

*catholica*, dates from 380. Till then exclusion from church privileges had been a spiritual discipline merely; thenceforward it was to expose a man to serious temporal risks. Excommunication still continued to be occasionally used in the spirit of genuine Christian fidelity, as by Ambrose in the case of Theodosius himself (390); but the temptation to wield it as an instrument of secular tyranny too often proved to be irresistible. In the formula used by Synesius (410), which is to be found in Bingham and in most other works of reference, we already find the attention of magistrates specially called to the censured person. The history of the next thousand years shows that the magistrates were seldom slow to respond to the appeal. Even the hasty survey of that long and interesting period enables the student to notice a marked development in the theory and practice of excommunication. One or two points may be specially noted. (1.) While it had been held as an undoubted principle by the ancient church that this sentence could only be passed on living individuals, whose fault had been distinctly stated and fully proved, we find the mediæval church on the one hand sanctioning the practice of excommunication of the dead (Morinus, *De Pœnit.*, x., c. 9), and, on the other hand, by means of the papal interdict, excluding whole counties and kingdoms at once from every church privilege. The earliest well-authenticated instance of such an interdict is that which was passed (998) by Pope Gregory V. on France, in consequence of the contumacy of King Robert the Wise. Other instances are those laid respectively on Germany in 1102 by Gregory VII. (Hildebrand), on England in 1208 by Innocent III., on Rome itself in 1155 by Adrian IV. (2.) While in the ancient church the language used in excommunicating had been carefully measured, we find an amazing recklessness in the phraseology employed by the mediæval clergy. The curse of Ernulfus or Arnulfus of Rochester (cir. 1100), which has been made familiar to most students of English literature, is a very fair specimen of that class of composition. With it may be compared the formula transcribed by Dr Burton in his *History of Scotland* (iii. 317 ff.). To the spoken word was added the language of symbol. By means of lighted candles violently dashed to the ground and extinguished the faithful were graphically taught the meaning of the greater excommunication,—though in a somewhat misleading way, for it is a fundamental principle of the canon law that *disciplina est excommunicatio, non eradicatorio*. The first instance, however, of excommunication by "bell, book, and candle" is comparatively late (cir. 1190).

At the Reformation the necessity for church discipline did not cease to be recognized; but the administration of it in many Reformed churches passed through a period of some confusion. In some instances the old episcopal power passed more or less into the hands of the civil magistrate (a state of matters which was highly approved by Erastus and his followers), in other cases it was conceded to the presbyterial courts. In the Anglican Church the bishops (subject to appeal to the sovereign) have the right of excommunicating, and their sentence, if sustained, may in certain cases carry with it civil consequences.

In the law of England sentence of excommunication, upon being properly certified by the bishop, was followed by the writ *de excommunicato capiendo* for the arrest of the offender. The statute 5 Eliz. c. 23 provided for the better execution of this writ. By the 53 Geo. III. c. 127 (which does not, however, extend to Ireland) it was enacted that "excommunication, together with all proceedings following thereupon, shall in all cases, save those hereafter to be specified, be discontinued." Disobedience to or contempt of the ecclesiastical courts is to be punished by a new writ *de contumace capiendo*, to follow on the certificate of the judge that the defender is contumacious and in contempt.

Sect. 2 provides that nothing shall prevent "any ecclesiastical court from pronouncing or declaring persons to be excommunicate on definite sentences pronounced as spiritual censures for offences of ecclesiastical cognizance." No persons so excommunicated shall incur any civil penalty or incapacity whatever, save such sentence of imprisonment, not exceeding six months, as the court shall direct and certify to the Queen in Chancery.

In Scotland, three degrees of church censure are recognized—admonition, suspension from sealing ordinances (which may be called temporary excommunication), and excommunication properly so called. Intimation of the last-named censure is occasionally (but very rarely) given by authority of a presbytery in a public and solemn manner, according to the following formula:—"Whereas thou N. hast been by sufficient proof convicted of (here mention the sin) and after due admonition and prayer remainest obstinate without any evidence or sign of true repentance; Therefore in the name of the Lord Jesus Christ, and before this congregation, I pronounce and declare thee N. excommunicated, shut out from the communion of the faithful, debar thee from privileges, and deliver thee unto Satan for the destruction of thy flesh, that thy spirit may be saved in the day of the Lord Jesus." This is called the greater excommunication. The congregation are thereafter warned to shun all unnecessary converse with the excommunicate. (See *Form of Process*, c. 8.) Formerly excommunicated persons were deprived of feudal rights in Scotland; but in 1690 all Acts enjoining civil pains upon sentences of excommunication were finally repealed (Burton's *History*, vii. 435). (J. S. BL.)

EXECUTORS AND ADMINISTRATORS, in the law of England, are those on whom the personal property of a deceased person devolves, according as he has or has not left a will. If a man dies and leaves a will, the person or persons named therein to carry out his intentions are his executors, and their title to the personality vests at the moment of the testator's death. If there is no will, the right of administering the personal estate of the deceased is granted, according to certain rules, by the court of probate to persons who are called administrators. When the will contains no nomination of executors, administration is said to be granted "with the will annexed." The title of the administrator vests at the date of the letters of administration. As to the appointment of executors and administrators before the establishment of the Court of Probate, see articles WILL and INTESTACY. The executors or administrators when appointed become the legal personal representatives of the deceased. As to powers and duties administrators stand in the same position as executors.

It is the duty of an executor—(1) to bury the deceased in a manner suitable to the estate he leaves behind him; extravagant expenses will not be allowed, but the payment of legitimate funeral expenses "takes precedence of any debt or duty whatsoever;" (2) to obtain probate of the will (or letters of administration) within six months after the death. (3) He must make an inventory of the personal estate of the deceased, whether in possession or outstanding, and this inventory he is to deliver to the court on oath. He is to collect all the goods so inventoried and to commence actions which may be necessary to recover those which are outstanding. The executor is responsible to creditors for the whole of such estate, whether in possession or in action. (4) He must pay the debts of the deceased according to their several degrees of priority. An executor can, however, pay any debt due to himself by retaining it out of the fund before the other creditors are paid, except in the case of an executor *de son tort*. And a creditor only gains a preference for himself over others of the same class by taking action and obtaining judgment for his debt. If the

estate is exhausted by due and proper payments before all the debts are cleared off, the unsatisfied creditors cannot recover. (5) After the debts come the *legacies*, which must be paid as far as the estate will extend. An executor cannot exercise a preference in the payment of his own legacy. (6) The residue of the estate must be paid to the person named in the will as residuary legatee. If there is no will or no residuary legatee named, the residue falls to be distributed among the next of kin, under the statute of distributions (see INTESTACY). It was held at one time that in default of a residuary legatee the residue fell to the executor himself, but now nothing less than the expressed intention of the testator can give it to him.

An executor *de son tort* (of his own wrong) is one who intermeddles with the estate of a deceased without authority. He thereby makes himself liable to all the trouble of an executorship without any of its profits.

If an executor is under age or abroad when he is appointed, temporary administration *durante minore etate*, or *durante absentia*, may be granted to another.

An executor of an executor becomes the executor of the first testator. If, however, an executor dies intestate before completing the administration of the estate, an administrator *de bonis non* must be appointed. This is also the case where an administrator dies before the administration is complete. (E. R.)

EXELMANS, RENE JOSEPH ISIDORE (1775-1852), a distinguished French general, was born at Bar-le-Duc, November 13, 1775. He volunteered into the 3d battalion of the Meuse in 1791, became lieutenant in 1797, and in 1798 was attached as aide-de-camp to General Eblé. In his first campaign in Italy he greatly distinguished himself; and in April 1799 he was rewarded for his services by the grade of captain in the 16th regiment of dragoons. In the same year he took part with honour in several battles connected with the conquest of Naples, and was promoted to the rank of major; and in 1801 he became aide-camp to General Murat. He was named chief of a squadron in 1803, and he accompanied Murat in the Austrian, Prussian, and Polish campaigns of 1805, 1806, and 1807. At the passage of the Danube, and in the battle of Wertingen, he specially distinguished himself; he was made colonel of the 1st regiment of chasseurs for the valour which he displayed at Austerlitz; and after the battle of Eylau in 1807 he obtained the rank of brigadier-general. In 1808 he accompanied Murat to Spain, but was there made prisoner and conveyed to England. On regaining his liberty in 1811 he went to Naples, where King Murat appointed him grand master of horse; but when Murat became estranged from Napoleon, Exelmans left his court and joined the French army. Napoleon was then entering on his Russian campaign, and gave him welcome and immediate employment as a general of division. He was present at the battle of Moscow, and in the famous retreat from that city his steadfast courage was conspicuously manifested on several occasions. In 1813 he received, for services in the campaign of Saxony, the decoration of the Legion of Honour; and in 1814 he reaped additional glory by his intrepidity and skill in the campaign of France. When the Bourbons were restored in 1815 he retained his position in the army, but this did not prevent Napoleon on his return from Elba from intrusting him with the command of the 2d army corps. After the second Restoration he was proscribed, and lived in Belgium, and subsequently in Nassau, till 1819, when he was recalled to France. In the following year he was appointed to an inspector-generalship of cavalry; and after the July revolution of 1830 he received from Louis Philippe the grand cross of the Legion of Honour, and was created a peer of France. In the House of Peers he denounced the execution of Marshal Ney

as an "abominable assassination." At the revolution of 1848 Exelmans was one of the adherents of Louis Napoleon; and in 1851 he was, in recognition of his long and brilliant military career, raised to the dignity of a marshal of France. His death, 10th July 1852, was the result of a fall from his horse.

EXETER, the chief town of Devonshire, in England, a city which is a county in itself, and a municipal and parliamentary borough, stands on the Exe, about ten miles north-west of the mouth of the river, where it opens to the English Channel. The distance of Exeter from London is 194 miles. The ancient city (round which suburbs have extended) occupies a broad ridge of land, which rises steeply from the left bank of the Exe. At the head of the ridge is the castle, on the site of a great British earthwork. This was the stronghold of *Caer Isc* (so named from the river Isc or Exe, meaning water); and the British town became the *Isca Damnoniorum* of the Romans, just as *Isca Silurum* was the Roman name of Caerleon on the *Usk*, in South Wales. Roman coins, tessellated pavements, pottery, and sepulchral urns have been found from time to time, proving that the station was one of importance. It was one of the few cities in Britain which were not deserted at the time of the Saxon Conquest; and when Athelstan came westward about 926, he found *Eacanceaster*, the "chester" or fortified town on the Exe, as the Saxons called it, occupied by Britons and Saxons *æquo jure*. The ground plan of the city indicates its



Plan of Exeter.

Romano-British origin, since the principal streets cross each other nearly in the centre. The main or High Street is, in fact, a portion of the Roman road which extended from the eastern border of the county to the Tamar. Exeter was more than once attacked by the Northmen; but the walls which had been constructed by Athelstan greatly protected the "burgh;" and in 1050 the episcopal see of Devonshire, which had been founded at Crediton about 910, was removed, for greater security, to Exeter.

The position of Exeter, and its importance as the principal city of the western peninsula, have affected the whole course of its history, and led to its numerous sieges. In 1068 the Conqueror appeared before Exeter, beleaguered it

for eighteen days, and then received the submission of its citizens. He afterwards founded the castle, known as "Rougemont," from the red colour of the rock on which it stands. The castle was held for Matilda in 1137 by Baldwin de Redvers, earl of Devon; and King Stephen took it after a siege of three months. Exeter was Lancastrian, and in 1469 held out successfully against Sir William Courtenay and the Yorkists. In 1497 it was besieged by Perkin Warbeck, and in 1549 for thirty-five days by the men of Devon and Cornwall, who rose in defence of the "old religion." The city was taken and retaken during the civil war; and the queen gave birth there to the Princess Henrietta, afterwards duchess of Orleans. After that period the most noticeable event is the entry of the prince of Orange (William III.) in November 1688. His "declaration" was then read by Burnet in the cathedral.

The High Street of Exeter and its continuation, called Fore Street, are narrow, but very picturesque, with many old houses of the 16th and 17th centuries. There is a tangle of lesser streets within the walls, the line of which may be traced. All the gates have been destroyed. The suburbs, which have greatly extended since the beginning of the present century, contain many good streets, terraces, and detached villas. The surrounding country is not only rich and fertile, but is of great beauty. Extensive views are commanded in the direction of Haldon, a stretch of high moorland which may be regarded as an outlier of Dartmoor. The lofty mound of the castle has been laid out as a promenade, with fine trees and broad walks. The city is the centre of the system of western railways. London may be reached either by the Great Western (Bristol and Exeter) line, or by the South-Western, passing by Salisbury and Basingstoke. The distance in both cases is about the same. The North Devon railway runs from Exeter by Crediton to Barnstaple and Ilfracombe; and the South Devon by Teignmouth and Totnes to Plymouth, and thence into Cornwall. There is also a line to Plymouth belonging to the South-Western Company, which passes inland by Lidford and Tavistock.

The population of Exeter in 1871 was 34,650 within the municipal limits. The parliamentary borough contained 44,226 persons. The city, of which the earliest recorded charter was granted by Henry I., has returned two members of parliament since the reign of Edward I. It is situated in the parliamentary division of East Devon. Assizes for the county of Devon are held twice in the year at Exeter, in the assize hall within the castle. The most important buildings in the city are the cathedral, the guildhall, and the Albert Memorial museum; and the remains of the castle are also of interest.

The cathedral, although not one of the largest in England, is inferior to none in the great beauty of its architecture and in the richness of its details. With the exception of the Norman transeptal towers, the general character is Decorated, ranging from about 1280 to 1369. On the exterior the great peculiarities are the towers mentioned above and the west front, which is of later date than the rest of the church (probably 1369-1394), and is adorned with statues. Transeptal towers occur elsewhere in England only in the collegiate church of Ottery, in Devonshire, where the cathedral served as a model. Within, the points to be specially noted are—the long unbroken roof, extending throughout nave and choir (there is no central tower or lantern); the beautiful sculpture of bosses and corbels; the minstrel's gallery, projecting from the north triforium of the nave; and the remarkable manner in which

the several parts of the church are made to correspond. The window tracery is much varied; but each window answers to that on the opposite side of nave or choir; pier answers to pier, aisle to aisle, and chapel to chapel, while the transeptal towers complete the balance of parts. A complete restoration of the cathedral, under Sir G. G. Scott, was begun in 1870 and completed in 1877. The new stall work, the reredos, the choir pavement, of tiles, rich marbles, and porphyries, the stained glass, chiefly by Clayton and Bell, and the sculptured pulpits in choir and nave are of the highest merit. The ancient episcopal throne, a sheaf of tabernacle work in wood, erected by

Bishop Stapledon about 1320, has been cleaned and renovated; and the organ, of which the pipes are of very nearly pure tin, has been rearranged. The most interesting monuments are those of bishops of the 12th and 13th centuries, in the choir and lady chapel. Some important MSS., including the famous book of Saxon poetry given by Leofric to his cathedral, are preserved in the chapter house. The united sees of Devonshire and Cornwall were fixed at Exeter from the installation there of Leofric (1050) by the Confessor, until the re-erection of the Cornish see in 1876.

The Guildhall in the High Street is a picturesque Elizabethan building, which contains some interesting portraits. Among them are a full-length of General Monk, duke of Albemarle, born in Devon (engraved in Lodge), and a full length (given by Charles II.), of the Princess Henrietta. Both are by Sir Peter Lely. The Albert Memorial Museum in Queen Street was designed by Hayward of Exeter (1865). Devonshire materials have been chiefly used in its construction. The building, which is of considerable size, contains a school of art, an excellent free library, a reading room, and a museum of natural history and antiquities. There is a good collection of local birds, and some remarkable pottery and bronze relics extracted from barrows near Honiton or found in various parts of Devonshire. Of the Castle the chief architectural remain is a portion of a gateway tower which may be late Norman. Huge dykes and trenches of the British period exist in an adjoining garden. The parish churches of Exeter are of small importance, but the modern church of St Michael (1860) deserves notice. It is sufficient to mention the Devon and Exeter Institution, founded in 1813, which contains a large and valuable library; the diocesan training college and school; and the grammar school, which dates from the reign of Henry VIII. There are two market houses in the city, many hospitals, and many charitable institutions.

Exeter has few manufactures; and Devonshire or Honiton lace, for which it is celebrated, is made quite as much in the villages of the south coast as in and around Exeter itself, although it is chiefly brought to the city for sale. There is a considerable trade of a miscellaneous description. Hides from South America, wines from Portugal and Spain, fruits and valonia from the Mediterranean, and coal from the northern counties and Wales are imported. Leather, paper, eorn, and cider are sent to London and other parts of the country. The woollen trade has quite passed away from Exeter, although it was at one time so considerable that it was only exceeded by that of Leeds, and the value of exported goods in 1768 exceeded half a million annually. The Ship Canal, from Exeter to Topsham, in the estuary of the Exe, greatly assisted this commerce. It was begun in 1564, enlarged in 1675, and again in 1827. Vessels of 300 tons can come up to the quay at Exeter; those of greater burden remain at



Arms of Bishopric.

Topsham; and those of the largest size lie at Exmouth, at the outfall of the river.

**Bibliography.**—Of older histories the most important is Izaak's *Antiquities of Exeter*, 1681. The best later authorities are *The History of the City of Exeter*, by the Rev. G. Oliver, 1861; *Lives of the Bishops of Exeter and History of the Cathedral*, by the Rev. G. Oliver, 1861; *Archdeacon Freeman's History of Exeter Cathedral*, 1874; and *Murray's Handbook for the Southern Cathedrals of England* (Exeter),—see edition of 1876. (R. J. K.)

**EXHIBITIONS.** National and International Exhibitions may be ranked among the most remarkable features in the industrial records of the world, and have taken their place as prominent instruments of civilization, for by their means the diffusion of knowledge has been advanced and extended in the most wonderful manner.

It is to the Society of Arts that the credit is due of having originated national exhibitions. So far back as the year 1761 that body offered prizes for agricultural and other machines, and had an exhibition of these in its apartments. In 1798 France began a series of national exhibitions under the direction of Napoleon. The exhibitors at first numbered only 110, and a jury of nine was appointed to decide upon their merits. A gold medal was offered to the manufacturer who should deal the heaviest blow to English trade. The second exposition took place in 1801, and was so successful that the third was fixed to take place in 1802. Expositions were subsequently held in 1806, 1819, 1823, 1827, 1834, 1839, 1844, and in 1849, in which year there were 4494 exhibitors. This last was the conclusion of the purely national displays in France before the great London international exhibition of 1851. So exclusive were the French at that time that a proposal made for the representation of foreign products in 1849 was deemed by the minister of commerce to have emanated from the enemies of French industry.

In 1820 a series of exhibitions were opened in various cities of Austria, and national exhibitions were held at Vienna in 1835, 1839, and 1845, which last had 1865 exhibitors. In Germany there were national exhibitions at Berlin in 1822 and 1827, and in 1844 one with 3060 exhibitors. National exhibitions were held in Saxony between 1824 and 1845, in which last year there were 6013 exhibitors. Between 1837 and 1848 exhibitions were held at Lausanne, Berne, St Gall, and Zurich in Switzerland; between 1835 and 1850 at Brussels and Ghent in Belgium; between 1823 and 1844 at Stockholm in Sweden; between 1829 and 1849 at St Petersburg, Moscow, and Warsaw in Russia; between 1844 and 1849 at Lisbon in Portugal; between 1829 and 1855 in the kingdom of Sardinia; between 1827 and 1850 at Madrid; between 1828 and 1844 at New York and Washington in the United States.

In the United Kingdom industrial displays had to fight their way against much apathy and prejudice. In 1828 an exhibition was formed in London under the patronage of George IV., which dragged out an unfortunate existence till 1833, when it was consigned to oblivion as an unsuccessful bazaar. In Ireland exhibitions of native industry were held triennially in the rooms of the Royal Dublin Society, commencing in 1829. In 1845, however, an exhibition of manufactures held in Covent Garden, London, proved a great success; and in 1849 an exposition of industry was held at Birmingham, which was the most complete of any held till that time in the country.

After various proposals made by the Society of Arts between 1846 and 1849, it was held that the great object of an international exhibition of industry was more likely to be carried out than hitherto, and at last a royal commission was issued to take steps for an industrial exhibition to be held in 1851. The commissioners received a site of upwards of 18 acres in Hyde Park, and erected the building known as the "Crystal Palace" from the designs of Mr

(afterwards Sir) Joseph Paxton. Its general plan was a parallelogram 1848 feet long by 408 feet wide. There was also a projection on the north side 936 feet long, the whole covering a space of 1,000,000 square feet. The exhibition had four great departments,—raw material, machinery, manufactures, fine arts,—which were subdivided into 30 classes; and this arrangement has been usually followed in the great exhibitions since held. In allocating the space for the display of objects one-half was given to England and the colonies, the other half to foreign countries. The estimated value of the articles exhibited, excluding the famous Koh-i-noor diamond, was £1,781,929. This exhibition was opened on 1st May by Queen Victoria in person, and was closed on 11th October following, and the receipts exceeded the expenditure by a sum of £213,305. The building was afterwards removed to Sydenham, where it forms the main part of the present "Crystal Palace."

The success of the Great Exhibition of 1851 encouraged the repetition of similar displays all over the world, a list of which will be found in the table given below.

In 1855 the great Paris international exhibition was held, which was opened by the emperor of the French on 17th May. The buildings for this exhibition were of various kinds. There were the palais d'industrie, the palais des beaux arts, and the panorama; erections were afterwards added for agricultural implements, carriages, minor articles, &c. The main building, which was of stone, brick, and glass, was only 800 feet long by 350 feet wide. This exposition brought together an assemblage of objects in the industrial and fine arts such as had never been seen before. The distinguishing feature of the palais d'industrie was its collection of the works of living artists, while the London exhibition of 1851 was principally a display of manufactured goods. The exposition was closed on the 15th November, when the distribution of medals to about 12,000 exhibitors took place.

In 1862 the second great English international exhibition was held in London in an immense brick erection adjoining the gardens of the Horticultural Society at South Kensington. The building consisted of two vast domes of glass, 250 feet high and 60 feet in diameter, larger than the dome of St Peter's, connected by a nave 800 feet long, 100 feet high, and 83 feet wide, with a closed roof lighted by a range of windows after the manner of the clerestory of a Gothic cathedral. The domes opened laterally into spacious transepts, and the nave into a wide central avenue and interminable side aisles and galleries roofed with glass. These apartments occupied 16 acres, but in addition there were two annexes which covered 7½ acres. The ceremonial with which this exhibition was inaugurated on 1st May was the most imposing public pageant which had been seen in Britain for many years. The number of exhibitors in the industrial division was 26,348, besides 2305 in art, making in all 28,653. The fine art collection was very extensive, comprising 901 pieces of sculpture, 1275 engravings, 983 architectural designs, and no less than 3370 paintings. The classification of the objects was based upon that of 1851, and embraced 36 divisions, in addition to those of the fine arts.

In April 1867 a great international *exposition universelle* was opened in Paris in an immense oval building erected in the Champ de Mars. It was arranged in twelve concentric aisles, with a small open central garden. It covered no less than 37 acres, and the total number of exhibitors was 42,000. It was intended to bring into notice all the resources which industry can create for satisfying the requirements of mankind, and it was divided primarily into groups corresponding with the leading wants of the human family. A great feature was the display of actual examples of the styles of domestic and palatial architecture of most



1804 he was made rear-admiral of the blue, and appointed commander-in-chief in India, where, by his vigilance and rapidity of movement, he entirely cleared the seas of French cruisers, and secured complete protection to English commerce. He returned to England in 1809, and in 1810 was appointed commander-in-chief in the North Sea, and in 1811 commander-in-chief in the Mediterranean. In 1814 he was created Baron Exmouth of Canonteign, and in the following year was made K.C.B., and a little later G.C.B. When the dey of Algiers, in 1816, violated the treaty for the abolition of slavery, Exmouth was directed to attack the town. Accordingly, on the 26th August, he engaged the Algerine battery and fleet, and after a severe action of nine hours' duration, he set on fire the arsenal and every vessel of the enemy's fleet, and shattered her sea defences into ruins. At the close of the action the dey apologized for his conduct, and agreed to a renewal of the treaty, at the same time delivering up 1800 persons of various nations who had been Algerine slaves. For this splendid victory Exmouth was advanced to the dignity of Viscount. Shortly before his death, which took place 23d January 1833, he was made vice-admiral. A Life of Exmouth, by Edward Osler, was published in 1835.

EXODUS. See PENTATEUCH.

EXORCISM, the act of expelling evil spirits from persons or places by means of certain adjurations and ceremonies, appears in the present custom or past history of almost every nation of the world. Its importance is greatest among barbarous peoples, whose belief in attacks of demons furnishes them with a general theory to account for misfortunes, mysterious events, and especially all diseases of body or mind, so that the exorcists, who are usually priests or sorcerers, become in fact the recognized order of physicians (see article DEMONOLOGY). From among the numerous accounts of modes of exorcism among rude tribes may be instanced that among the Dakota Indians, where the medicine-man summoned to cure a sick person chants "hi-le-li-lah!" to the accompaniment of a gourd rattle, and sucks at the part affected till the possessing spirit is supposed to come out and take flight, when men in waiting at the tent-door fire guns at it (Schoolcraft, *Indian Tribes of North America*, part i. p. 250, part ii. p. 199); and that of the Zulus, among whom the ghosts of the dead who enter men's bodies and cause disease are got rid of by the sacrifice of cattle, with expostulations, such as, "I say, cease; leave off making me ill" (Callaway, *Religious System of the Amazulu*, p. 157). In the most ancient known civilizations we find records of exorcism. An Egyptian tablet records the possession of a princess of the land of Bakhten by a demon, and the exorcism of this spirit by the god Khonsu, who was sent thither in his ark and cured her at once, the spirit saying, "Thou hast come in peace, great god, driver away of possessors. I am thy slave, I will go to the place whence I came" (Birch, in *Records of the Past*, vol. iv. p. 53). Among the formulas of ancient Babylonian exorcism are such as these:—"May the noxious spirit of the neck, the noxious wind, from the man himself and the clothing of the body be driven forth!" "From the burning spirit of the entrails, which devours the man, may the king of heaven preserve!" (Sayce, in *Records of the Past*, vol. i. p. 131). In Greece men of no less distinction than Epicurus and Eschines were the sons of women who lived by the exorcist's art; and both were bitterly reproached, the one by the Stoics, and the other by Demosthenes (*De Cor.*), for having assisted their parents in these practices. This power was in some instances considered as a divine gift; in others it was thought to be required by investigations into the nature of demons and the qualities of natural productions, as herbs, stones, &c., and by the use of certain forms of adjurations and ceremonies.

The power of expelling demons Josephus places among the endowments of Solomon, and relates that he left behind him the manner of using exorcisms by which they drive away demons. (For the pretended fragments of these books see Fabricius, *Cod. Pseud. Vet. Test.*, p. 1054.) He relates that he had seen a man named Eleazar releasing people that were demoniacal, in the presence of Vespasian, his sons, captains, and soldiers, by means of a certain root set in a ring, on the application of which to the nose of the patient, the devil was expelled through his nostrils. (See *Antiq.* viii. 2, § 5; and *De Bell. Jud.* vii. 6, § 3.) The profession of exorcist was not uncommon among the Jews; and the epithet applied to such persons (*περιερχομένον*; *Vulg.*, *de circumventibus Judæis*) perhaps indicates that they were travelling mountebanks. The passages of the New Testament which refer to the exorcism of demons from epileptic, insane, and other diseased persons are too numerous and well known to require particular reference. The prominence of exorcism in the early ages of the Christian church appears from its frequent mention in the writings of the fathers, and by the 3d century there seems to have been an order of exorcists (see Bingham, *Antiquities of the Christian Church*). The ancient rite of exorcism in connexion with baptism is still retained in the Roman ritual, as is also a form of service for the exorcising of possessed persons. The exorcist signs the possessed person with the figure of the cross, desires him to kneel, and sprinkles him with holy water; after which the exorcist asks the devil his name, and abjures him by the holy mysteries of the Christian religion not to afflict the person possessed any more. Then, laying his right hand on the demoniac's head, he repeats the form of exorcism as follows: "I exorcise thee, unclean spirit, in the name of Jesus Christ; tremble, O Satan, thou enemy of the faith, thou foe of mankind, who hast brought death into the world, who has deprived men of life, and hast rebelled against justice, thou seducer of mankind, thou root of evil, thou source of avarice, discord, and envy." Houses and other places supposed to be haunted by unclean spirits are likewise to be exorcised with similar ceremonies.

EXPIATION or ATONEMENT, DAY OF (*יום הכיפורים*, *ἡμέρα ἐξέλασμού*), called in the Mishna simply "the Day," the only fast enjoined by the Mosaic legislation, occurred annually on the tenth day of the 7th month (Tisri). The laws for its observance are given in Lev. xvi. 1-34, xxiii. 27-32, and Numb. xxix. 7-11. The high priest was to enter the Most Holy Place according to a minutely detailed ritual, and so "make an atonement for" (*קָפַר*) the sanctuary, the tabernacle, the altar, the priests, and all the people. From the one evening to the other the people were enjoined, under the severest penalties, to "afflict their souls," and observe a "perfect sabbath."

EXPLOSIVES. It lies beyond the object of this article to attempt an estimate of the influence, direct or indirect, upon modern civilization of the introduction of explosive agents for the purposes of war. Some eminent authors have gone so far as to consider the invention of gunpowder as next in importance, in its ultimate effects, to those of printing and the application of steam power. However this may be, it is well to remember that explosive substances are now of immense utility in the arts of peace; indeed, it is not too much to say that without their aid many of the great engineering enterprises of the present day would either be impossible, or else have to be carried out at a vast additional expenditure of time and labour.

The germ of all the knowledge of explosive reaction we possess undoubtedly lay in the probably accidental discovery, many ages ago, of the deflagrating properties of the natural substance nitre or saltpetre (KNO<sub>3</sub>), when in contact with incandescent charcoal. To trace the consequences

of that discovery, very gradual as they have been, and intimately bound up with the progress of chemical and mechanical science, belongs rather to an article on gunpowder; but the fact may be briefly referred to in connexion with the second great epoch in the history of explosive substances. By distilling nitre with oil of vitriol, the alchemists obtained a corrosive fluid which they called *aqua fortis*, now known as nitric acid (HNO<sub>3</sub>), which parts with its oxygen even more readily than saltpetre; so that if the strongest nitric acid be poured upon finely powdered charcoal, the latter takes fire at the ordinary temperature. Somewhat less than half a century back, it was discovered by some French chemists that upon treating various organic substances, such as starch, the sugars, cotton fabrics, and even paper, with concentrated nitric acid under proper precautions, the chemical constitution of the substances underwent a great change, and they became endowed with violently explosive properties, while remaining for the most part unaltered in external characteristics. To this discovery we owe a distinct class of explosive compounds, the most powerful for practical purposes as yet known; their general formation and properties will be noticed in due course.

We will now proceed to examine into those principles of constitution and action which are more or less common to all explosive substances.

Defini-  
tions.

As the term is often rather loosely employed, "explosion" may for our purpose be defined as the sudden or extremely rapid conversion of a solid or liquid body of small bulk into gas or vapour, occupying very many times the volume of the original substance, and, in addition, highly expanded by the heat generated during the transformation. This sudden or very rapid expansion of volume is attended by an exhibition of force, more or less violent according to the constitution of the original substance and the circumstances of explosion. Any substance capable of undergoing such a change upon the application of heat, or other disturbing cause, is called "explosive."

The explosive substances that are practically the most important essentially contain carbon, oxygen, and nitrogen, the last always existing in a state of feeble combination with the whole or part of the oxygen, and thus creating that condition of unstable chemical equilibrium which is necessary. When explosion takes place, the nitrogen parts with its oxygen to the carbon, for which it has a great affinity, forming carbonic acid (CO<sub>2</sub>) and carbonic oxide (CO) gases, the combination being accompanied with great generation of heat, and the nitrogen gas is set free. In most explosives there is also hydrogen accompanying the carbon, and by its combustion producing an extremely high temperature; it combines with part of the oxygen to form water in the form of greatly expanded vapour. Other subordinate elements are often present; in gunpowder, for instance, the potassium binds the nitrogen and oxygen loosely together in the state of saltpetre, and there is sulphur, a second combustible, whose oxidation evolves greater heat than that of carbon. When chlorate of potash is present, the chlorine plays the part of the nitrogen, and is set free in the gaseous state. Two very unstable and practically useless explosive substances, the so-called chloride and iodide of nitrogen, contain neither carbon nor oxygen: but their great violence is equally caused by the feeble affinities of nitrogen for other elements, large volumes of gaseous matter being suddenly disengaged from a very small quantity of a liquid and solid body respectively.

Explosives may be conveniently divided into two distinct classes,—(1) explosive mixtures, and (2) explosive compounds.

The first class consists of those explosive substances which are merely intimate mechanical mixtures of certain

ingredients, and which can be again separated more or less completely by mechanical means, not involving chemical action. These ingredients do not, as a rule, possess explosive properties in their separate condition. There are, however, explosives which might almost be classed in both categories; for example, *picric powder* is composed of ammonium picrate and saltpetre, the former of which contains an explosive molecule, but is mixed with the latter to supply additional oxygen, and thus increase the force.

If a substance that will burn freely in air, combining gradually with the oxygen of the atmosphere, be ignited in pure oxygen gas, the combustion will be much more rapid, and the amount of heat generated greater, at the ordinary atmospheric pressure. If it be possible to burn the substance in a very condensed atmosphere of oxygen, we can readily imagine the combustion being very greatly accelerated, and therefore increased in violence; this is what is ordinarily effected by an explosive "mixture." A combustible body and a supporter of combustion are brought into extremely close contact with one another, by means of intimate mechanical mixture; also, the supporter of combustion, or oxidizing agent, is present in a very concentrated form, constituting what may be termed a magazine of condensed oxygen, solid or liquid. In the case of the explosion of a definite chemical compound, the change may be considered as the resolution of a complex body into simpler forms; this is not, however, always the case when a mechanical mixture is concerned: gunpowder, for example, may be said to contain two elementary substances, carbon and sulphur, not in chemical union.

The chief explosive mixtures may be subdivided into "nitrate mixtures," and "chlorate mixtures."

In the nitrates, the oxygen is held in combination with Nitrate sufficient force to need a powerful disturbing cause to mix- separate it, so that mixtures made from nitrates do not tures explode very readily, and their action is comparatively gradual; they are not sensitive to friction or percussion, and hence are tolerably safe. Any of the nitrates will form explosive mixtures with combustible substances, but nitrate of potash (KNO<sub>3</sub>) is the only one practically employed. The nitrate of soda, called "cubical" or Chili saltpetre, has been used, but absorbs moisture from the air so readily as to give very inferior results. Gunpowder may be taken as the representative of the nitrate explosive mixtures. Picric powder, above referred to, has been proposed by Abel for use as a bursting charge for shells, as being more powerful than a corresponding charge of gunpowder, equally safe as regards friction or percussion, and less hygroscopic; it consists of two parts ammonium picrate, and three parts saltpetre, incorporated, pressed, and finished very much as ordinary gunpowder.

The chlorates part with their oxygen far more readily than the nitrates, the strong affinities of chlorine for the mix- metals coming into play, and consequently chlorate mixtures tures are very sensitive to friction and percussion, and explode with great violence; chlorate of potash (KClO<sub>3</sub>) is the only one used. Very many chlorate mixtures have been made, some of which are employed in fireworks. "White gunpowder" is a mixture of two parts chlorate of potash, one of yellow prussiate of potash, and one of sugar; it is exploded very easily by friction or percussion. The most important chlorate mixtures are those used for igniting other explosives, such as the composition for friction tubes for firing cannon, percussion cap composition, and percussion fuzes for bursting shells on impact; it is sometimes mixed with sulphur, as a combustible, and sometimes with black sulphide of antimony, which gives a longer flame.

In an explosive "compound," the elements are all in chemical combination, presenting a definite explosive "molecule," which contains, so to speak, both the com-