

built, are to be met with in Ireland, but there is only one other in Scotland, viz., that at Brechin. Petrie argues, in his *Round Towers of Ireland*, that these structures have been used as belfries, and also as keeps.

ABERNETHY, JOHN,—a Protestant dissenting divine of Ireland, was born at Coleraine, county Londonderry, Ulster, where his father was minister (Nonconformist), on the 19th October 1680. In his thirteenth year he entered a student at the University of Glasgow. On concluding his course at Glasgow he went to Edinburgh University, where his many brilliant gifts and quick and ready wit—thought-born, not verbal merely—struck the most eminent of his contemporaries and even his professors. Returning home, he received licence to preach from his Presbytery before he was twenty-one. In 1701 he was urgently invited to accept the ministerial charge of an important congregation in Antrim; and after an interval of two years, he was ordained there on 8th August 1703. His admiring biographer tells of an amount and kind of work done there, such as only a man of fecund brain, of large heart, of healthful frame, and of resolute will, could have achieved. In 1717 he was invited to the congregation of Usher's Quay, Dublin, as colleague with Rev. Mr Arbuckle, and contemporaneously, to what was called the Old Congregation of Belfast. The Synod assigned him to Dublin. He refused to accede, and remained at Antrim. This refusal was regarded then as ecclesiastical high-treason; and a controversy of the most intense and disproportionate character followed. The controversy and quarrel bears the name of the two camps in the conflict, the "Subscribers" and the "Non-subscribers." Out-and-out evangelical as John Abernethy was, there can be no question that he and his associates sowed the seeds of that after-struggle in which, under the leadership of Dr Henry Cooke, the Arian and Socinian elements of the Irish Presbyterian Church were thrown out. Much of what he contended for, and which the "Subscribers" opposed bitterly, has been silently granted in the lapse of time. In 1726 the "Non-subscribers," spite of an almost wofully pathetic pleading against separation by Abernethy, were cut off, with due ban and solemnity, from the Irish Presbyterian Church. In 1730, spite of being a "Non-subscriber," he was called by his early friends of Wood Street, Dublin, whither he removed. In 1731 came on the greatest controversy in which Abernethy engaged, viz., in relation to the Test Act nominally, but practically on the entire question of tests and disabilities. His stand was "against all laws that, upon account of mere differences of religious opinions and forms of worship, excluded men of integrity and ability from serving their country." He was nearly a century in advance of his century. He had to reason with those who denied that a Roman Catholic or Dissenter could be a "man of integrity and ability." His *Tracts*—afterwards collected—did fresh service, generations later. And so John Abernethy through life was ever foremost where unpopular truth and right were to be maintained; nor did he, for sake of an ignoble expediency, spare to smite the highest-seated wrongdoers any more than the hoariest errors (as he believed). He died in 1740, having been twice married. (Kippis' *Biog. Brit.*, s. v.; Dr Duchal's *Life*, prefixed to *Sermons*; *Diary* in MS., 6 vols. 4to; *History of Irish Presbyterian Church*.)

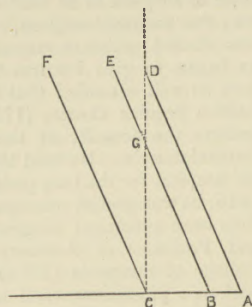
(A. B. G.)

ABERNETHY, JOHN, grandson of the preceding, an eminent surgeon, was born in London on the 3d of April 1764. His father was a London merchant. Educated at Wolverhampton Grammar School, he was apprenticed in 1779 to Sir Charles Blicke, a surgeon in extensive practice in the metropolis. He attended Sir William Blizard's anatomical lectures at the London Hospital, and was early employed to assist Sir William as "de-

monstrator;" he also attended Pott's surgical lectures at St Bartholomew's Hospital, as well as the lectures of the celebrated John Hunter. On Pott's resignation of the office of surgeon of St Bartholomew's, Sir Charles Blicke, who was assistant-surgeon, succeeded him, and Abernethy was elected assistant-surgeon in 1787. In this capacity he began to give lectures in Bartholomew Close, which were so well attended that the governors of the hospital built a regular theatre (1790-91), and Abernethy thus became the founder of the distinguished School of St Bartholomew's. He held the office of assistant-surgeon of the hospital for the long period of twenty-eight years, till, in 1815, he was elected principal surgeon. He had before that time been appointed surgeon of Christ's Hospital (1813), and Professor of Anatomy and Surgery to the Royal College of Surgeons (1814). Abernethy had great fame both as a practitioner and as a lecturer, his reputation in both respects resting on the efforts he made to promote the practical improvement of surgery. His *Surgical Observations on the Constitutional Origin and Treatment of Local Diseases* (1809)—known as "My Book," from the great frequency with which he referred his patients to it, and to page 72 of it in particular, under that name—was one of the earliest popular works on medical science. The views he expounds in it are based on physiological considerations, and are the more important that the connection of surgery with physiology had scarcely been recognised before the time he wrote. The leading principles on which he insists in "My Book" are chiefly these two:—1st, That topical diseases are often mere symptoms of constitutional maladies, and then can only be removed by general remedies; and 2d, That the disordered state of the constitution very often originates in, or is closely allied to deranged states of the stomach and bowels, and can only be remedied by means that beneficially affect the functions of those organs. His profession owed him much for his able advocacy of the extension in this way of the province of surgery. He had great success as a teacher from the thorough knowledge he had of his science, and the persuasiveness with which he enunciated his views. It has been said, however, that the influence he exerted on those who attended his lectures was not beneficial in this respect, that his opinions were delivered so dogmatically, and all who differed from him were disparaged and denounced so contemptuously, as to repress instead of stimulating inquiry. It ought to be mentioned, that he was the first to suggest and to perform the daring operation of securing by ligature the carotid and the external iliac arteries. The celebrity Abernethy attained in his practice was due not only to his great professional skill, but also in part to the singularity of his manners. He used great plainness of speech in his intercourse with his patients, treating them often brusquely, and sometimes even rudely. In the circle of his family and friends he was courteous and affectionate; and in all his dealings he was strictly just and honourable. He resigned his surgery at St Bartholomew's Hospital in 1827, and his professorship at the College of Surgeons two years later, on account of failing health, and died at his residence at Enfield on the 20th of April 1831. A collected edition of his works in five volumes was published in 1830. A biography, *Memoirs of John Abernethy*, by George Macilwain, F.R.C.S., appeared in 1853, and though anything but satisfactory, passed through several editions.

ABERRATION, or (more correctly) THE ABERRATION OF LIGHT, is a remarkable phenomenon, by which stars appear to deviate a little, in the course of a year, from their true places in the heavens. It results from the eye of the observer being carried onwards by the motion of the earth on its orbit, during the time that light takes to

travel from the star to the earth. The effect of this combination of motions may be best explained by a familiar illustration. Suppose a rain-drop falling vertically is received in a tube that has a lateral motion. In order that the drop may fall freely down the axis of the tube, the latter must be inclined at such an angle as to move from the position AD to BE, and again to CF, in the times the drop moves from D to G, and from G to C. The drop in this case, since it moves down the axis all the way, must strike the bottom of the tube at C in the direction FC. The



light proceeding from a star is not seen in its true direction, but strikes the eye obliquely, for a precisely similar reason. If lines be taken to represent the motions, so that the eye is carried from A to C during the time that light moves from D to C, the light will appear to the eye at C to come, not from D, but from F. The angle DCF, contained by the true and apparent directions of the star, is the *aberration*. It is greatest when the two motions are at right angles to each other, *i.e.*, when the star's longitude is 90° in advance of, or behind, the heliocentric longitude of the earth, or (which amounts to the same thing) 90° behind, or in advance of, the geocentric longitude of the sun. (See ASTRONOMY.) Now, in the right-angled triangle ACD, $\tan ADC$ (*i.e.*, DCF) = $\frac{AC}{DC}$; whence it appears that the tangent of the angle of aberration (or, since the angle is very small, the aberration itself) is equal to the ratio, $\frac{\text{velocity of earth in orbit}}{\text{velocity of light}}$.

The rate of the earth's motion being to the velocity of light in the proportion of 1 to 10,000 nearly, the maximum aberration is small, amounting to about 20.4 seconds of arc,—a quantity, however, which is very appreciable in astronomical observations.

Aberration always takes place in the direction of the earth's motion; that is, it causes the stars to appear nearer than they really are to the point towards which the earth is at the moment moving. That point is necessarily on the ecliptic, and 90° in advance of the earth in longitude. The effect is to make a star at the pole of the ecliptic appear to move in a plane parallel to the ecliptic, so as to form a small ellipse, similar to the earth's orbit, but having its major axis parallel to the minor axis of that orbit, and *vice versa*. As we proceed from the pole, the apparent orbits the stars describe become more and more elliptical, till in the plane of the ecliptic the apparent motion is in a straight line. The length of this line, as well as of the major axes of the different ellipses, amounts, in angular measure, to about $40''.8$. The stars thus appear to oscillate, in the course of the year, $20''.4$ on each side of their true position, in a direction parallel to the plane of the ecliptic, and the quantity $20''.4$ is therefore called the *constant of aberration*.

For the discovery of the aberration of light, one of the finest in modern astronomy, we are indebted to the distinguished astronomer Dr Bradley. He was led to it, in 1727, by the result of observations he made with the view of determining the annual parallax of some of the stars; that is, the angle subtended at these stars by the diameter of the earth's orbit. He observed certain changes in the positions of the stars that he could not account for. The deviations were not in the direction of the apparent motion that parallax would give rise to; and he had no better

success in attempting to explain the phenomenon by the nutation of the earth's axis, radiation, errors of observation, &c. At last the true solution of the difficulty occurred to him, suggested, it is said, by the movements of a vane on the top of a boat's mast. Roemer had discovered, a quarter of a century before, that light has a velocity which admits of measurement; and Bradley perceived that the earth's motion, having a perceptible relation to that of light, must affect the direction of the visual rays, and with this the apparent positions of the stars. He calculated the aberration from the known relative velocities of the earth and of light, and the results agreed entirely with his observations.

The observed effects of aberration are of importance as supplying an independent method of measuring the velocity of light, but more particularly as presenting one of the few direct proofs that can be given of the earth's motion round the sun. It is indeed the most satisfactory proof of this that astronomy furnishes, the phenomenon being quite inexplicable on any other hypothesis.

ABERYSTWITH, a municipal and parliamentary borough, market town, and seaport of Wales, in the county of Cardigan, is situated at the western end of the Vale of Rheidol, near the confluence of the rivers Ystwith and Rheidol, and about the centre of Cardigan Bay. It is the terminal station of the Cambrian Railway, and a line to the south affords direct communication with South Wales, Bristol, &c. The borough unites with Cardigan, Lampeter, &c., in electing a member of Parliament. Coal, timber, and lime are imported, and the exports are lead, oak bark, flannel, and corn. The harbour has of late been much improved; and the pier, completed in 1865, forms an excellent promenade. There are many elegant buildings, and it has been proposed to establish here a University College of Wales. On a promontory to the S.W. of the town are the ruins of its ancient castle, erected in 1277, by Edward I., on the site of a fortress of great strength, built by Gilbert de Strongbow, and destroyed by Owen Gwynedd. From its picturesque situation and healthy climate, and the suitableness of the beach for bathing, Aberystwith has risen into great repute as a watering-place, and attracts many visitors. Much of the finest scenery in Wales, such as the Devil's Bridge, &c., lies within easy reach. Population (1871), 6898.

ABETTOR, a law term implying one who instigates, encourages, or assists another to perform some criminal action. See **ACCESSORY**.

ABEYANCE, a law term denoting the expectancy of an estate. Thus, if lands be leased to one person for life, with reversion to another for years, the remainder for years is in abeyance till the death of the lessee.

ABGAR, the name or title of a line of kings of Edessa in Mesopotamia. One of them is known from a correspondence he is said to have had with Jesus Christ. The letter of Abgar, entreating Jesus to visit him and heal him of a disease, and offering Him an asylum from the wrath of the Jews, and the answer of Jesus promising to send a disciple to heal Abgar after His ascension, are given by Eusebius, who believed the documents to be genuine. The same belief has been held by a few moderns, but there can be no doubt whatever that the letter of Jesus at least is apocryphal. It has also been alleged that Abgar possessed a picture of Jesus, which the credulous may see either at Rome or at Genoa. Some make him the possessor of the handkerchief a woman gave Jesus, as He bore the cross, to wipe the sweat from His face with, on which, it is fabled, His features remained miraculously imprinted.

ABIAD, **BAHR-EL**, a name given to the western branch of the Nile, above Khartoum. It is better known as the White Nile. See **NILE**.