difference between the believed and imagined idea the same as that between impression and idea, which is an ultimate distinction, and yet holds the difference to be merely one of degree. In Mill's account of memory it may be pointed out that the ideas of *past* experience, and of myself as having had the experience, contain in themselves the very element which is supposed to be got out of their conjunction. With regard to expectation it is clear that ideas irresistibly suggested by present experience are by no means necessarily believed, and further, that many of our beliefs do not arise from any such association. J. S. Mill,[1] who subjects the association theory of belief to a searching examination, comes to the conclusion that the distinction between thinking of a reality and representing to ourselves an imaginary picture is ultimate and primordial. With his opinion later investigators, as Mr Sully,[2] concur.

Professor Bain, in opposition to other psychologists, holds that belief is not so much an intellectual state as a "phase of our active nature, otherwise called the will." "It is a growth or development of the will under the pursuit of intermediate ends." When, for instance, we perform certain acts as means towards a desired end with as much vigour as if we were realizing the end itself, "we are in a very peculiar situation, not implied in desire." This situation is belief, which is essentially "an anticipation of the pleasure" of attaining the end. Belief being a form of activity, our primitive state is one of complete confidence. The mind is filled with its present experience, and confidently believes that the future will resemble it. Ideas are so strongly taken up by the mind that they are accepted as real, and influence the will. The various disappointments of this primitive confidence give rise to definite avoidances of certain actions, and to pursuit of others, in order to escape pain or gain pleasure. Action directed towards these intermediate ends involves, or rather is, belief. This theory has to explain expectation and memory. With regard to the first, "we make light of the difference between the conceived future and the real present;" or in other words, "we are disposed to act in any direction where we have never been checked." Our primitive disposition to act is equivalent to full expectation. It may be pointed out that this explanation throws no light on expectation of events in which our activity could by no possibility be involved. But the theory seems to break down entirely when applied to memory. There is first to be explained the fact of memory, and then it has to be shown how reference to activity is contained in it. "In surrendering our mind to the idea still remaining, and so imparting a momentary quasi-reality, we have an experience possessing the characteristic features of present reality." "We really make no radical difference between a present and a proximate past." This, in the first place, would apply only to certain cases of memory. Secondly, imparting a quasi-reality is not an explanation of the peculiar phenomenon of an idea representing the past. It is an error, even on Professor Bain's own principles (see note to *Mill's Analysis*, i. 342; *Emotions and Will*, 2d ed. 525), to speak of *belief* in a present reality, while here memory is explained as a pseudo-realization of the ideas. Nor is he more successful in referring memory to activity. To identify my remembrance of having run up against a wall to avoid a carriage with the conviction that, should such a danger recur, I should again run up against the wall (see *Emotions and Will*, 2d. ed., 554), is absurd. The whole theory seems but an instance of a not uncommon error in psychology,—the confusion of the test or measure of a thing with the thing itself. Belief is truly a motive to action,[3] and all that has been said of it by Professor Bain would hold good of it in this relation; to identify the two is to run together totally distinct processes.

Modern German psychology has not approached the problem of belief from the same side as the English. Beneke alone, by his analysis of *tact* (see *Lehrbuch der Psych.*, § 158, and *System der Logik*, i. 268, *seq.*), has opened up a somewhat fresh vein of thinking. His hints have been carried out by Germar (*Die alte Streitfrage, Glauben oder Wissen*, 1856), who gives the following definition of belief: "If the consciousness (of the truth of what we think) arises from *tact*, and therefore without consciousness of the factors or grounds through which it is produced, it is called belief; it is elevated to knowledge when these factors are brought before consciousness" (p. 58).[4] In general the example of Kant has been followed, who looked upon the question as belonging not so much to psychology as to the theory of knowledge. His own discussion of the subject and his distinction between *Meinen*, *Glauben*, and *Wissen* have powerfully influenced later thought. According to him, *Glaube* (belief, in the sense of *Fides* as opposed to *Credulitas*, *Foi* as opposed to *Croyance*) should be confined to such propositions as rest on grounds subjectively not merely sufficient but necessary; that is to say, the propositions believed in are recognized as the demands of our moral or practical reason, and their truth can never be disproved, for such disproof would be radically inconsistent with the moral nature which we are conscious of possessing. Our confidence in their truth is unwavering and practical, *i.e.*, leading to action; for without them we could not act in conformity with our moral nature. Nevertheless, of the objects of such propositions we can never have scientific knowledge.

3. Kant's distinction of *Meinung* and *Glaube* leads us directly to the one species of belief which has not yet been considered. All objects of belief, so far as has yet appeared, might come within our temporal experience; but we are said to believe in the supersensible, which from its very definition seems to surpass experience and, consequently, knowledge. To such belief the name *faith* is properly restricted, and in its nature it differs somewhat from the belief hitherto discussed. There is not, of course, included in it the specifically theological notion of faith as *Fiducia* (*quæ est apprehensio meriti Θεανθρώπου appropriativa ad me et te in individuo*); it corresponds rather to the *Notitia* and *Assensus*, which are also elements in theological faith, and may be defined as the subjective expression of man's relation to God. When understood in this sense, religious belief is by no means a mere feeling, though it contains feeling as one of the stages in its development, for mere feeling is in itself blind and valueless, whereas faith is intelligent or rational. Nor is it a blank faith which would have the same value whatever were the objects believed in, for religious belief has a definite content; it is the acceptation of certain facts and truths and the active realization of them. As its content is definite (for if it were not so, the religions of Christ and of Mahomet, of Buddha and of Zoroaster, would stand on the same level, all having subjective faith or conviction), belief of necessity involves knowledge, rational construction of the facts believed. Faith is but the lower stage of completed insight, and in its own development follows the natural order of progress in knowledge, which begins with feeling and intuition, rises through concrete representation into logical connection, and finally culminates in rational cognition. So religious belief, which is primarily little more than a vague feeling of something over and beyond the present state of existence, combined with the dim sense of our own finite and dependent condition, gradually rises to a higher stage, and in its efforts to attain some cognizance of the supersensible, begins even to attach itself to natural objects. But as it can find in these no satisfaction, it is compelled to construct some representations of the supernatural which shall harmonize with our spiritual wants. In the formation of these religious ideas we are not left without help, nor are they to be looked upon as mere figments of the mind. The revelation which has been given in nature, both physical and moral, and in the special experience to which the name is more frequently applied, furnishes matter which is laid hold of and pressed into the service. Religious belief or faith always attaches itself to representations, intuitions, or facts; it gives what Newman has called Real as opposed to Notional Assent. But it is not the less necessary that faith should be raised to insight, and that we should construe in terms of thought what religious experience brings before us as direct intuition. There must be theology as well as religion. Nothing is believed which is not held to be so connected with the rational nature of man as irretrievably to injure that nature should its truth be overthrown. This is not to put knowledge in place of faith, if knowledge be understood to apply only to the logically necessary; nor is it to assert that what have been called truths of revelation could have been discovered by natural reason. Knowledge, however, cannot be confined to the abstract understanding; and nothing is more delusive than the total opposition of revelation and reason. "What is there in the nature of things," says Augustine, "that God has done unreasonably?" To affirm that reason does not of itself discover the truths of revelation, is simply to bring against it the reproach it may well bear, that it does not create experience. Reason has not to make new facts, but to accept given experience, and evolve from it the pure elements of thought which it contains, and in which its truth consists. Faith, therefore, precedes knowledge, as Anselm used to say; but its priority is that of time, not of authority.[1]

4. There remains to be taken into account the interesting question of the grounds and motives for belief. It is, of course, necessary to distinguish between these two; the *cause* of a belief may not be exactly a *reason* for it. Belief, though natural, is not always rational, but frequently rests with happy unconsciousness on foundations utterly inadequate to its support. But if we disregard this distinction and include both causes and reasons under the title principles of belief, these may be divided into three classes —(1), Testimony; (2), Feelings, Desires, or Wishes; (3), Evidence of Reason. These are rarely dissevered in actual practice. Testimony, to the reception of which the name belief is frequently restricted, is familiar enough to require no extended notice. Our natural tendency is to accept all testimony as true; it is experience alone that teaches caution. Where from the nature of the case no such experience is to be had, credulity settles down into firm and ineradicable conviction. The majority of men would be astonished to find how much their belief depends upon the society into which they have been born and in which they live. Dogmas at first forced upon a people gradually become ingrained in the minds of those brought up in habitual contact with them. There is hardly a limit to the possibility of instilling beliefs through continued custom, and no resistance to analysis is so strong as that offered by mere customary opinion, which has imperceptibly introduced itself into the very life's blood of those who share it.

The feelings, though not so directly a source of convictions as testimony, exercise an extensive and complex influence on belief. It has always been a popular saying that a man believes what he wishes—that "the wish is father to the thought;" and there can be no doubt that the superior force given to an idea by the concentration on it of desire or affection, causes it to bulk so largely in consciousness as to exclude the thought of its non-realization. The very idea of a result opposed to what we earnestly desire is unpleasant enough to make us resolutely shut it out of sight. This, however, is but a partial and limited effect. We know very well that our belief is only occasionally swayed by our wishes, and that necessity too often constrains us to believe what we willingly would not. Our volition cannot directly compel belief. But the feelings play a more important part; for it is by their means primarily that we stretch beyond the field of direct knowledge and complete our limited experience with what we feel to be necessary for the harmony of our moral and religious nature. We believe that without which our nature would be dissatisfied, and this belief takes its rise in the feelings,—the blind expressions of intellectual want,—which form the first stage towards completed insight.

It is hardly necessary to do more than refer to the rational grounds for belief. Wherever our knowledge of any object or law is incomplete, belief is ready to step in and fill up the gap by some hypothesis, which is in conformity with our experience, is rationally connected with the facts to be explained, and is not yet known to be true. Great portions of our so-called scientific knowledge are nothing but rational belief,—hypotheses unverified, perhaps even unverifiable,—and the settlement of the conditions or legitimacy of such presumptions forms the principal part of inductive logic.

Besides the works already referred to, the following treat of belief in general:—Fechner, *Drei Motive und Grunde des Glaubens*, 1863; Ulrici, *Glauben und Wissen, Spekulation und exacte Wissenschaft*, 1858; of religious belief in particular, in addition to works on dogmatic theology or philosophy of religion:—Schwarz, *Das Wesen der Religion*, 1847; Asher, *Der religiöse Glaube*, 1860; J. Köstlin, *Der Glaube*, 1860; Venn, *Hulsean Lectures for* 1869. (R. AD.)

BELISARIUS (Sclavonic, *Beli-tzar*, "White-Prince"), the greatest general of the Byzantine empire, was born about 505 A.D., at Germania, on the borders of Illyria. As a youth he served in the body-guard of Justinian, who appointed him commander of the Eastern army. He won a signal victory over the Persians in 530, and successfully conducted a campaign against them, until forced, by the rashness of his soldiers, to join battle and suffer defeat in the following year. Recalled to Constantinople, he married Antonina, a profligate, daring woman. During the sedition of the "green" and "blue" parties of the circus he did Justinian good service, effectually crushing the rebels who had proclaimed Hypatius emperor. In 533 the command of the expedition against the Vandal kingdom in Africa, a perilous office, which the rest of the imperial generals shunned, was conferred on Belisarius. With 15,000 mercenaries, whom he had to train into Roman discipline, he took Carthage, defeated Gelimer the Vandal king, and carried him captive, in 534, to grace the first triumph witnessed in Constantinople. In reward for these services Belisarius was invested with the consular dignity, and medals were struck in his honour. At this time the Ostrogothic kingdom, founded in Italy by Theodoric the Great, was shaken by internal dissensions, of which Justinian resolved to avail himself. Accordingly, Belisarius invaded Sicily; and, after storming Naples and defending Rome for a year against almost the entire strength of the Goths in Italy, he concluded the war by the capture of

[1] Notes to J. Mill's *Analysis*, i. *Cf. Dissertations*, iii.
[2] *Sensation and Intuition*. (On the Development of Belief.)
[3] It is so defined by Bain (*Ment. and Moral Sc.*, 372), who finds great difficulty in reconciling his theory with ordinary phraseology. Such an expression as the following has a curious ring:—"Belief is identical with the activity or active disposition, at the moment, and with reference to the thing *believed*."—(Note to *Analysis*, i. 395.)
[4] With this view may be compared much of what is said by J. H. Newman, *Grammar of Assent*; see specially 73, 281

See Scotus Erigena. *De Divis. Natur.*, i. 69.

Ravenna, and with it of the Gothic king Vitiges. So conspicuous were Belisarius's heroism and military skill that the Ostrogoths offered to acknowledge him Emperor of the West. But his loyalty did not waver; he rejected the proposal and returned to Constantinople in 540. Next year he was sent to check the Persian king Nushirvan; but, thwarted by the turbulence of his troops, he achieved no decisive result. On his return to Constantinople the intrigues of Antonina, whom he had confined on account of her illicit amours, caused him to be stripped of his dignities and condemned to death, and he was only pardoned by humbling himself before his imperious consort. The Goths having meanwhile reconquered Italy, Belisarius was despatched with utterly inadequate forces to oppose them. Nevertheless, during five campaigns his strategic skill enabled him to hold his enemies at bay, until he was removed from the command, and the conclusion of the war entrusted to his rival Narses. Belisarius remained at Constantinople in tranquil retirement until 559, when an incursion of Bulgarian savages spread a panic through the metropolis, and men's eyes were once more turned towards the neglected veteran, who placed himself at the head of a mixed multitude of peasants and soldiers, and repelled the barbarians with his wonted courage and adroitness. But this, like his former victories, stimulated Justinian's envy. The saviour of his country was coldly received and left unrewarded by his suspicious sovereign. Shortly afterwards Belisarius was accused of complicity in a conspiracy against the emperor; his fortune was confiscated, and himself flung into prison. His last years are shrouded in uncertainty, as they are not dealt with in the circumstantial history of Procopius; but he seems to have been liberated and reinstalled in the enjoyment of his hard-won honours before his death in 565. The fiction of Belisarius wandering as a blind beggar through the streets of Constantinople, which has been adopted by Marmontel in his *Bélisaire*, and by various painters and poets, seems to have been invented by Tzetzes, a writer of the 12th century. Gibbon justly calls Belisarius the Africanus of New Rome. But for his successes, which were achieved with most insignificant means, the effete Byzantine empire would have been dismembered among Vandals, Persians, and Goths. He was merciful as a conqueror, stern as a disciplinarian, enterprising and wary as a general; while his courage, loyalty, and forbearance seem to have been almost unsullied. Like Corbulo, the faithful general of Nero, he was suspected and persecuted by an ungrateful master; and, like him, he restored the old discipline to the troops and the ancient lustre to the Roman arms in a corrupt and nerveless age. (*Cf.* Mahon's *Life of Belisarius;* Finlay's *Greece under the Romans;* Procopius; Gibbon's *Decline and Fall*, ch. 41–43.)

BELIZE, the capital of British Honduras, and the only trading-port in the colony. It is situated on the sea-coast, at the mouth of a river of the same name, in lat. 17° 29′ N. and long. 88° 8′ W. It consists of one principal street along the shore with a number of offshoots, is for the most part well built, and has a governor's house, a fort, a courthouse, a jail, a Gothic church, a hospital, and a number of schools. The exports are principally mahogany, rosewood, cedar, logwood, cocoa-nuts, fustic, and sugar. In 1872, 379 vessels, most of them British, with a total tonnage of 32,345 tons, entered the port. Regular steamboat communication has been established with Kingston, Jamaica. The population is about 5000.

BELKNAP, JEREMY, an American clergyman and author, was born at Boston in 1744 and died in 1798. He was educated at Harvard University, where he graduated in 1762. In 1767 he was called to a Congregational church in Dover, New Hampshire, and remained there for twenty years. He then removed to the Federal Street church in Boston, which he held till his death. His principal works are—*History of New Hampshire*, 3 vols., 1784–92; *American Biography*, 2 vols., 1794–98; *The Foresters*, 1792.

BELL (from Ang. Sax. *bellan*, to resound, akin to *peal*), an open percussion instrument varying in shape and material, but usually cup-like or globular and metallic, so constructed as to yield one dominant note. This definition excludes on the score of sound the cauldrons of Dodona (*Dodonæi lebetes* of the Greek oracular temples), and also the Chinese or Indian gongs, and, on the score of shape, all drums, cymbals, the metal plates of the Romans, and resonant bars of metal or wood still used by many savage tribes.

Antiquaries have worried themselves and their readers about the antiquity of bells and to small purpose. It is doubtful whether the bells of gold (Exod. xxviii. 32, 35) were anything but jangling ornaments of some kind worn by the high priest; but Mr Layard believes that he has found some small bronze bells in the palace of Nimroud. We may gather generally that small bells long preceded large ones, which latter, however, were used in India and China long before they were known in Europe.

The Romans used bells for various purposes. Lucian, 180 A.D., mentions an instrument (*Clepsydra*) mechanically constructed with water, which rang a bell as the water flowed to measure time. Bells summoned the Romans to the public baths; they were also used in processions, and so passed naturally into the service of the Western Church. The first recorded application of them to churches is ascribed by Polydore Vergil to Paulinus (*circa* 400 A.D.) He was bishop of Nola, a city of Campania (hence *nola* and *campana*, the names of certain bells). It has been maintained that Pope Sabinianus, 604, first used church bells; but it seems clear that they were introduced into France as early as 550. In 680 Benedict, abbot of Wearmouth, imported them from Italy; and in the 7th century, Bede mentions them in England. St Dunstan hung many in the 10th century; and in the 11th they were not uncommon in Switzerland and Germany. It is incredible that the Greek Christians, as has been asserted, were unacquainted with bells till the 9th century; but it is certain that, for political reasons after the taking of Constantinople by the Turks, in 1453, their use was forbidden, lest they should provide a popular signal for revolt.

Several old bells are extant in Scotland, Ireland, and Wales; the oldest are often quadrangular, made of thin iron plates hammered and rivetted together. Dr Reeves of Lusk described in 1850 St Patrick's bell preserved at Belfast, called *Clog an eadhachta Phatraic*, "the bell of St Patrick's will." It is 6 inches high, 5 broad, 4 deep, adorned with gems and gold and silver filagree-work; it is inscribed 1091 and 1105, but is probably alluded to in Ulster annals in 552. For Scotch bells, see *Illustrated Catalogue of Archæological Museum*, Edinburgh, for 1856.

The four-sided bell of the Irish missionary St Gall, 646, is preserved at the monastery of St Gall, Switzerland. In these early times bells were usually small; even in the 11th century a bell presented to the church at Orleans weighing 2600 lb was thought large. In the 13th century larger bells were cast. The bell, Jacqueline of Paris, cast 1400, weighed 15,000 lb; another Paris bell of 1472, 25,000 lb; and the famous Amboise bell at Rouen, 1501, 36,364 lb. But there we have reached the threshold of the golden age of bells, of which more anon.

Before we enter on the history and manufacture of the bell in Europe it is worth while to enumerate the different kinds of bells named by Hieronymus Magius in his work *De Tintinnabulis*:—1. *Tintinnabulum*, a little bell, otherwise called *tinniolum*, for refectory or dormitory, according to Belethus, but Durandus names *squilla* for the refectory; 2. *Petasius*, or larger "broad-brimmed hat" bell; 3. *Codon*, orifice of trumpet, a Greek hand-bell; 4. *Nola* (see *ante*), a very small bell, used in the choir, according to Durandus; 5. *Campana* (see *ante*), a large bell, first used in the Latin churches in the steeple (Durandus), in the tower (Belethus); 6. *Squilla*, a shrill little bell. We read of *cymbalum* for the cloister (Durandus), or *campanella* for the cloister (Belethus); *nolula* or *dupla* in the clock; *signum* in the tower. There was also a bell called *corrigiuncula*, to summon the monks at scourging time.

We shall now give a brief account of the manufacture of the bell proper, *i.e.*, the church bell of the last five centuries. It must not be supposed that the early bell-founders understood all the principles of construction, mixture of metals, lines, and proportions which go to form our notion of a good bell As the Amati or Stradiuarius violin is the result of innumerable experiments extending over centuries, so the bells of Van den Gheyn (1550) and Hemony (1650) disengaged themselves after ages of empirical trials as the true models, and supplied the finished type for all succeeding bell-workers.

Bell-metal is a mixture of copper and tin in the proportion of 4 to 1. In Henry III.'s reign it was 2 to 1. In Mr Layard's Nineveh bronze bells, it was 10 to 1. Zinc and lead are used in small bells. The thickness of the bell's edge is 1·15th of its diameter, and its height is twelve times its thickness.

Bells, like viols, have been made of every conceivable shape within certain limits. The long narrow bell, the quadrangular, and the mitre-shaped in Europe at least indicate antiquity, and the graceful curved-inwardly-midway and full trumpet-mouthed bell indicates an age not earlier than the 16th century.

The bell is first designed on paper according to the scale of measurement. Then the crook is made, which is a kind of double wooden compass, the legs of which are respectively curved to the shape of the inner and outer sides of the bell, a space of the exact form and thickness of the bell being left betwixt them. The compass is pivotted on a stake driven into the bottom of the casting-pit. A stuffing of brickwork is built round the stake, leaving room for a fire to be lighted inside it. The outside of this stuffing is then padded with fine soft clay, well mixed and bound together with calves' hair, and the inner leg of the compass run round it, bringing it to the exact shape of the inside of the bell. Upon this *core*, well smeared with grease, is fashioned the false clay bell, the outside of which is defined by the outer leg of the compass. Inscriptions are now moulded in wax on the outside of the clay-bell; these are carefully smeared with grease, then lightly covered with the finest clay, and then with coarser clay, until a solid *mantle* is thickened over the outside of the clay bell. A fire is now lighted, and the whole baked hard; the grease and wax inscriptions steam out through holes at the top, leaving the sham clay bell baked hard and tolerably loose, between the *core* and the *cope* or *mantle*. The cope is then lifted, the clay bell broken up, the *cope* let down again, enclosing now between itself and the *core* the exact shape of the bell. The metal is then boiled, and run molten into the mould. A large bell will take several weeks to cool. When extricated it ought to be scarcely touched, and should hardly require tuning. This is called its maiden state, and it is one so sought after that many bells are left rough and out of tune in order to claim it.

A good bell, when struck, yields one note, so that any person with an ear for music can say what it is. This note is called the *consonant*, and when it is distinctly heard the bell is said to be "true." Any bell of moderate size (little bells cannot well be experimented upon) may be tested in the following manner:—Tap the bell just on the curve of the top, and it will yield a note one *octave* above the consonant. Tap the bell about one quarter's distance from the top, and it should yield a note which is the *quint* or fifth of the octave. Tap it two quarters and a half lower, and it will yield a *tierce* or third of the octave. Tap it strongly above the rim where the clapper strikes, and the quint, the tierce, and the octave will now sound simultaneously, yielding the consonant or key-note of the bell.

If the tierce is too sharp the bell's note (*i.e.*, the consonant) wavers between a tone and a half-tone above it; if the tierce is flat the note wavers between a tone and a half-tone below it; in either case the bell is said to be "false." A sharp tierce can be flattened by filing away the inside of the bell just where the tierce is struck; but if the bell when cast is found to have a flat tierce there is no remedy. The consonant or key-note of a bell can be slightly sharpened by cutting away the inner rim of the bell, or flattened by filing it a little higher up inside, just above the rim. (See H. R. Haweis's *Music and Morals*, 5th edition, p. 429.)

The quality of a bell depends not only on the casting and the fineness and mixture of metals, but upon the due proportion of metal to the calibre of the bell. The larger the bell the lower the tone; but if we try to make a large E bell with metal only enough for a smaller F bell, the E bell will be puny and poor. It has been calculated that for a peal of bells to give the pure chord of the ground tone or key-note, third, fifth, and octave, the diameters are required to be as thirty, twenty-four, twenty, fifteen, and the weights as eighty, forty-one, twenty-four, and ten.

The history of bells is full of romantic interest. In civilized times they have been intimately associated, not only with all kinds of religious and social rights, but with almost every important historical event. Their influence upon architecture is not less remarkable, for to them indirectly we probably owe all the most famous towers in the world. Grose in his *Antiquities* observes, "Towers at first scarcely rose above the roof, being intended as lanterns for the admission of light, an addition to the height was in all likelihood suggested on the more common use of bells."

Bells early summoned soldiers to arms, as well as citizens to bath or senate, or Christians to church. They sounded the alarm in fire or tumult; and the rights of the burghers in their bells were jealously guarded. Thus the chief bell in the cathedral often belonged to the town, not to the cathedral chapter. The curfew, the Carolus, and St Mary's bell in the Antwerp tower all belong to the town; the rest are the property of the chapter. He who commanded the bell commanded the town; for by that sound, at a moment's notice, he could rally and concentrate his adherents. Hence a conqueror commonly acknowledged the political importance of bells by melting them down; and the cannon of the conquered was in turn melted up to supply the garrison with bells to be used in the suppression of revolts. Many a bloody chapter in history has been rung in and out by bells.

On the third day of Easter 1282, at the ringing of the Sicilian vespers, 8000 French were massacred in cold blood by John of Procida, who had thus planned to free Sicily from Charles of Anjou. On the 24th of August, St Bartholomew's day, 1571, bells ushered in the massacre of the Huguenots in France, to the number, it is said, of 100,000. Bells have rung alike over slaughtered and ransomed cities; and far and wide throughout Europe in the hour of victory or irreparable loss. At the news of Nelson's triumph and death at Trafalgar, the bells of Chester rang a merry peal alternated with one deep toll, and similar

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 (4½ tons) first rang when Carl the Bold entered Antwerp 1467. St Antoine is another celebrated bell, and the favourite Carolus, given by Charles V. (7½ 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 gloriæ Christæ 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 vitæ
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, Paco 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 eum."
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 beatæ Mariæ.
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 thirtye 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 *morceaux fugués* discovered by the Chevalier van Elewyck, in the archives at Louvain, the work of the celebrated organist and carilloneur 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, *Tintinalogia*, 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; Nôtre 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 play-things.

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