ENCYCLOPÆDIA BRITANNICA.

ELE—ELE

ELEANOR, of Aquitaine (1122–1204), queen of France and afterwards of England, was the daughter of William IX., the last duke of Guienne, and was born in 1122. She succeeded her father in 1138, and was married the same year to Louis VII. of France. Her lively and somewhat frivolous manners, and her love of pleasure, did not fit her for the society of a husband who was naturally austere, and who from religious conviction had adopted many ascetic habits. They became gradually estranged, and in the Holy Land, whither she had accompanied Louis in 1147, their quarrels became so frequent and so bitter that at last a divorce was agreed upon, which on their return from France was completed under the pretext of kinship, 18th March 1152. Six months afterwards she gave her hand and her possessions to Henry of Navarre, who in 1155 mounted the throne of England as Henry II. That the duchy of Guienne should thus become permanently annexed to the English crown was naturally displeasing to Louis, and the indirect consequence of his displeasure was protracted wars between France and England. In other respects also the marriage had unhappy consequences. The infidelities of Henry, and the special favours he showed to one of his mistresses, so greatly roused Eleanor's jealousy, that she incited her son Richard to rebellion, and also intrigued with her former husband to get him to lend his influence to the great league formed against Henry in 1173. Her son had fled to Louis, and she was preparing to follow him when she was arrested and placed in confinement, where she remained till the death of her husband in 1189. As soon as he died she regained her liberty, and reigned as regent until Richard's arrival from France. She also held this position during Richard's absence in the Holy Land, for which he left in 1190. After his escape in 1194 from the captivity which befell him as he was returning home, she retired to the abbey of Fontevrault, where she died April 1, 1204.

ELEATIC SCHOOL, a Greek school of philosophy, so called because Elea was the birth-place or residence of its chief representatives. Parmenides, who was born at Elea probably about the year 515, was the first completely to develop the Eleatic doctrines; but his philosophy has a very close connection with that of Xenophanes, who was born more than a century earlier. Xenophanes, indeed, has been described as the founder of the school, and though that title is with more strictness to be given to Parmenides, it may not incorrectly be applied to him. The philosophy of Xenophanes took its rise in a strong antagonism to the popular anthropomorphic mythology; and, though it contains part, it is far from containing the whole, of the Eleatic doctrine as maintained by Parmenides and his followers. Its chief doctrines were that "the One is God," and that God is self-existent, eternal, unchangeable, immovable, of the same substance throughout, and in every respect incomparable to man.

The Eleatic philosophy is founded upon the doctrine of a complete severance and opposition of thought and sense. Truth is in no degree attainable by sense; sense gives only false appearances, non-being: it is by thought alone that we arrive at the knowledge of being, at the great truth that "the All is One," eternal, unchangeable; or rather, as Hegel rightly interprets the Eleatics, thought *is* being. No distinction is drawn by Parmenides between thought and material being; the "One and All," indeed, is described materially as a perfect and immovable sphere. The notions of creation, change and destruction, diversity and multiplicity, time and space, and the various sensations, are all mere false appearances of sense, which thought shows to be contradictory and false. Upon a very common confusion of the word *exist* with the verb *to be*, which does not necessarily imply existence, he founded his argument against the possibility of creation: création cannot be, for being cannot arise out of non-being; nor can non-being be. Again, there can be no difference or change except in appearance, for a thing cannot arise from what is different from it. But this side of the Eleatic argument was more completely developed by Zeno. In the second part of his poem, Parmenides, notwithstanding his assertion of their falseness, does offer an explanation of the facts of consciousness. Of this part of his theory, however, we have only very incomplete knowledge. It stands altogether distinct from his main doctrine. It is materialistic, like nearly all the other early Greek explanations of the universe. The universe (that is, the apparent universe) is, he says, made up of two elements, one of which he describes as heat and light, the other as cold and darkness. Of these elements all men are composed, and their thinking varies as the proportions

in which these elements are mixed in their composition. Even the dead body feels cold and darkness.

Zeno, born in the beginning of the 5th century B.C., the fellow-townsman, disciple, and adopted son of Parmenides, is famous for his attempts to prove that the notions of time, space, motion, multiplicity, sight, sound, &c., are self-contradictory and unthinkable. His paradoxes were stated with a subtlety which has forced thinkers even of distinction, who were opposed to his main position, for instance, Sir William Hamilton, to admit some of them to be unanswerable. Against motion Zeno directed several arguments, the most celebrated being that of Achilles and the tortoise, which are founded upon the confusion of that which is infinitely divisible with that which is infinite. Against space Zeno argued that any space, however large, must be in a larger space, this larger space again in a still larger, and so on *ad infinitum*. Against the manifold he argued (1) that the manifold, being divisible into the infinitely small, *i.e.*, into that which has no magnitude, can itself have none, as divisions that have no magnitude must make up a whole without magnitude; and (2) that, being divisible into an infinite number of parts, it must be infinitely large. Against sound he argued—and he applied similar reasoning to sight—that, as you cannot hear a single grain of corn fall, you cannot hear the sound of a number of grains falling, the sound of the falling of the number of grains being made up of the sounds of the falling of each grain. Thus Zeno sought to prove that thought and sense are opposed, and that the latter, contradicting itself, proves itself unworthy of the consideration of the philosopher.

The last of the Eleatic teachers was Melissus of Samos, the friend of Heraclitus, who was probably born somewhat later than Zeno. We only possess fragments of his works, preserved by Simplicius and collected by Brandis. His modifications of the doctrines of his master, Parmenides, are not important, with the exception of his assertion of the infinity, the unlimitedness, of "the One and All," and his distinct insistance upon the doctrine that the "One and All" is immaterial, unextended, without parts.

See the separate articles Xenophanes, Parmenides, and Zeno.

ELECAMPANE (M. Lat., *Enula Campana*), a perennial composite plant, the *Inula Helenium* of Linnæus, which is common in many parts of Britain, and ranges throughout central and southern Europe, and in Asia as far eastwards as the Himalayas. Its stem attains a height of from 3 to 5 feet; the leaves are serrate-dentate, the lower ones stalked, the rest embracing the stem; the flowers are yellow, and 2 inches broad, and have many rays, each three-notched at the extremity. The root, the *radix inulæ* of pharmacy, is thick, branching, and mucilaginous, and has a warm bitter taste and a camphoraceous odour. For medicinal purposes it should be procured from plants not more than two or three years old. Besides *inulin*, $C_{12}H_{20}O_{10}$, a body isomeric with starch, the root contains, according to Kallen, two crystallizable substances—*helenin*, C_8H_8O, and *alantcamphor*, $C_{10}H_{16}O$. By the ancients the root was employed both as a medicine and as a condiment, and in England it was formerly in great repute as an aromatic tonic and stimulant of the secretory organs. "The fresh roots of elecampane preserved with sugar, or made into a syrup or conserve," are recommended by Parkinson in his *Theatrum Botanicum* as "very effectual to warm a cold and windy stomack, and the pricking and stitches therein or in the sides caused by the Spleene, and to helpe the cough, shortnesse of breath, and wheesing in the Lungs." As a drug, however, the root is now seldom resorted to except in veterinary practice. In France and Switzerland it is used in the manufacture of absinthe.

ELECTIONS. The law of parliamentary and municipal elections in England is now governed as to procedure by the 35 and 36 Vict. c. 33 (the Ballot Act, 1872), and as to disputed returns by the 31 and 32 Vict. c. 125 (Parliamentary Elections Act, 1868) and 35 and 36 Vict. c. 60. See Ballot and Bribery.

The inquiry into a disputed parliamentary election was formerly conducted before a committee of the House of Commons, chosen as nearly as possible from both sides of the House for that particular business. The decisions of these tribunals laboured under the suspicion of being prompted by party feeling, and by the above-named Act of 1868 the jurisdiction was finally transferred to Her Majesty's judges, notwithstanding the general unwillingness of the bench to accept a class of business which they feared might bring their integrity into dispute. In future no election shall be questioned except in accordance with the provisions of this Act. Section 11 of the Act orders, *inter alia*, that the trial of every election petition shall be conducted before a *puisne judge* of one of the common law courts at Westminster and Dublin; that the said courts shall each select a judge to be placed on the *rota* for the trial of election petitions; that the said judges shall try petitions standing for trial according to seniority or otherwise, as they may agree; that the trial shall take place in the county or borough to which the petition refers, unless the court should think it desirable to hold it elsewhere. The judge shall determine "whether the member whose return is complained of, or any and what other person, was duly returned and elected, or whether the election was void," and shall certify his determination to the Speaker. When corrupt practices have been charged the judge shall also report (1) whether any such practice has been committed by or with the knowledge or consent of any candidate, and the nature thereof; (2) the names of persons proved to have been guilty of any corrupt practice; and (3) whether corrupt practices have extensively prevailed at the election.

Questions of law may be referred to the decision of the Court of Common Pleas. The report of the judge is equivalent to the report of an election committee under the old system. Petitions may be presented by the following persons:—(1) some person who has voted or had the right to vote at the election; (2) some person claiming to have a right to be returned or elected; (3) some person alleging himself to have been a candidate. The trial of a petition shall be proceeded with notwithstanding the acceptance by the respondent of an office of profit under the Crown, and notwithstanding the prorogation of Parliament; though it would appear that the dissolution of Parliament abates a petition. The judge appointed to try a petition shall be received with the same state as a judge of assize in an assize town. The costs and expenses of the petition shall be paid by the parties in such manner and such proportions as the court or judge may determine, regard being had to the discouragement of needless expense by throwing the burden thereof on the parties by whom it has been caused, whether they are on the whole successful or not. When a returning officer has wilfully neglected to return a person found on petition to have been entitled to be returned, such person may sue the officer (within one year of the act complained of, or six months of the trial of the petition), and shall recover double the damage he has actually sustained, together with full costs of suit.

To meet the additional work imposed on the English courts of common law by this Act, power was given to appoint an additional judge to each of them. Section 58 applies the provisions of the Act, with certain modifications, to Scotland.

This, like the Ballot Act, is a continuing Act.

Petitions against municipal elections are dealt with in 35 and 36 Vict. c. 60. The election judges under the last described Act appoint a number of barristers, not exceeding five, to try such petitions. No barrister can be appointed who is of less than fifteen years standing, or a member of Parliament, or holder of any office of profit (other than that of recorder) under the Crown; nor can any barrister try a petition in any borough in which he is recorder or in which he resides, or which is included in his circuit. The barrister sits without a jury. The provisions are generally similar to those relating to parliamentary elections in the former Act. The petition may allege that the election was avoided as to the borough or ward on the ground of general bribery, &c., or that the election of the person petitioned against was avoided by corrupt practices, or by personal disqualification, or that he had not the majority of lawful votes. And no election shall be questioned by any other process whatsoever for a matter for which it might have been questioned under this Act.

ELECTRICITY

THE word *Electricity* is derived from the Greek word ἤλεκτρον, meaning *amber*. The term was invented by Gilbert,[1] who used it with reference to the attractions and repulsions excited by friction in certain bodies of which amber may be taken as the type. To the cause of these forces was given the name Electricity; and out of the study of these and kindred phenomena arose the science of electricity, of which it is the purpose of the present article to give a brief outline.

The science has been divided into three branches—*Electrostatics*, which deals with electricity at rest; *Electrokinetics*, which considers the passage of electricity from place to place; and *Electromagnetism*, which treats of the relation of electricity to magnetism. We shall, however, make no attempt to adhere to this division, but shall exhibit the different parts of the subject in such order and connection as seems most clear and natural in the present state of the science. For the sake of the non-scientific reader we prefix a brief history[2] of the science of electricity, wherein mention is made of some of the more striking electrical discoveries and of the steps by which our knowledge of the subject has advanced to its present condition.

Historical Sketch.

Thales, 600 B.C. The name of the philosopher who first observed that amber when rubbed possesses the property of attracting and repelling light bodies has not been handed down to our times. Thales of Miletus is said to have described this remarkable property, and both Theophrastus (321 B.C.) and Pliny (70 A.D.) mention the power of amber to attract straws and dry leaves. The same authors speak of the *lapis lyncurius*, which is supposed to be a mineral called *tourmaline*, as possessing the same property. The electricity of the torpedo was also known to the ancients. Animal electricity. Pliny informs us, that when touched by a spear it paralyzes the muscles and arrests the feet, however swift; and Aristotle adds that it possesses the power of benumbing men, as well as the fishes which serve for its prey. The influence of electricity on the human body, and the electricity of the human body itself, were also known in ancient times. Anthero, a freedman of Tiberius, was cured of the gout by the shocks of the torpedo; and Wolimer, the king of the Goths, was able to emit sparks from his own body. Eustathius, who records this fact, also states that a certain philosopher, while dressing and undressing, emitted occasionally sudden crackling sparks, while at other times flames blazed from him without burning his clothes. Such are the scanty gleanings of electrical knowledge which we derive from the ancient philosophy; and though several writers of the Middle Ages have made occasional references to these facts, and even attempted to speculate upon them, yet they added nothing to the science, and left an open field for the researches of modern philosophers.

Dr Gilbert of Colchester may be considered as the founder of the science, as he appears to have been the first philosopher who carefully repeated the observations of the ancients, and applied to them the principles of philosophical investigation. In order to determine if other bodies possessed the same property as amber, he balanced a light metallic needle on a pivot, and observed whether or not it was affected by causing the excited or rubbed body to approach to it. In this way he discovered that the following bodies possess the property of attracting light substances:—amber, gagates or jet, diamond, sapphire, carbuncle, rock-crystal, opal, amethyst, vincentina or Bristol stone, beryl, glass, paste for false gems, glass of antimony, slags, belemnites, sulphur, gum-mastic, sealing-wax of lac, hard resin, arsenic, rock salt, mica, and alum. These various bodies attracted, with different degrees of force, not only straws and light films, but likewise metals, stones, earths, wood, leaves, thick smoke, and all solid and fluid bodies. Among the substances which are not excited by friction Gilbert enumerated emerald, agate, carnelian, pearls, jasper, calcedony, alabaster, porphyry, coral, marble, Lydian stone, flints, hematites, smyris (emery or corundum), bones, ivory, hard woods, such as cedar, ebony, juniper, and cypress, metals, and natural magnets. Gilbert also discovered that the state of the atmosphere affects the production of electricity; dryness with north or east wind being a favourable condition, while moisture with south wind is unfavourable. An account of Gilbert's experiments will be found in his book *De Magnete*, lib. ii. cap. 2. Gilbert (1540–1603).

Robert Boyle added many new facts to the science of electricity, and he has given a full account of them in his *Experiments on the Origin of Electricity*. By means of a suspended needle, he discovered that amber retained its attractive virtue after the friction which excited it had ceased; and though smoothness of surface had been regarded as advantageous for excitation, yet he found a diamond which in its rough state exceeded all the polished ones and all the electrics which he had tried, having been able to move a needle three minutes after he had ceased to rub it. He found also that heat and *tersion* (or the cleaning or wiping of any body) increased its susceptibility of excitation; and that if the attracted body were fixed, and the attracting body movable, their mutual approach would still take place. To Gilbert's list of "electrics" Boyle added the resinous cake which remained after evaporating one-fourth part of good oil of turpentine, the dry mass which remains after distilling a mixture of petroleum and

[1] *De Magnete Magneticisque Corporibus.*

[2] A portion of this historical sketch was written by Sir David Brewster, and formed the introduction to his article "Electricity" in last edition of the *Encyclopædia*. It has been modified by suppressions and alterations here and there, and by large additions at the end which were thought necessary to make it suit the present state of science. For the sake of the student in search of original sources of information, pretty copious reference to such has been added throughout. Valuable for information of this kind the student will find Riess's *Reibungselectricität*, Young's *Natural Philosophy*, Wiedemann's *Galvanismus*, and the recent work on electricity by Prof. Mascart, of the Collège de France.