with the Secretary, was ever ready to impart useful information, and to contribute to the general welfare of the Society. His loss will be deeply felt and lamented, not only by his widow and family, but by a large and admiring circle of friends, to whom he was endeared by his kindly bearing and most benevolent disposition.

Colonel JAMES NISBET COLQUHOUN was born in the Parish of St. Pierre, Island of Guernsey, on the 23rd June 1791, and after pursuing the usual course of study for a military career at Marlow and at Woolwich, received a commission as second lieutenant in the Royal Artillery, on the 1st of June, 1808.[1] His activity of mind and solid acquirements, soon enabled him to distinguish himself, on active service in Spain, and during the occupation of France, by the allied armies, he was employed as adjutant to Colonel Adye, then commanding the Driver Corps of the British Artillery. When the allied forces were in Paris, he rendered an important service to his own corps, and to military science generally, by securing a collection of ancient arms and military models, which, but for his alertness, would have been appropriated by the Prussians. This, with a few additions, subsequently became the nucleus of the Museum now formed in the Rotunda of the Woolwich Repository.

On the termination of the war he was sent to the West Indies, with a detachment of his corps, and on his return to England, he devoted some time to the investigation of the processes of smelting and working iron in Yorkshire, and thus acquired the knowledge by which he was subsequently enabled to point out the imperfections in certain departments of the Royal Arsenal at Woolwich, which he laboured so zealously to remedy.

About this period his attention was drawn to the fact of a rocket maintaining a nearly direct course, when fired into water at a depression. This property he sought to apply to the whale fishery, and after numerous experiments, he in 1821 and 1822 made two voyages to the Polar seas, for the purpose

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[1] The steps of his military career were:—Second Lieutenant, June 1, 1808; First Lieutenant, September 8, 1810; Captain, November 6, 1827; Brevet-Major, December 2, 1836; Brevet Lieutenant-Colonel, November 10, 1840; Regimental Lieutenant-Colonel, November 9, 1846; Brevet Colonel, November 11, 1851.

of trying whether those weapons could be used in the fisheries for killing whales; the result, however, was that the whales were killed so instantaneously that they sunk and were generally lost.

It is a curious coincidence, that the same course should have been previously pursued by Captain George Manby, before he adapted the mortar to the more useful and philanthropic purpose of saving lives from shipwreck.

In 1835 Captain Colquhoun obtained leave of absence, for the purpose of raising, organizing, equipping and commanding the corps of artillery attached to the British Auxiliary Legion, under Lieut.-General De Lacy Evans, for the service of Her Imperial Majesty the Queen of Spain, in the war against Don Carlos. The undertaking was a bold one, as there was little, or no time to train the men to the management of guns, before they were required on active service; however, with the zealous and intelligent assistance of Lieut.-Colonel Claudius Shaw, R.A., and other retired officers and non-commissioned officers of the Royal Artillery, but chiefly by his own skill and untiring energy, he succeeded in forming a corps of field artillery, and a small rocket detachment, which acquired, and retained to the last day of its service, in Spain, a well-deserved reputation for its skill, coolness and gallantry in the field. He served with this corps, and distinguished himself in all the severe engagements of the campaign, particularly in the storming of the Carlist lines, on the 5th of May 1836; in the actions in defence of the lines afterwards constructed, and the capture of the town and harbour of Passages, in May, June and October following; in the advance to Fuentarabia and Irun, and, in fact, wherever duty was to be done, there he was found. At the close of 1836, on the expiration of his leave of absence, he returned to his regimental duties, at Woolwich; but within three weeks, after an interview with His Majesty King William the Fourth, he was selected for the command of the detachment of Royal Artillery and Royal Marine Artillery, attached to Lord John Hay's squadron, on the north coast of Spain. On his arrival at St. Sebastian, he was sent, with some heavy guns and mountain artillery, to assist the Spanish army, under General Espartero, in raising the siege of Bilbao. The gallant and skilful manœuvring of his guns (in conjunction with those of the gun-boats of the Royal Navy), although inferior in number and weight of metal to those of the

opposing Carlist forces, mainly contributed to the important and brilliant result of the action; whereby the city of Bilbao was saved, and the besieging army was completely routed and obliged to abandon their lines, and all their artillery, which fell into the hands of the victors. For this great service the thanks of the Cortes, were given to all the British officers, seamen and soldiers engaged in the action, and Colonel Wylde, R.A. (the British Commissioner in Spain), Major Colquhoun, and Captains Le Hardy and Otway, R.N., were specially mentioned by name.

He continued in command, and rendered very essential services, until the termination of the civil war in 1840, when General Evans, Lord John Hay, and the Spanish Government, concurred in a very high testimonial of the value of his services.

Soon after his return to England, he was ordered, with a detachment of Royal Artillery, to the coast of Syria, to join the Turkish army, then opposed to Mehemet Ali Pacha, but as he did not arrive until after the siege of St. Jean d'Acre, he devoted himself to the training of the Turkish artillery, and the practical instruction then imparted may, in some degree, have laid the foundation for the present good service of that branch of the army in the recent actions with the Russians.

Brilliant, however, as was his career in the field, the real utility of his services commenced on his appointment, in 1845, to the Carriage Department of the Arsenal, at Woolwich, where he displayed that wonderful zeal and energy, combined with judgment, mechanical skill, and administrative ability, which raised his department to such a high state of excellence and efficiency, and stamped him as one of the first artillery officers of the day.

At the period of his appointment to the Carriage Department, it was very deficient in the modern appliances for executing work, and, unlike the great private manufacturing establishments, it contained but little machinery, and that of an antiquated character. Recognizing these defects, he devoted himself steadily to the task of remedying them, and knowing what was required, and where to seek, among civil and mechanical Engineers, for the information which was always freely imparted, he succeeded, within an incredibly short period, in raising the department to its present high state of efficiency. The means

he adopted were, the application of the best machinery used for general manufacturing purposes, and carefully investigating the numerous improvements suggested by the heads of the various departments, and by his subordinates, for one of his distinctive qualities was that of discovering merit and aiding in its development. Thus there is scarcely an article in his branch of the service which has not received some modification and practical amelioration, and had his life been longer spared, much more would have been accomplished; but it may be justly said, that he found an important department in a state of comparative inefficiency, and left it in a condition well prepared for any emergency.

His chief object was the substitution of machinery for manual labour, as only a very few old-fashioned self-acting machines previously existed in the workshops; whereas, at present, almost all the most approved tools are used, and very little mere manual labour is required. A scrap forge was built, with a rolling mill for working up the old iron of the service, by which, it was anticipated, that economy would be effected, and a better quality of iron would be secured. Hand forging was entirely superseded by Nasmyth's steam hammers: by a better distribution and division of labour the work was executed more rapidly, and with greater precision: he carried his views of economy of labour so far, as to cause the greater portion of the department to be covered by roofs, in order that no time might be wasted, and better floors were laid down to economize power in moving the heavy weights.

It would not be possible, within the limits of this mere sketch of his career, to describe all the novelties introduced, or the improvements made; but a few must be mentioned.

The method of fitting the pivots for slides, and improvements in the slides and sliding carriages, afforded greater facilities for working and pointing heavy ship-guns, and also better cover for the men, when at quarters.

The improved travelling carriage for naval field howitzers, and an under carriage to enable boat guns to be fired into the enemies' tops, and the carriage on which to mount heavy 10-inch guns and 68-pounders, on the broadside of ships, instead of mounting them on slides and sliding carriages, were all useful introductions, as were several modifications of the

construction and fitting of field gun carriages, and in the method of carrying small arm ammunition, elevating heavy guns, &c. He also laid before the Committee, ordered to examine into "Coast Defences," the advantages of pivoting guns in casemates and other embrazures; by which means the neck of the embrasure could be reduced to the smallest dimensions, so as to afford more effectual protection to the gunners.

The simple, but ingenious system of mustering and paying the artizans of the Carriage department, by which about eight hundred men were paid in from twelve to fifteen minutes, was a valuable suggestion, as under the old system the greater part of a day would have been consumed by the pay, whereas by the new plan, the saving of time is estimated at upwards of £1000 per annum.

In the year 1824, when the attention of British capitalists became first directed to the silver mines of Mexico, which being abandoned during many years of revolutionary warfare, had become so inundated by water, as to defy all the imperfect machinery, formerly used, to effect their drainage, the opening was considered very promising, for the introduction of modern steam machinery, as employed in the mines of Cornwall. One of the most important localities thus selected, for the trial of British energy and machinery, was the famous mine of Real del Monte; but as it is situated at 250 miles from the coast, and at an elevation of nearly 10,000 feet above the sea, difficulties of no ordinary description had to be overcome, before the masses of heavy machinery could be deposited in their sphere of operation. To accomplish this arduous task, the Directors of the Real del Monte Company were fortunate in securing the services of Lieutenant Colquhoun, who with his marked predilection for Engineering pursuits, and with all the energy and zeal, which distinguished his character, immediately entered into the spirit of this novel and difficult undertaking, which he clearly foresaw would give renewed impetus to the mining industry of a country, whose sustained produce of the precious metal, he even then contemplated as important to the commerce of England.

The quantity of machinery requiring to be conveyed to the Real del Monte Mine, was very considerable, comprising seven steam-engines, with their boilers, pumps, and other accessories,

besides tools and stores, and for their conveyance the Company chartered three vessels, of from 250 to 400 tons, while Colquhoun prepared for his campaign, by the selection of a competent staff of wheelers, smiths, and non-commissioned Officers of artillery, and obtained from the abundant stores of the Royal Arsenal of Woolwich, a complete equipment of about sixty pontoon and artillery waggons, which were fitted up with the greatest care, for the conveyance of the heavy pieces of machinery. This expedition should have left England at the beginning of the year 1825, but unfortunately so many delays occurred, in preparing the machinery, that the three vessels did not arrive at their destination on the coast of Mexico, until the month of May, when the sickly season of that unhealthy coast was just commencing; while to add to their misfortunes, the castle of San Juan de Ulloa, which commands the harbour of Vera Cruz, being still held against the Mexican republic, by a Spanish garrison, it was found necessary to anchor in the open roadstead of Moicambo.

The difficulties which were subsequently encountered, in landing such masses of heavy machinery, through the surf of a perfectly unprotected beach,—the breaking-in of herds of wild mules for draught, and training the native drivers,—the passage over the heavy sands and jungle of the coast, succeeded by the precipitous and broken ascent of more than 9000 feet, to the table-land of Mexico, contending during part of the time with that cruel scourge, the yellow fever, and which in a few months carried off more than half the English attached to the party,—were trials which can hardly be imagined, and required all the energy of a determined will to conquer. Lieutenant Colquhoun only escaped fever to suffer very severely from the cruel disease of dysentery; but finally, after a year of constant anxiety and fatigue, the whole of the machinery was conveyed to its destination, and before the end of 1826, Colquhoun had the gratification of seeing the drainage of the Real del Monte Mines commenced, by the first steam-engine, which had ever been planted on the table-land of Mexico.

Soon after this, and on the expiration of his leave of absence from his corps, he returned to England, but his relations with Mexican mining were still retained, by his being elected one of the directors of the Bolanos Company, and this subsequently

led to his making (at the end of 1830) another visit to Mexico, with the object of inspecting and controlling the very important mining establishments belonging to that Company, in the State of Zacatecas, and which were then yielding the large produce of two millions and a quarter of ounces of silver per annum. He remained at the mines about two years, during which time his exertions were incessant and at the same time most successful, in introducing such a system and economy, into their very extensive establishments, as greatly tended to the large profits made by the Company, in that district.

Colonel Colquhoun was very early interested in the project for a direct railway from London to York, which at length merged into the present Great Northern Railway, of which he was for some years, a very efficient Director, interesting himself not only in the formation of the line, and in the working of the ordinary traffic, but by suggesting local improvements in the districts near which the line passed, and encouraging the formation of establishments, likely to add to the resources of the Company, he not only tended to the augmentation of the dividends, but to the permanent benefit of the country.

He also took great interest in the projected railway from the coast of Vera Cruz to the table-land of Mexico; and only a few weeks before his death, very flattering proposals were made to him, from influential capitalists of Mexico, urging his presence in that city, to assist them in the commencement of the work.

He engaged enthusiastically in the question of the best means of saving life in cases of shipwreck, and as a member of the Committee of the Shipwreck Society, he studied and experimented on the use of rockets, for carrying a line from the shore to a stranded vessel; and he constructed a carriage for facilitating the conveyance of a life-boat to the shore, and launching it through the surf: this is now stationed at Cullercoats, near Shields, and is stated to be very successful.

He was frequently employed on Committees of Investigation on such subjects, as "The Defences of the Channel Islands;" "On the Effect of Shot on Iron Plates and Pillars;" "On the Construction of Batteries on Sandy Shoals;" and "On the Armament of the Contract Mail Packets," &c., on all which occasions, as on all other civil, or military inquiries, in addition

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