to a thorough knowledge of his profession, he exhibited a very comprehensive mind and considerable legal acumen. As one of a jury of the Great Exhibition in 1851, he was very assiduous in the discharge of his duties, and his opinions were always received with deference.

Colonel Colquhoun's military services, won for him the Medal for the Peninsula, and from the Spanish Government, the Medal for the Action of the 5th May, 1836, and the Cross of San Fernando, of the 'Laurelled Class' (Classe laureado), granted only to those who had commanded a battalion, in a successful engagement; and this honour he twice received, and he was created a Commander of the Order of Isabel la Catolica.

He was a Fellow of the Royal Society, and a frequent visitor at most of the scientific Societies of the Metropolis; he joined the Institution of Civil Engineers, as an Associate, in 1843, served on the Council in 1846, and was constantly in communication with the Members of our profession, by whom, as by his military comrades, his loss will be severely felt; few men have so justly gained almost universal esteem, and by his premature decease, on the 17th of September, 1853, in his sixty-third year, the corps has been deprived of one of its best officers, at a moment when his services were most valuable to his country.

He was a man of rare natural intelligence and ready perception of principles; he possessed great energy of purpose and indomitable perseverance; as an officer he was unhesitatingly obeyed and followed by his men, his love of duty and determination to perform it, acting more effectually upon them than the sternest enforcing of military discipline, whilst his true kindness of heart and consideration for all around him, caused him to be universally beloved.

Mr. EDWARD JOHN DENT was born in London on the 19th of August, 1790; he was originally intended for a very ordinary business, but feeling an inclination for mechanical pursuits he entered the workshops of the Brothers Callame, in Castle-street, Long Acre, then justly celebrated as makers of 'repeating motions,' where he had the advantage of the instruction of the late Mr. Rippon. He soon became a very expert workman, and from 1815 to 1829, was constantly employed by Messrs. Vulliamy and Son and Messrs. Barrauds

and Son, acquiring from the latter considerable practical knowledge of chronometers. He was also at times engaged by Messrs. McCabe, Murray, and other principal houses in the trade. Following the example of Earnshaw, he had the good sense to feel, that a reputation for practical skill in his art was essential, he laboured assiduously and with success; his name became known, he was soon intrusted with work, on his own account, by the Admiralty, the Honourable East India Company, and for the Royal Observatory, at Greenwich, where he was employed to remove, from the transit clock, the escapement originally supplied by Hardy, and to substitute a Graham's escapement.

In 1829 he sent for public trial, the chronometer 'Dent 114,' which by its superior rate of going, confirmed his reputation; and he shortly afterwards (in 1830) entered into partnership with the late Mr. John Arnold, and in a few years the firm of Arnold and Dent attained a very high character for its productions.

Whilst Mr. Arnold chiefly resided in the country, always engaged in chronometric investigations and experiments, Mr. Dent was actively engaged in the direction of the workshops, in prosecuting numerous experiments of which he subsequently published accounts;[1] among which must be particularly mentioned those on balance springs made of steel, gold, and palladium, as also with reference to the small compensation required by the glass springs, invented by Mr. Scrimgeour of Glasgow, in 1828.

These were communicated to the British Association in 1833,[2] and in 1838[3] he also laid before that body, an account of the adaptation of a cast iron jar to the mercurial pendulum invented by Mr. Jones, of Charing Cross, and which had been successfully applied by Mr. B. L. Vulliamy in 1832, to the astronomical clock, in the transit room at Dr. Lee's Observatory, at Hartwell, so excellently described in Captain Smyth's Ædes

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[1] *Vide* 'Description of Dipleidoscope,' &c., by E. J. Dent.—Tract. 8vo. Cuts. London, 1843.

[2] *Vide* Report of the Third Meeting of the British Association, vol. ii.; Transactions of Sections, page 421.

[3] *Vide* Report of the Eighth Meeting of the British Association, vol. vii.; Transactions of Sections, page 35.

Hartwellianæ.[1] He also followed up the investigations, on the additional compensation required for the pendulum spring, alluded to by Daniel Bernouilli in 1747,[2] and established by Berthoud in 1773,[3] on which Mr. Loseby based his additional compensation.

On these and other horological subjects Mr. Dent read lectures, and gave illustrations, before the Royal Institution, and the United Service Institution, and published papers and descriptions in the Transactions of the Royal Astronomical Society, and he received the thanks of the Royal Irish Academy for the assistance he rendered in determining the longitude of Dublin and of Armagh; and when he visited Russia, in 1843, he was presented with a gold medal, by order of the Emperor, for the services rendered by his chronometers.

In the year 1840, when the connexion with Mr. Arnold was dissolved, Mr. Dent took premises very near to the old establishment in the Strand, and continued to exercise a very lucrative business, which was ultimately extended to two other depôts, in Cockspur Street and in the City.

The success of his chronometer, in 1829, induced the devotion of much time and attention to that delicate branch of horology; and Mr. Dent was very successful in the investigation of the causes of the tendency of chronometers to gain at mean temperature, when the compensation has been adjusted for extremes: this had been still observed, after other errors were reduced by improved workmanship, and led to the introduction of a secondary compensation, for correcting this error, and the correctness of his views on this point have been recently fully corroborated. His paper on this subject was published in the Nautical Magazine in 1833.[4]

By his mechanical contrivances and the employment of a better class of self-acting tools, he materially diminished the cost of chronometers; and a short time before his decease he invented and registered an ingenious and simple method of

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[1] *Vide* 'Ædes Hartwellianæ,' by Captain W. H. Smyth, R.N. 4to. London, 1841, page 231.

[2] *Vide* Bernouilli, 'Histoire de la Mésure du Tems,' tome ii., page 38.

[3] *Vide* Berthoud, 'Traité des Horloges Marines.' Paris, 1773.

[4] *Vide* 'Nautical Magazine,' 1833, vol. ii., page 262.

simultaneously effecting both the primary and secondary compensations, within any ordinary range of temperature, but not adapted for the excessive and artificial range to which the chronometers are now exposed at Greenwich.

In 1843 he entered into another branch of business,—the manufacture of turret clocks, almost under compulsion; for being selected, in a limited competition, for the construction of a clock for the Royal Exchange, which was required to satisfy certain conditions, laid down by the Astronomer Royal; the co-operation he relied on in this country, being refused to him by the regular turret clock makers, who are very limited in number, he had recourse to the counsel and assistance of M. Wagner, and other celebrated horologists in Paris, intending that the former should co-operate with him in the construction; but subsequently he was constrained to rescind the order on account of some difficulties at the Custom-house. He therefore erected machinery of a very complete nature, and produced the present clock at the Royal Exchange, of which a very high character has been pronounced by the Astronomer Royal, and although the chimes have not yet been attached, and there has been a considerable extra expenditure, these arise from causes apart from the mechanical design of the clock, and for an account of which, reference may be made to the Papers, published on the subject which are deposited in the Library of the Institution of Civil Engineers.

With an establishment thus formed, Mr. Dent proceeded to introduce many modifications of the arrangement of large clocks and of the style of workmanship, having a tendency to reduce their cost, and to place them more on a level with the clocks made in Paris, which previously had been considered superior in design. In these labours he was assisted by Mr. Denison, who although a Barrister, has devoted much time to the study of Horology, and is the author of a popular work on the art.[1] At the Great Exhibition of 1851, the Council Medal Class XB. was awarded to Mr. Dent, for a "large turret clock, on account of the combination of strength and of accuracy of time-keeping attained in it, which are also accomplished by a

[1] *Vide* 'On Clock and Watch Making, &c.,' by E. B. Denison. Weale's Rudimentary Series.

cheaper mode of construction, than in other turret clocks of high character."[1]

In the year 1852 the order for the great clock for the New Palace at Westminster was intrusted to him, and he just lived to see the successful trial of a new gravity escapement, invented by Mr. Denison, in which "the pendulum, weighing 6 cwt. is kept going by a scape wheel, weighing little more than a quarter of an ounce."[2] The reasons for the great delay in giving this order, are detailed in the Parliamentary Papers on the subject, which are collected and placed in the Library of the Institution of Civil Engineers.

An Exhibition Prize Medal was also awarded, for his "successful attempt to construct a Compass that should not be disturbed, by the motion of the ship at sea, nor by the firing of guns on board." These compasses have since been extensively adopted, and are employed on board Her Majesty's yachts, &c.

He introduced many other ingenious instruments, of which he published descriptions; and in fact few men have led such an active life and have kept their inventive faculties so constantly on the stretch. He was a Member of several, and was a constant attendant, or visitor at most of the Meetings of the Scientific Societies of the Metropolis, and was admitted to intimate communication with many of the first men of his time, from whom he received very efficient aid and valuable advice, which he always acknowledged with gratitude. In the latter part of his career he was engaged in some unfortunate discussions which gave him pain, as he possessed naturally a cheerful, and even convivial temperament, and would willingly have avoided the contests into which he was forced by circumstances. He had profited much by the scientific society into which he had been introduced, and readily adapting theory to his practical skill, obtained excellent results.

He was fortunate in his worldly affairs, leaving to his succes-

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[1] *Vide* Reports of the Juries, Great Exhibition of 1851; List of Jury Awards, page lxviii.

[2] *Vide* Journal of the Society of Arts, No. 60, vol. ii., January 13, 1854, page 133.

[3] *Vide* Reports of the Juries, Jury Awards, page lix.

sors, very flourishing establishments, with ample capital for carrying them on.

He joined the Institution of Civil Engineers, as an Associate, in the year 1833, and was a frequent attendant at the meetings.

During his latter years he suffered considerably from illness, and at length being attacked by bronchitis, he had not strength to contend against it, and sank under it on the 8th of March, 1853, in the sixty-third year of his age, deeply regretted by a large circle of friends.