings were published in this format rather than as papers in scientific journals. The times were also favorable—at least initially—to a man such as Bell. During the nineteenth century, learned men of different disciplines interacted with each other in a way that permitted
the cross-fertilization of ideas, and there were fewer interruptions than there are today in the ordered life of the academic. Bell was clearly a learned surgeon–scientist, but he was also a talented painter and scholarly classicist. Times changed, however, and Bell was sidelined and eventually left behind, piously clinging to creationist beliefs that seemed increasingly dull and antiquated as new concepts emerged to counter them (see Chapter 10).

Bell lived a sober life, an academic bound up in his work and constantly leaning on his family for financial support. In his sixties, he returned to Scotland, an old man still holding to the creationist beliefs that framed his views as a surgeon–scientist. Although appointed to a prestigious chair at the University of Edinburgh, he felt redundant and unappreciated and became increasingly devoted to fishing and other leisurely pursuits. His creativity was diminished, he was worried about money, and he was sick with an ailing heart. He died in the arms of his wife while on his way to London in April 1842 and is buried in the old churchyard of a quiet English village.
Early in the eighteenth century, Edinburgh, capital city of Scotland, consisted primarily of a main street running along an east–west axis between the Castle and Holyrood Palace, with narrow, dirty, overcrowded lanes branching off on either side. It was home to a university (founded in 1583 and the sixth oldest in Britain), government offices, a cathedral, and various other ecclesiastical institutions. Its traditional industries were printing and distilling. The population numbered approximately thirty-five thousand, and there was close contact between the professional and working classes, who often shared the same alehouses and lived in the same tenement buildings, with the poor on the higher floors.

With the 1707 Act of Union between the kingdoms of England and Scotland, the parliament and many of the prosperous governing classes moved south to London. The economy initially declined, and the poor became increasingly unsettled by the high cost of living. Nevertheless, by mid-century, the city had expanded to the north and south of the castle, and the professional and business classes gradually moved from the medieval Old Town to the more spacious, elegant, single-family homes in the New Town. The professional class did particularly well: Lawyers prospered because Scottish law was distinct from English law, professors and medical men flourished because of the university and medical schools, and architects profited from the expansion of the city. Tradesmen also prospered because of the demands of an enlarging middle class, and the port of Leith, to the north, became important with the increasing commercial activity of the city and the arrival of trading vessels from all points of the globe. Prosperity also led to the establishment of various major banks and financial institutions. The last quarter of the eighteenth century and the first decade of the nineteenth century thus led to a remarkable expansion of the city, and the population reached over one-hundred thousand souls. Unlike Glasgow, the city did not become a major manufacturing or industrial center, but it gained an international reputation as an intellectual and cultural powerhouse, especially in philosophy, the arts and sciences, economics, and medicine.

A The University of Edinburgh was preceded in Britain by the universities of Oxford (1169 or earlier), Cambridge (1209), St. Andrews (1413), Glasgow (1451), and Aberdeen (1495). It is noteworthy that four of the six oldest British universities are thus in Scotland.