The publication amongst Torricelli’s *Opera geometrica* (Florence, 1644) of a tract on the properties of the cycloid involved him in a controversy with G. P. de Roberval, who accused him of plagiarizing his earlier solution of the problem of its quadrature. There seems, however, no room for doubt that Torricelli’s was arrived at independently. The matter was still in debate when he was seized with pleurisy, and died at Florence on the 25th of October 1647. He was buried in San Lorenzo, and a commemorative statue of him erected at Faenza in 1864.

Among the new truths detected by him was the valuable mechanical principle that if any number of bodies be so con­nected that, by their motion, their centre of gravity can neither ascend nor descend, then those bodies are in equilibrium. He also discovered the remarkable fact that the parabolas described (in a vacuum) by indefinitely numerous projectiles discharged from the same point with equal velocities, but in all directions have a paraboloid of revolution for their envelope. His theorem that a fluid issues from a small orifice with the same velocity (friction and atmospheric resistance being neglected) which it would have acquired in falling through the depth from its surface is of fundamental importance in hydraulics. He greatly improved both the telescope and microscope. Several large object lenses, engraven with his name, are preserved at Florence. He used and developed B. Cavalieri’s method of indivisibles.

A selection from Torricelli’s manuscripts was published by Tommaso Bonaventura in 1715, with the title *Leziοni accademiche* (Florence). They include an address of acknowledgment on his admission to the Accademia della Crusca. His essay on the inundations of the Val di Chiana was printed in *Raccolta d'autoriche trattano del moto dell' acque,* iv. 115 (Florence, 1768), and amongst *Opusculi idraul·ici,* iii. 347 (Bologna, 1822). For his life see Fabronî, *Vitae Italorum,* i. 345 ; Ghinassi, *Lettere fin qui inedite di Evan­gelista Torricelli* (Faenza, 1864); Tiraboschi, *Storia della lett. it.* viii. 302 (ed. 1824); Montucla, *Hist. des math.,* vol. ii. ; Marie, *Hist.* des *sciences,* iv. 133.

**TORRIDONIAN,** in geology, a series of pre-Cambrian are­naceous sediments extensively developed in the north-west high- lands of Scotland and particularly in the neighbourhood of upper Loch Torridon, a circumstance which suggested the name Torridon Sandstone, first applied to these rocks by J. Nicol. The rocks are mainly red and chocolate sandstones, arkoses, flagstones and shales with coarse conglomerates locally at the base. Some of the materials of these rocks were derived from the underlying Lewisian gneiss, upon the uneven surface of which they rest; but the bulk of the material was obtained from rocks that are nowhere now exposed. Upon this ancient denuded land surface the Torridonian strata rest horizontally or with gentle inclination. Their outcrop extends in a belt of variable breadth from Cape Wrath to the Point of Sleet in Skye, running in a N.N.E.-S.S.W. direction through Ross-shire and Sutherlandshire. They form the isolated mountain peaks of Canisp, Quinag and Suilven in the neighbourhood of Loch Assynt, of Slioch near Loch Maree and other hills. They attain their maximum development in the Applecross, Gairloch and Torridon districts, form the greater part of Scalpay, and occur also in Rum, Raasay, Soay and the Crowlin Islands. The Torridonian rocks have been subdivided into three groups: an upper Aulthea group, 3000-5000 ft.; a middle or Applecross group, 6000-8000 ft.; and a lower or Diabeg group, 500 ft. in Gairloch but reaching a thickness of 7200 ft. in Skye.

See " The Geological Structure of the North-West Highlands of Scotland,” *Mem. Geol. Survey* (Glasgow, 1907). (J. A. H.)

**TORRIGIANO, PIETRO** (1472-1522), Florentine sculptor, was, according to Vasari, one of the group of talented youths who studied art under the patronage of Lorenzo the Magnificent in Florence. Benvenuto Cellini, reporting a conversation with Torrigiano, relates that he and Michelangelo, while both young, were copying the frescoes in the Carmine chapel, when some slighting remark made by Michelangelo so enraged Torrigiano that he struck him on the nose, and thus caused that disfigure­ment which is so conspicuous in all the portraits of Michelangelo. Soon after this Torrigîano visited Rome, and helped Pinturicchio in modelling the elaborate stucco decorations in the Apartamenti Borgia for Alexander VI. After some time spent as a hired soldier in the service of different states, Torrigîano was invited to England to execute the magnificent tomb for Henry VII. and his queen, which still exists in the lady chapel of Westminster Abbey. This appears to have been begun before the death of Henry VII. in 1509) but was not finished till 1517. The two effigies are well modelled, and have lifelike but not too realistic portraits. After this Torrigiano received the com­mission for the altar, retable and baldacchino which stood at the west, outside the screen of Henry VII.’s tomb. The altar had marble pilasters at the angles, two of which still exist, and below the *mensa* was a life-sized figure of the dead Christ in painted terra-cotta. The retable consisted of a large relief of the Resurrection. The baldacchino was of marble, with enrichments of gilt bronze; part of its frieze still exists, as do also a large number of fragments of the terra-cotta angels which sur- mounted the baldacchino and parts of the large figure of Christ. The whole of this work was destroyed by the Puritans in the 17th century.@@1 Henry VIII. also commissioned Torrigîano to make him a magnificent tomb, somewhat similar to that of Henry VII., but one-fourth larger, to be placed in a chapel at Windsor; it was, however, never completed, and its rich bronze was melted by the Commonwealth, together with that of Wolsey’s tomb. The indentures for these various works still exist, and are printed by Neale, *Westminster Abbey,* i. 54-59 (London, 1818). These interesting documents are written in English, and in them the Florentine is called “ Peter Torrysany.” For Henry VII.’s tomb he contracted to receive £1500, for the altar and its fit­tings £1000, and £2000 for Henry VIII.’s tomb. Other works attributed from internal evidence to Torrigîano are the tomb of Margaret of Richmond, mother of Henry VII., in the south aisle of his chapel, and a terra-cotta effigy in the chapel of the Rolls.

While these royal works were going on Torrigiano visited Florence in order to get skilled assistants. He tried to induce Benvenuto Cellini to come to England to help him, but Cellini refused partly from his dislike to the brutal and swaggering manners of Torrigiano, and also because he did not wish to live among “ such beasts as the English.” The latter part of Torrigiano’s life was spent in Spain, especially at Seville, where, besides the painted figure of St Hieronymus in the museum, some terra-cotta sculpture by him still exists. His violent temper got him into difficulties with the authorities, and he ended his life in 1522 in the prisons of the Inquisition.

See Wilhelm Bode, *Die italienische Plastik* (Berlin, 1902).

**TORRINGTON, ARTHUR HERBERT,** Earl of (1647- 1716), British admiral, was the son of a judge, Sir Edward Herbert (c. 1591-1657). He entered the navy in 1663, and served in the Dutch wars of the reign of Charles II., as well as against the Barbary pirates. From 1680 to 1683 he commanded in the Mediterranean. His career had been honourable, and he had been wounded in action. The known Royalist sentiments of his family combined with his reputation as a naval officer to point him out to the favour of the king, and James II. appointed him rear-admiral of England and master of the robes. The king no doubt counted on his support of the repeal of the Test Acts, as the admiral was member for Dover. Herbert refused, and was dismissed from his places. He now entered into com­munication with the agents of the prince of Orange, and promised to use his influence with the fleet to forward a revolution. After the acquittal of the seven bishops in 1688 he carried the invitation to William of Orange. The Revolution brought him ample amends for his losses. He was named first lord, and took the command of the fleet at home. In 1689 he was at sea attempting to prevent the French admiral Château-Renault (*q.υ.)* from landing the troops sent by the king of France to the aid of King James in Ireland. Though he fought an action with

@@@1 An old drawing still exists showing this elaborate work; it is engraved in the *Hierurgia anglicana,* p. 267 (London, 1848). Many hundreds of fragments of this terra-cotta sculpture were found a few years ago hidden under the floor of the triforium in the abbey; they are unfortunately too much broken and imperfect to be fitted together.