

striking incidents could be indefinitely multiplied. It was, however, in the low countries of Belgium and Holland, distracted with incessant civil wars, that, for purely political reasons, bells acquired unique importance.

But their religious and civil uses may be further noticed. The Ave Mary bell tolled at 6 and 12 to remind men of prayer to the Virgin; the vesper bell for evening prayer; the compline was for the last service of the day. The sanctus, often a handbell, rung at the sacrifice of the mass; the passing bell, at death. The curfew (*couvre feu*), introduced by the Conqueror into England, rang at 8 o'clock to extinguish all lights. In many parts of the country and in university towns at 8 and 6 o'clock bells are still rung. At Antwerp cathedral we find the *Cloche de Triomphe*, by Dumery; sixteen bells at Sotteghem and several at Ghent and elsewhere bear the same maker's name. The Horrida, or ancient tocsin at Antwerp, said to date from 1316, is long-shaped and is now unused. The curfew in the same tower rings at 5, 12, and 8. The Santa Maria ( $4\frac{1}{2}$  tons) first rang when Carl the Bold entered Antwerp 1467. St Antoine is another celebrated bell, and the favourite Carolus, given by Charles V. ( $7\frac{1}{2}$  tons), is made of copper, silver, and gold, and valued at £20,000. At Strasburg we have the Holy Ghost bell, with motto, "O Rex glorie Christe veni cum pace," and date 1375, 3 nonas Augusti (8 tons), only rung when two fires are seen in the town at once. The recall or storm bell warns travellers in the plain of the storm coming from the Vosges Mountains. The Thor or gate bell, for shutting and opening gates of the city, has been cast three times (1618, 1641, and 1651); it bears the following inscription:—

"Dieses Thor Glocke das erst mal schallt  
Als man 1618 sahlt  
Dass Mgte jahr regnet man  
Nach doctor Luther Jubal jahr  
Das Bös hinaus das Gut hinein  
Zu läuten soll igr arbeit seyn."

The Mittags, or 12 o'clock bell, taken down in the French Revolution, bore the motto—

"Vox ego sum vite  
Voco vos—orate—venite."

From all this it will appear that these Continental bells acquired a strong personality from the feelings and uses with which they were associated; and, indeed, they were formally christened with more ceremony than we give to christening our ships, and were then supposed to have the power of driving away evil spirits, dispersing storms, &c.

Bell-founding attained perfection in Holland in the 16th and 17th centuries; and the names of Hemony, Dumery, and the Van den Gheyns stand out as the princes of the art. Their bells are still heard throughout the Low Countries, and are plentiful at Amsterdam, Bruges, Ghent, Louvain, Mechlin, and Antwerp. These bells are frequently adorned with bas reliefs of exquisite beauty, such as feathers, forest leaves, fruit, flowers, portraits, or dancing groups, and inscribed with Latin, sometimes bad, but strong, quaint, and often pathetic. We give the preference to Hemony's small bells, and to Van den Gheyns's large ones. The names of Deklerk, Claes Noorden and Johann Albert de Grave (1714), Claude and Joseph Plumere (1664), Bartholomew Goethale (1680), and Andrew Steiliert (1563) also occur in Belgium. The following illustrate the nature of inscriptions and mottoes common in Belgium:—"Non sunt loquelæ neque sermones audiantur voces eorum, F. Hemony, Amstelodamia, 1658;" "Laudate Domini omnes gentes, F. Hemony, 1674;" and on a Ghent bell—

"Mynem naem is Roelant  
Als ick clippe dan ist brandt  
A's ick luyde dan is storm in Vlænderland,

A common inscription runs—

"Funera plango, Fulgura frango, Sabbata pango,  
Excito lentos, Dissipo ventos, Pao cruentos."

A few other inscriptions which occur on bells in France and England may be quoted. The bell in the cathedral at Rouen, already mentioned, which was melted down by the Revolutionists in 1793, bore the words—

"Je suis George d'Ambois  
Qui trente cinque mille pois  
Mais lui qui me pesera  
Trente six mille me trouvera."

Bells of the parish church at Winnington, Bedfordshire, had—

"Nomina campanis hæc indita sunt quoque nostris."  
1st bell.—"Hoc signum Petri pulsatur nomine Christi."  
2d " " "Nomen Magdalene campana sonat melode."  
3d " " "Sit nomen Domini benedictum semper in enm."  
4th " " "Musa Raphaelis sonat auribus Immanuelis."  
5th " " "Sum Rosa pulsata mundique Maria vocata."

By an old chartulary it appears that the bells of the Priory of Little Dunmow, in Essex, were in the year 1501 new cast and baptized—

"Prima in honore Sancti Michaelis Archangeli.  
Secunda in honore Sancti Johannis Evangelisti  
Tertia in honore S. Johannis Baptisti.  
Quarta in honore Assumptionis beate Mariae.  
Quinta in honore sanctæ Trinitatis et omnium sanctorum."

In the little sanctum at Westminster, Edward III. built a clocher, and placed in it bells for St Stephen's chapel, round the largest of which was cast—

"King Edward made mee thirte thousand weight and three  
Take me down and wey mee,  
And more you shall fynd mee."

Some of the music played on the carillon clavecin is still extant. We may specially mention the *morcaux fugiés* discovered by the Chevalier van Elewyck, in the archives at Louvain, the work of the celebrated organist and carillonneur Matthias van den Gheyn (published by Schott and Co., Brussels and London). This music is as fine in its way as Bach or Handel.

Quite lately several carillons have been put up in England; and one (1875) is in contemplation for St Paul's cathedral. The new carillon machinery by Messrs Gillett and Bland of Croydon, now employed almost everywhere in connection with clocks and carillons, is incomparably superior to anything of the kind on the Continent. By its aid the hammer, which falls on the outside of the bell, is raised mechanically instead of by the action of the fist or finger on the key; and all that the stroke on the key does is to let it slide off like a hair-trigger, and drop on the bell. Thus the touch of the modern carillon clavecin bids fair to rival that of the organ. The same firm has also invented a bell piano. The chief carillons in England at present are at Boston church, Lincolnshire, Worcester cathedral, Bradford town-hall, Rochdale town-hall, and Shoreditch. Several good peals of bells in London are immortalized in the common nursery rhyme—

"Gay go up and Gay go down,  
To ring the bells of London town."

Bell-ringing by rope is still a popular art in England. The first regular peal of bells in this country was sent in 1456 by Pope Calixtus III. to King's College, Cambridge, and was for 300 years the largest peal in England. At the beginning of the 16th century sets of eight bells were hung in a few large churches. In 1668 a famous work on bells, *Tintinologia*, by T. W. [White], appeared, introducing a sort of bell-notation by printing the bells 1, 2, 3, 4, &c., on slips of paper in different orders according to the changes rung. Of these changes there is a great variety, spoken of technically as hunting, dodging, snapping, place-making, plain-bob, bob-triple, bob-major, bob-major reversed, double bob-major, grandsire-bob-cator, &c.

The following numbers show how three bells can ring six changes:—1, 2, 3; 1, 3, 2; 2, 1, 3; 2, 3, 1; 3, 1, 2; 3, 2, 1. Four bells ring four times as many as three, i.e., twenty-four; five bells ring five times as many as four, or 120. And it may thus be shown that it would take ninety-one years to ring all the changes upon twelve bells at two strokes a second; whilst twenty-four bells would occupy more than 117 billions of years!

Bell-ringing is conducted as follows:—Ropes hang through holes in the bell-chamber, and are usually fastened to a wheel for leverage, round which the rope passes. There is a great knack in handling the rope. The first half-pull "drops" the bell, the second "sets" it; it next swings up to the slur-bar, then it swings down and up to the other side, the clapper striking as it ascends. Eight bells make the most perfect peal, tuned in the diatonic scale.

Bells are struck in three ways,—(1) with a hammer on the outside, let off either by a tambour or revolving drum, similar in appearance to the prickly cylinder of a musical box, which drum can be fitted with tunes or chimes by musical nuts or spikes, and altered at will; (2) the bell can also be struck by hand, as in the common stand of small bells to be seen occasionally in the London streets, the player having a hammer in each hand; or (3) the clapper may strike the bell internally, either being pulled by a rope, the bell being stationary, or by the bell swinging to and fro. If the hammer or clapper be too light the tone of the bell is not properly drawn; if too heavy it will pulverize or crack the bell in time.

Great reforms are needed in the hanging of bells, a subject to which the Americans have given much attention. What Messrs Gillett and Bland are in England with reference to carillon machinery, the Meneelys of New York are to the ordinary mechanism and hanging of bells. There is hardly a cathedral tower in England where the hanging of one or more bells, or the oscillation of the tower, is not justly complained of. When a bell is hard to ring it is usually on account of its hanging. The leverage is wrongly applied; the wood-work is crowded against the masonry, and many of the finest towers have thus become unsafe.

There are a few bells of world-wide renown, and several others more or less celebrated. The great bell at Moscow, *Tzar Kolokol*, which, according to the inscription, was cast in 1733, was in the earth 103 years, and was raised by the Emperor Nicholas in 1836. The present bell seems never to have been actually hung or rung, having cracked in the furnace. Photographs of it are now common, as it stands on a raised platform in the middle of a square. It is used as a chapel. It weighs about 440,000 lb; height, 19 feet 3 inches; circumference, 60 feet 9 inches; thickness, 2 feet; weight of broken piece, 11 tons. The second Moscow bell, the largest in the world in actual use, weighs 128 tons. The great bell at Peking weighs 53 tons; Nanking, 22 tons; Olmutz, 17 tons; Vienna (1711), 17 tons; Notre Dame (1680), 17 tons; Erfurt, one of the finest bell metal, 13 tons; Great Peter, York Minster, which cost £2000 in 1845, 10 tons; St Paul's, 5 tons; Great Tom at Oxford, 7 tons; Great Tom at Lincoln, 5 tons. Big Ben of the Westminster clock tower (cracked) weighs between 13 and 14 tons; it was cast by George Mears under the direction of Edward Beckett Denison in 1858. Its four quarters were cast by Warner in 1856. The Kaiserglocke of Cologne cathedral, lately recast (1875), weighs 25 tons.

On the varied uses past and present of small bells a volume might be written. Octaves of little bells have been introduced into organs and utilized in the orchestra. Handringers are still common throughout the country—one man with a bell fitted with a clapper, in each hand,

ringing but two notes of the tune in his turn. Upright stands of bells without clappers, struck with wands, may often be seen in the streets. Bells for horses, dogs, cows, sheep, &c., have already been alluded to. In Italy and elsewhere they are often made of baked earth; these have a very sweet sound, and cost about a penny. For sledges and harness they are of metal, and worn usually in bunches. A bunch of twelve costs about two francs. On the Italian lakes and elsewhere a bell fixed to a floating cork marks the spot where lines or nets are laid for fish. Hunting-hawks were formerly supplied with small bells to facilitate recovery.

Whilst some uses of bells have gone out, new ones have come in. A few instances will give the reader some idea of the indefinite number of services to which they have been applied. The expression to curse with book, bell, and candle, alludes to an old form of exorcism, in which the bell was used to scare the evil spirit—a function also attributed to larger bells. Bearing the bell alludes to the prize of a silver bell usually given at horse-races to the winner; hence comes what is, after all, only the bell reversed and used as a drinking vessel—the prize cup. The diving-bell no more comes within the scope of the present article than the dome of a mosque. Certain uses of small bells are fast disappearing. The dustman's bell is now seldom heard. The town-crier, with his "Oh, yes" (*oyez, hear ye*), has been banished to the provinces. The 5 o'clock postman, with his hand-bell to collect letters, went out when the present postal system came in. On the other hand the muffin-bell, the railway-bell, the dock-bell, the half-hour bells at sea, and the stage-bell survive; whilst new applications, unknown to our forefathers, have been introduced. Few people are aware that house-bells worked with wires are scarcely 100 years old. Long before them, no doubt, handbells had to a great extent superseded the use of the horn, whistle, rattle, clapping of hands and hammering on the door with a stick, and fire-bells were in frequent use. The old bell-pulls, which still linger in country inns and mansions, have been replaced by spring handles in the walls, and these are disappearing from hotels and clubs in favour of electric bells, now so common in railway stations in connection with the telegraph. A current of electricity sets a small hammer in motion, and, in the dark, the stream of sparks between the hammer and bell is clearly visible. In a word, then, it is plain that the whole of civilized life is set to bell music in one shape or another; and although the more important uses of bells have been enumerated, time would fail to mention all their lowly but not less useful functions,—such as the familiar dinner-bell, yard-bell, school-bell, factory-bell, jail-bell, small portable cupola spring-bell (pressed with the hand), spring signal door-bell (used in shops), safety-bell on swinging coil (fastened to shutters or doors); and, not to forget the nursery, the coral and bells, bell-rattles—which call to mind, and are probably relics of, the old fool's cap and bells and fool's wand with its crown of jingling baubles, or it may be that the fool's baubles are copies of the child's playthings.

The Rev. H. T. Ellacombe, author of various works on bells, gives in his *Chiming* a complete catalogue of bell literature. (H. R. H.)

BELL, DR ANDREW, a clergyman of the Church of England well known for his philanthropic efforts in the cause of education, and more particularly for his success in extending the monitorial system of instruction in schools, was born at St Andrews in 1753. He graduated at the university of that town, and afterwards spent some years in America. In 1789 he was chaplain at Fort St George, and minister of St Mary's church, Madras. While in this position he occupied himself with instructing the orphan children of the military asylum, and having been obliged

from scarcity of teachers to introduce the system of mutual tuition by the pupils, found the scheme answer so well that he became convinced of its universal applicability. In 1797, after his return to London, he published a small pamphlet explaining his views. No public attention was drawn towards the plan till the following year, when Mr Joseph Lancaster, a dissenter, opened a school in Southwark, conducting it in strict accordance with Bell's principles. The success of the method, and the strong support given to Lancaster by the whole body of dissenters, gave immense impetus to the movement. Similar schools were established in great numbers; and the members of the Church of England, becoming alarmed at the patronage of these schools resting entirely in the hands of dissenters, resolved to set up similar institutions in which church principles should be inculcated. In 1807 Dr Bell was called upon to organize a system of schools in accordance with these views. For his valuable services he was in some degree recompensed by his perferment to a prebend of Westminster, and to the mastership of Sherborn Hospital, Durham. He died in 1832 at Cheltenham, and was buried in Westminster Abbey. His great fortune was bequeathed almost entirely for educational purposes. Of the £120,000 given in trust to the provost of St Andrews, two city ministers, and the professor of Greek in the university, half was devoted to the founding of the important school, called the Madras College, at St Andrews; £10,000 was left to each of the large cities, Edinburgh, Glasgow, Leith, Inverness, and Aberdeen, for school purposes; and £10,000 was also given to the Royal Naval School. (See Southey's *Life of Dr Bell*.)

BELL, SIR CHARLES, K.H., the youngest son of the Rev. William Bell, a clergyman of the Episcopal Church of Scotland, was born at Edinburgh, November 1774. His mother Margaret Morice, the elder daughter of an Episcopal clergyman, was remarkable for her piety and general accomplishments, and she exercised a powerful influence over her gifted sons. The father, William Bell, after a life of contending with difficulties, died on 20th of September 1779, aged seventy-five, leaving his wife and six children very slenderly provided for. Of these six children, three became distinguished men, namely, John Bell, the anatomist and surgeon; George Joseph Bell, professor of the law of Scotland in the University of Edinburgh; and Charles Bell, the subject of this notice. After having studied two years at the High School and two years more at the University of Edinburgh, Charles embraced the profession of medicine and devoted himself chiefly to the study of anatomy, under the direction of his brother John, who was twelve years older, and who had already earned a reputation as an anatomist and surgeon. Regarding his early education, he wrote, in 1839, on a copy of Pettigrew's *Medical Portrait Gallery*, opposite a remark that he had been educated at the High School,—"Nonsense! I received no education but from my mother, neither reading, writing, ciphering, nor anything else." At school and college he does not appear to have distinguished himself, except by his facility in drawing, a hereditary gift acquired from his mother. It was not until he entered on the study of anatomy that he gave evidence of possessing those talents which soon made him a worthy rival of his brother John.

His first work, entitled *A System of Dissections, explaining the Anatomy of the Human Body, the manner of displaying the Parts, and their Varieties in Disease*, was published in Edinburgh in 1798, while the author was still a pupil. The "Introduction" to this work shows much originality of thought, and an aptitude for devising new methods of preparing animal structures for dissection and demonstration. The volume is illustrated by numerous engravings from original drawings, and the text is clear and precise in

language. For many years this work was considered to be a valuable guide to the student of practical anatomy.

On the 1st of August 1799 he became a fellow of the Royal College of Surgeons of Edinburgh. At that time the fellows of the college were in rotation surgeons to the Royal Infirmary of Edinburgh. In this position Bell soon gave evidence of great ability. He dissected, drew, described, mounted preparations of anatomical, physiological, or pathological value, improved on the modes of operating in surgery known at that time, and invented a method of making models of morbid parts, of which specimens may still be seen in the museum of the college.

In 1802 he published a series of engravings of original drawings, showing the anatomy of the brain and nervous system. These drawings are remarkable for artistic skill and finish. They were taken from dissections made by Bell for the lectures or demonstrations he gave on the nervous system as part of the course of anatomical instruction of his brother. In 1804 he wrote volume iii. of *The Anatomy of the Human Body*, by John and Charles Bell. This volume contains the anatomy of the nervous system, and of the organs of special sense.

In 1804 a new arrangement was made regarding the attendance of surgeons at the Edinburgh Infirmary; and Bell, probably as being junior in the profession, was excluded from the hospital. He proposed to the managers to pay £100 a year, and to transfer to them, for the use of the students, the museum he had collected, on condition that he should be "allowed to stand by the bodies when dissected in the theatre of the infirmary, and to make notes and drawings of the diseased appearances." This enthusiastic proposal was rejected, and the consequence was that Bell went to London in November 1804.

From that date, for nearly forty years, he kept up a regular correspondence with his brother George, much of which has recently been published (*Letters of Sir Charles Bell, &c.*, 1870). The earlier letters of this correspondence show how rapidly he rose to distinction in a field where success was difficult, as it was already occupied by such men as Abernethy, Sir Astley Cooper, and Cline. He quickly made acquaintance with most of the scientific men of the day, and apparently won friends in the highest social, professional, and artistic circles. After having lodged in Fludyer Street for some months, he settled in Leicester Street, Leicester Square, and immediately commenced a course of lectures on anatomy and surgery. Here he also located his museum, which was sent to him from Edinburgh; and his letters indicate that this was the subject of much interest to scientific and professional men. He lectured to painters, directed private dissections, gave demonstrations to surgeons, and gradually acquired a surgical practice.

Before leaving Edinburgh in 1804, he had written his work on the *Anatomy of Expression*. It was published in London soon after his arrival, and at once attracted attention. His practical knowledge of anatomy and his skill as an artist qualified him in an exceptional manner for such a work. The object of this treatise was to describe the arrangements by which the influence of the mind was propagated to the muscular frame, and to give a rational explanation of the muscular movements which usually accompany the various emotions and passions. One special feature of the author's system was the importance attributed to the respiratory arrangements as a source of expression. He also showed how the physician and surgeon might derive information regarding the nature and extent of important diseases by observing the expression of bodily suffering. This work, apart from its value to artists and psychologists, is of interest historically, as there is no doubt the investigations of the author into the nervous supply of the muscles of expression induced him to prosecute inquiries which led to

his great discoveries in the physiology of the nervous system.

In 1807 Bell first published his idea of a new anatomy of the brain, in which he announced the discovery of the different functions of the nerves corresponding with their relations to different parts of the brain. It is now difficult to imagine the confusion which prevailed in the minds of anatomists and physiologists regarding the functions of the various nerves prior to this discovery. The nerves had been noticed by anatomists from the earliest times, and they were divided into cranial and spinal nerves, according as they originated from the brain or spinal cord. Some were supposed to carry from the brain the mandates of the will, while others communicated to the sensorium impressions made on their extremities, which resulted in consciousness. It was supposed, however, that the same nerve, even at the same time, might in some mysterious way transmit either motor or sensory impressions in opposite directions. When a nerve was cut, the parts beyond the incision were found to be destitute of sensibility, and to be beyond the influence of the will. It was consequently correctly inferred to be the cord through which volition acted on the muscles, and through which sensory impressions were transmitted to the sensorium. The idea of two sets of filaments functionally different in the same nerve was not then entertained. Boerhaave asserted that there were two kinds of spinal nerves, the one serving for motion and the other for the use of the senses. Haller states, "I know not a nerve which has sensation without also producing motion." The first Monro held a similar opinion, and he believed all those spinal nerves which passed through a ganglion to be motor nerves.

To Sir Charles Bell we owe the discovery that in the nervous trunks there are special sensory filaments, the office of which is to transmit impressions from the periphery of the body to the sensorium, and special motor filaments which convey motor impressions from the brain or other nerve centre to the muscles. He also showed that some nerves consist entirely of sensory filaments and are therefore sensory nerves, that others are composed of motor filaments and are therefore motor nerves, whilst a third variety contain both kinds of filaments and are therefore to be regarded as sensory-motor. Furthermore, he indicated that the brain and spinal cord may be divided into separate parts, each part having a special function—one part ministering to motion, the other to sensation, and that the origin of the nerves from one or other or both of those sources endows them with the peculiar property of the division whence they spring. He also demonstrated that no motor nerve ever passes through a ganglion. Lastly, he showed both from theoretical considerations and from the result of actual experiment on the living animal, that the anterior roots of the spinal nerves are motor, while the posterior are sensory. These discoveries as a whole must be regarded as the greatest in physiology since that of the circulation of the blood by the illustrious Harvey. It not only was a distinct and definite advance in scientific knowledge, but from it flowed many practical results of much importance in the diagnosis and treatment of disease. It is not surprising that Bell should have announced it to his friends with exultation. On 26th November 1807 we find him writing as follows to his brother George:—"I have done a more interesting *nova anatomia cerebri humani* than it is possible to conceive. I lectured it yesterday. I prosecuted it last night till one o'clock; and I am sure it will be well received." On the 31st of the same month he writes—"I really think this new anatomy of the brain will strike more than the discovery of the lymphatics being absorbents."

In 1807 he produced a *System of Comparative Surgery*

founded on the basis of anatomy. This work indicates the author's idea of the science of surgery. He regarded it almost wholly from an anatomical and operative point of view, and there is little or no mention of the use of medicinal substances. It placed him, however, in the highest rank of English writers on surgery.

In 1809 he relinquished his professional work in London, and rendered meritorious services to the wounded from Coruña, who were brought to the Haslar Hospital at Portsmouth. In 1810 he published a series of *Letters concerning the Diseases of the Urethra*, in which he treated of stricture from an anatomical and pathological point of view.

In 1812 he was appointed surgeon to the Middlesex Hospital, and a few years afterwards professor of anatomy, physiology, and surgery to the College of Surgeons of London. He was also for many years teacher of anatomy in the school of Great Windmill Street, no longer in existence. He acted as surgeon to the hospital for twenty-four years, and delivered many courses of lectures on surgery in that institution. In 1815 he did good public service by devoting all his skill and time to the wounded after the battle of Waterloo. On the formation of University College, Gower Street, he was asked to place himself at the head of the medical department. This appointment he held for only a short time, when he resigned in consequence, it is said, of dissensions in the senate.

In 1816, 1817, 1818, he published a series of *Quarterly Reports of Cases in Surgery, treated in the Middlesex Hospital, in the Cancer Establishment, and in Private Practice, embracing an Account of the Anatomical and Pathological Researches in the School of Windmill Street*. In 1821 he issued a volume of coloured plates with descriptive letterpress, entitled *Illustrations of the Great Operations of Surgery, Trepan, Hernia, Amputation, and Lithotomy*. In 1824 appeared *An Exposition of the Natural System of Nerves of the Human Body; being a Republication of the Papers delivered to the Royal Society on the subject of the Nerves*. In the same year he wrote *Observations on Injuries of the Spine and of the Thigh Bone*. In 1832 he wrote a paper for the Royal Society of London on the "Organs of the Human Voice," in which he gave many illustrations of the physiological action of these parts.

Of an eminently pious and reflective mind, he was often in the habit of pointing out in his lectures what he regarded as evidences of creative design to be found in the anatomy of the bodies of animals. These he embodied in a treatise on *Animal Mechanics*, written for the Society for the Diffusion of Useful Knowledge. The executors of the earl of Bridgewater selected him as a fit person to maintain the argument which it was the purpose of that nobleman's bequest to have published. Sir Charles wrote in 1833—*The Hand: its Mechanism and Vital Endowments as evincing Design*. Along with Lord Brougham he annotated and illustrated an edition of Paley's *Natural Theology*, published in 1836, in which he followed out his favourite line of thought.

The Royal Society of London awarded to him in 1829 the first annual medal of that year given by George IV. for discoveries in science; and when William IV. ascended the throne, Charles Bell received the honour of knighthood along with a few other men distinguished in science and literature.

The chair of surgery in the University of Edinburgh was offered to him in 1836. When the offer was made he was regarded as one of the foremost scientific men in London, and he had a large surgical practice. But his opinion was "London is a place to live in, but not to die in;" and he accepted the appointment. In Edinburgh he did not earn great local professional success; and, it must be confessed,

he was not appreciated as he deserved. But honours came thick upon him. On the Continent he was spoken of as greater than Harvey. It is narrated that one day Roux, a celebrated French physiologist, dismissed his class without a lecture, saying "C'est assez, Messieurs, vous avez vu Charles Bell." He held the Edinburgh chair from 1836 to 1842. During his professorship, in 1838, he published the *Institutes of Surgery, arranged in the order of the Lectures delivered in the University of Edinburgh*; and in 1841 he wrote a volume of *Practical Essays*, two of which "On Squinting," and "On the Action of Purgatives," are of great value.

Sir Charles Bell died at Hallow Park near Worcester on Thursday, 28th April 1842, in his sixty-eighth year; and he lies under the yew tree in the peaceful churchyard of Hallow. His epitaph, written by his life-long friend Lord Jeffrey, summarizes his character as follows:—"Sacred to the memory of Sir Charles Bell, who, after unfolding, with unrivalled sagacity, patience, and success, the wonderful structure of our mortal bodies, esteemed lightly of his greatest discoveries, except only as they tended to impress himself and others with a deeper sense of the infinite wisdom and ineffable goodness of the Almighty Creator. He was born at Edinburgh 1774; died, while on a visit of friendship, at Hallow park, in this parish, 1842; and lies buried in the adjoining churchyard." (J. G. M.)

BELL, GEORGE JOSEPH, brother of the preceding, was born at Edinburgh on the 20th of March 1770. At the age of eight he entered the High School, but he received no university education further than attending Tytler's lectures on civil history, Stewart's course of moral philosophy, and Hume's lectures on the law of Scotland. He became a member of the Faculty of Advocates in 1791, and was one of the earliest and most attached friends of Francis Jeffrey. In 1804 he published a *Treatise on the Law of Bankruptcy in Scotland*, in 2 vols. 8vo, which was gradually enlarged in subsequent editions, till at length a fifth edition was published in 1826, in 2 vols. 4to, under the title of *Commentaries on the Law of Scotland and on the Principles of Mercantile Jurisprudence*—an institutional work of the very highest excellence, which has guided the judicial deliberations of his own country till the present time, and has had its value acknowledged by such eminent jurists as Story and Kent. In 1821 he was unanimously elected professor of the law of Scotland in the University of Edinburgh; and in 1831 he was appointed to one of the principal clerkships in the Supreme Court. He was in 1833 placed at the head of a commission to inquire into the expediency of making various improvements in the Scottish bankruptcy law; and in consequence of the reports of the commissioners, chiefly drawn up by himself, many beneficial alterations have been made in this department of the law. He died on the 23d September 1843. A seventh edition of the *Commentaries*, edited by J. Maclaren, advocate, appeared in 1870. Bell's smaller treatise, *Principles of the Law of Scotland* (6th edit. 1872), has long been a standard text-book for law students. The *Illustrations of the Principles* is also a work of high value.

BELL, HENRY, a mechanical engineer, well known for his successful application of steam-power to the propulsion of ships, was born at Torphichen, in Linlithgowshire, in 1767. Having received the ordinary education of a parish school, he was apprenticed to his uncle, a millwright, and, after qualifying himself as a ship-modeller at Bo'ness, went to London, where he found employment under Rennie, the celebrated engineer. Returning to Scotland in 1790, he first settled as a carpenter at Glasgow and afterwards removed to Helensburgh, on the Firth of Clyde, where his wife superintended a large inn, together with the public baths, while he pursued his mechanical projects, and also

found occasional employment as an engineer. It was not until January 1812 that he gave a practical solution of the difficulties which had beset all previous experimenters, by producing a steamboat (which he named the "Comet,") of about 25 tons, propelled by an engine of three horse power, at a speed of seven miles an hour. Although the honour of priority, by about four years, is admitted to belong to Robert Fulton, an American engineer, there appears to be no doubt that Fulton had received very material assistance in the construction of his vessel from Bell and others in this country. A handsome sum was raised for Bell by subscription among the citizens of Glasgow; and he also received from the trustees of the River Clyde a pension of £100 a year. He died at Helensburgh, 14th November 1830, and a monument was erected to his memory at Duglass, near Bowling, on the banks of the Clyde.

BELL, HENRY GLASSFORD, was born at Glasgow in 1805, and received his education at the High School of that city. He afterwards studied at Edinburgh and became intimate with Moir, Hogg, Wilson, and others of the brilliant staff of *Blackwood's Magazine*, to which he was drawn by his political sympathies. In 1828 he became editor of the *Edinburgh Literary Journal*, which proved unsuccessful. He passed to the bar in 1832. In 1836 he competed unsuccessfully against Sir William Hamilton for the chair of logic and metaphysics in Edinburgh University, and three years afterwards was appointed sheriff-substitute of Lanarkshire, an office which he held until 1867, when he succeeded Sir Archibald Alison in the post of sheriff-principal of the county. During his early life he had been a versatile author of poems and prose sketches, but his literary activity was checked after he applied himself seriously to law. In 1831 he published *Summer and Winter Hours*, a volume of poems, of which the best known is that on Mary Queen of Scots. He further defended the cause of the unfortunate queen in a prose *Life*. A preface which he wrote to the works of Shakespeare contains some acute and original criticism. His *Romances and other Poems* (1866) display deeper thought and less fervour than his former works, but are mainly interesting as evidence of latent poetic genius, the development of which was prevented by attention to other pursuits. Bell's literary tastes did not affect his industry in his profession, and, on the other hand, his legal labours never dulled his early affection for poetry and painting. He deserves to be held in kindly remembrance for his readiness to assist youthful literary aspirants. During many years he took an active interest in social questions, especially in promoting educational and sanitary reforms. He died in January 1874.

BELL, JOHN, of Antermony, a Scottish traveller in the first half of the last century, was born in 1691, and educated for the medical profession, in which he took the degree of M.D. In 1714 he set out for St Petersburg, where, through the introduction of a countryman, he was nominated medical attendant to Valensky, recently appointed to the Persian embassy, with whom he travelled from 1715 to 1718. The next four years he spent in an embassy to China, passing through Siberia and the great Tatar deserts. He had scarcely rested from this last journey when he was summoned to attend Peter the Great in his perilous expedition to Derbend and the Caspian Gates. The narrative of this journey he has enriched with interesting particulars of the public and private life of that remarkable prince. In 1738 he was sent by the Russian Government on a mission to Constantinople, to which, accompanied by a single attendant who spoke Turkish, he proceeded, in the midst of winter and all the horrors of a barbarous warfare, returning in May to St Petersburg. It appears that after this he was for several years established as a merchant at Constantinople, where he married

in 1746. In the following year he retired to his estate of Antermony in Scotland, where he spent the remainder of his life. He died in 1780. His travels, published at Glasgow, in 2 vols. 4to, 1763, were speedily translated into French, and widely circulated in Europe.

BELL, JOHN, anatomist and surgeon, was born at Edinburgh, 12th May 1763. He had the merit of being the first in Scotland who applied with success the science of anatomy to practical surgery. While still a young man he established, in the face of much opposition, an anatomical theatre in Surgeon Square, where he attracted large audiences by his admirable lectures on anatomy, physiology, and surgery, in which he was assisted by his younger brother Charles. After his exclusion from the infirmary (to which reference has been made in the notice of Sir Charles Bell), he ceased to lecture, and devoted his time to study and practice. He died at Rome in 1820, while on a tour in Italy for the benefit of his health. To great skill in his profession he united high and varied mental abilities and extensive learning.

His principal works are:—*Anatomy of the Human Body*, 3 vols. 8vo, 1793–1802; *Discourses on the Nature and Cure of Wounds*, 2 vols. 8vo, 1793–95; *Principles of Surgery*, 3 vols. 8vo, 1801; and several volumes of Engravings illustrative of Human Anatomy. His *Observations on Italy* were published by his widow in 1825.

BELL, ROBERT, editor of the *Annotæes Lætion of the British Poets*, was an Irishman by birth and education, but a Londoner by a long residence of nearly forty years. He was born at Cork in 1800, and was educated at Trinity College, Dublin. With the tasks of a subordinate in a Government office at Dublin he combined literary pursuits, editing a political journal and contributing to periodicals. In 1828 he settled in London, and literature was thenceforward the business of his life. As journalist he edited the *Atlas* for several years; and afterwards the *Monthly Chronicle, Mirror, and Home News*. Of his early undertakings the more important were the volumes which he compiled for Lardner's *Cabinet Cyclopædia*, including the *Lives of British Admirals*, in continuation of Southey's work; *Lives of British Poets*; a *History of Russia*; and the continuation of Sir James Mackintosh's *History of England*. He made himself favourably known as a novelist by *The Ladder of Gold and Hearts and Altars*. Among his other works are a *Life of Canning*, *Wayside Pictures in France, Belgium, and Germany*, three five-act comedies, and a volume entitled *Memorials of the Civil War*, based on the *Fairfax Correspondence*. He earned a higher place and a more enduring reputation by his *Annotated Edition of the British Poets*, of which the first volume appeared in 1854. The series was carried through twenty-nine volumes. The works of each poet are prefaced by a carefully-prepared memoir, and accompanied by explanatory and illustrative notes, of a really helpful and often indispensable kind. In his earlier years Bell had taken a leading part in founding the Dublin Historical Society. In the course of his London life he became an active director of the Royal Literary Fund. He was also chosen F.S.A. In private life he was highly esteemed and warmly loved for his open-heartedness, his genial temper, and his generous readiness to give aid to fellow-workers who might be in need. He died in London, at the age of sixty-seven, April 12, 1867.

BELLA, STEFANO DE LA, engraver, was born at Florence in 1610. He was apprenticed to a goldsmith; but some prints of Callot having fallen into his hands, he began to turn his attention entirely towards engraving, and studied the art under Canta Gallina, who had also been the instructor of Callot. By the liberality of Lorenzo de' Medici he was enabled to spend three years in study at Rome. In 1642 he went to Paris, where Cardinal Richelieu engaged him to go to Arras and make drawings of the siege and

taking of that town by the royal army. After residing a considerable time at Paris he returned to Florence, where he obtained a pension from the grand duke, whose son, Cosmo, he instructed in drawing. He died in 1664. His productions were very numerous, amounting to over 1400 separate pieces.

BELLADONNA, DWALE, or DEADLY NIGHTSHADE (*Atropa Belladonna*), a tall bushy herb of the natural order *Solanaceæ*, growing to a height of 4 or 5 feet, having leaves of a dull green colour, with a black shining berry fruit about the size of a cherry, and a large tapering root. The plant is a native of Central and South Europe, extending into Asia, and it is also found in waste places and hedge-rows of Britain, though it is a doubtful native. The entire plant is highly poisonous, and accidents not unfrequently occur through children and unwary persons eating the attractive-looking fruit. Its leaves and roots are largely used in medicine, on which account the plant is cultivated, chiefly in South Germany, Switzerland, and France. Both roots and leaves contain the poisonous alkaloid atropia, but in practice the roots only are employed for its extraction. The proportions in which atropia is present in the roots range between 0.6 and 0.25, the roots of young plants being always richest in the alkaloid. The percentage found in leaves is much more uniform, being about 0.47, and extracts and tinctures of the leaves are therefore of much more constant strength than if prepared from roots. Preparations of belladonna and atropia are used in medicine as anodynes in local nervous pains,—atropia being frequently hypodermically injected but rarely taken internally. They are also of great value in ophthalmic practice on account of their peculiar property of producing dilatation of the pupil, either when painted around or dropped into the eye. Belladonna is also used as an antispasmodic in whooping-cough and spasmodic coughs generally, and for various other medicinal purposes. A remarkable antagonism between the physiological action of atropia and the alkaloid of the calabar bean has been experimentally worked out by Dr Thomas R. Fraser (*Trans. Roy. Soc. Ed.*, 1870–1). To a more limited extent also an antagonism between atropia and morphia and other alkaloids has been established; and the researches on these substances, and on the mutual action of alkaloids generally, have been continued in experiments conducted by Dr J. G. McKendrick reported to the British Medical Association in 1874.

BELLAI, or BELLAY, GUILLAUME DU, lord of Langey, a French general, who signalized himself in the service of Francis I., was born at Glatigny in 1491. He was considered the ablest captain of the time, and his great abilities as a negotiator occasioned the remark of the Emperor Charles V., that "Langey's pen had fought more against him than all the lances in France." He was sent in 1537 as viceroy into Piedmont, where he took several towns from the imperialists. His address in penetrating into the most secret designs of the enemy was extraordinary, and he spared no expense for that end. He was extremely active in influencing some of the universities of France to give a judgment agreeable to the desires of Henry VIII., when that prince wished to divorce his queen in order to marry Anne Boleyn. Langey composed several works, the most remarkable of which was the history of his own times (*Mémoires*, 1753, 7 vols.) He died in 1543, and was buried in the church of Mans, where a noble monument was erected to his memory.

BELLAMY, JACOBUS, a Dutch poet, was born at Flushing in 1757. He was apprenticed when young to a baker, but his abilities were discovered by a clergyman named De Water, who exerted himself in the boy's behalf, and obtained sufficient assistance to send him, in 1782, to