

OBITUARY.

SIR WILLIAM HENRY WHITE,¹ K.C.B., F.R.S., formerly Director of Naval Construction and Assistant Controller of the Royal Navy, died suddenly on the 27th February, 1913, in Westminster Hospital, where he was brought, suffering from a paralytic seizure, from his office in Victoria Street, shortly after noon. The extent and intensity of the regret which his untimely end awakened, and the universality of the tribute paid to his genius, are only just recognitions of the great services which Sir William White rendered in advancing naval architecture from both scientific and practical standpoints, and of the conscientious and most successful work he did in the responsible position he held for 17 years at the Admiralty. The results of his efforts were, however, not confined to the products of his research and design, satisfactory as these invariably were; they had a far wider influence. He set an inspiring example, and readily won many disciples, by his practice of attacking ship-design problems at their base and on purely scientific lines, and by his continuous desire to introduce a higher standard of training and to advance the status of the profession technically and ethically. His enthusiasm, combined with his high reputation, enabled him to achieve great results as a leader in such causes, and thus in his life he not only accomplished a large volume of practical work, but exerted a powerful influence which will live long after his practical work has gone the way of all things material. There is in White's record immense encouragement for every youth, as he worked his way to prominence and success in his profession without influence or extraneous support; study, strenuous work, courage and consistency were the agents which carried him forward.

Born at Devonport, on the 2nd February, 1845, in circumstances

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which gave him no advantage over his fellows in the race of life, he, after education in the local schools, began work as an apprentice shipwright in the Royal dockyard in his native town, attending meanwhile the dockyard school. There he excelled, winning an Admiralty scholarship in 1863. At that time there were no technical schools at which students in naval architecture could take advanced courses, the Portsmouth School of Naval Architecture having been closed in 1853. But fortunately for White, the Admiralty in 1864, acceding to the recommendation of the Institution of Naval Architects, decided to establish the Royal School of Naval Architecture at South Kensington in conjunction with the Science and Art Department, the school being merged later in the Royal Naval College at Greenwich. At the earliest entrance examination White took first place, and continued during his 3 years' studentship to be first, graduating in 1867 with the Diploma of Fellow (first class). It is significant that the future Director of Naval Construction served his apprenticeship while attending special classes before taking his college course, a procedure which enabled him the better, as a constructor at the Admiralty, to combine supervision of work in progress with the preparation of designs. Indeed, this blending of theory and practice gave him experience and confidence in the highly responsible duties of later years, notably in connection with the selection of firms to undertake their first naval work under the Defence Act of 1889.

White entered the Admiralty in 1867, was promoted to the rank of Assistant Constructor in 1875, advanced to Chief Constructor in 1881, and after about 2 years at Elswick—between 1883 and 1885—returned to Whitehall as head of the Constructive Department, holding the offices of Director of Naval Construction and Assistant Controller of the Royal Navy from October, 1885, to February, 1902, when he retired owing to ill-health. During the 35 years' career embraced in this brief chronological record White won high recognition for original and arduous work in connection with the development of the science of naval architecture generally, and of warship design particularly, and for his encouragement of scientific study by means of professional papers and service given freely to technical institutions and, through treatises, in more permanent book form.

Circumstances favoured him during the period when he was preparing for the more responsible work of his life, and he availed himself of these to the fullest extent. When he went to the Admiralty the chief of the designing staff was Sir Edward Reed,

who recognized White's worth, and entrusted him with the solution of scientific problems in design and with the preparation of much data for his books on naval architecture, notably on "Shipbuilding in Iron and Steel," and for his papers to the Royal Society. In 1870 White began his 11 years' lectureship at the Royal School of Naval Architecture, which in the interval was removed to Greenwich. In 1870 also, when Reed retired, and a Council of Construction of the Navy was formed under Mr. (now Sir) Nathaniel Barnaby, White was appointed Secretary, and continued so until Sir Nathaniel became chief of the designing department in 1872. In 1871 White, in association with his old fellow-student and life-long brilliant friend, the late Mr. William John, undertook a close study of the stability of ships, in connection with the inquiry by Lord Dufferin's Commission into the loss of *Cowper Cole's* "Captain," and in this way he greatly advanced the science of ship-design. In these years were developed that love of research, that perspicacity in judgment, and that lucidity in exposition which were his strong characteristics.

Three years later, as stated, White was made Assistant Constructor, and in 1881 he was given the rank of Chief Constructor.

In 1883, when Sir William (afterwards Lord) Armstrong was about to found the now famous shipbuilding works at Elswick, he offered White the onerous task of organizing and directing it, which he did with distinction until his return to the Admiralty in 1885.

When at Elswick he had a free hand and a fuller scope than in his prior work at the Admiralty. He did good work for Austria, Italy, Spain, China, and Japan, while his designs for two United States cruisers were bought by the authorities at Washington. When Lord George Hamilton succeeded in getting him released from his engagement with Sir W. G. Armstrong and Co., and he returned to the Admiralty in October, 1885, as chief of the Constructive Department, the Navy was in an unsatisfactory condition. The Fleet was made up of a great variety of types, the only attempt at uniformity being in the ships of the Admiral class. The central-battery ship had given place to the turret vessel with low freeboards forward and aft, and it was doubted whether the guns could be fought in a heavy sea. White's first work was the expediting of the building of the ships under order. He designed several small ships for an Australian fleet. Then followed Lord George Hamilton's comprehensive scheme embodied in the Naval Defence Act of 1889, including seventy vessels, and costing 21 millions. This gave White a splendid

chance to achieve homogeneity of types, and again he availed himself of his opportunity.

The result was the eight ships of the Royal Sovereign class, which marked a great departure in the design of battleships, not so much in their size as in their high freeboard and disposition of armament. No advance, however, was made in speed; White never advocated high speed in ships-of-the-line, contending that it was dearly bought at the expense of the power of attack or defence. When, with Admiralty sanction, he revealed in a paper read before the Institution of Naval Architects the principles underlying the elements of design, and described in greater detail than in any previous communication to a technical society the features of the ship, unstinted approval was expressed, an approval more convincingly displayed in the acceptance in subsequent foreign ships of all the main points he advocated. Under the Spencer programme of 1894 White produced nine ships of the Majestic class. Here the activity in experiments of the armour-plate maker and of the ordnance manufacturer, as well as the progress in explosive compounds, which White himself continuously encouraged, assisted him. As the supercarburisation and chilling of armour intensified its resistance to attack, he was enabled to reduce the thickness of armour to 9 inches over the water-line, and to increase its height and length. The increase in gun-power made the 12-inch gun more effective than the 13.5-inch, and the former replaced the latter. But there were still retained the unarmoured ends, while the disposition of guns was unaltered.

In 1889 and in 1894 effort was made to ascertain whether smaller ships could not be produced, and in the former year the "Barfleur" and "Centurion" resulted, while in the latter year the "Renown" was designed, in all of which lighter armour was adopted. This policy was pursued in the six ships of the Canopus class, designed in 1896, and the results were not so successful; so that when the Goschen programme was entered upon in 1896, the eight Formidables were made larger, and in every way more powerful. Again, in the Duncans, when Krupp cemented steel was available, the armour was thinned amidships, but thickened forward; the displacement was reduced, and the designed speed was increased to 19 knots—the furthest White went in battleships. The last ships he designed were those of the King Edward VII. class, of which eight were built. Their most notable feature was the adoption of single 9.2-inch guns in barbettes on the four quarters of the ship, in addition to pairs of 12-inch guns forward and aft, and the fitting of the ten 6-inch quick-firers in a citadel behind the broadside

armour, extended for this purpose from the main deck to the upper deck. In addition to the armour forward, the water-line belt was continued aft, but of lessened thickness.

The largest ship prior to White becoming chief of the Constructive Department was 340 feet long and of 10,600 tons displacement; his Royal Sovereigns were 380 feet and 14,150 tons, while his King Edwards were 425 feet and 16,350 tons. The speed increased from 17 to 19·4 knots, with an augmentation of designed power from 13,000 to 18,000 indicated horse-power. The armour was increased in resisting power and in the area covered, while the offensive qualities were augmented. As before said, he was not enamoured of great speed in ships of the line. He ever contended that all his ships had adequate armoured reserve of buoyancy, and that a mixed battery, including many quick-firing guns, was preferable to the battery of the earlier Dreadnoughts. These points he strenuously advocated to the last, notwithstanding that he was in a great minority. It is significant that the later Dreadnoughts, so far as armament is concerned, have, like the most of White's ships, a battery of 12-inch and 6-inch guns, although the numbers, like the length and displacement and cost of ships, have considerably increased. The speed, too, has increased to 22 knots and more.

The speed of armoured cruisers during White's *régime* increased from 17 to 24½ knots, the length from 315 feet to 500 feet, and the displacement from 8,400 tons to 14,100 tons. The introduction of water-tube boilers and fast-running engines, both of which he supported, conduced to the greater speeds. Again, it must not be forgotten that since he left the Admiralty the development and consequent substitution in ships of the Navy of turbines for reciprocating engines has greatly simplified the problem of the naval architect, the weight saved enabling the fighting power to be augmented. In the design of small craft, light cruisers, gun-boats, and torpedo-boat destroyers, White was invariably successful, and in respect of the last-named he did great service.

In several important features, his work was most accurate. In not a single case did the actual ship exceed in draught or displacement the estimates of the design. High propulsive efficiency was always realised, and in no instance did a ship of his fail to attain her legend speed. But for the difficulties in connection with the Royal yacht "Victoria and Albert," when overwhelming demands upon his time precluded him from personally checking all data, his record on the matter of stability is equally flawless. The significance of these facts is only appreciated when it is noted that during his 17 years' tenure of office he was responsible for the

design and construction of 43 battleships, 26 armoured cruisers, 21 first-class, 48 second-class, and 33 third-class protected cruisers, and 74 smaller vessels, exclusive of destroyers. These 245 vessels cost about one hundred million sterling. In 1900, shortly after the "Victoria and Albert" launch, his health, which had been latterly indifferent, failed him, and having experienced a serious breakdown, he retired in February, 1902. His rewards of a C.B. in 1891, of a K.C.B. in 1895, and of a special grant by vote of Parliament in recognition of "exceptional services to the Navy," certainly did not err on the side of extravagance with public money or official honours. As a mark of the general esteem in which he was held, his professional brethren entertained him to dinner at Goldsmiths' Hall, and presented him with his portrait painted in oils.

When restored to health, which had been so undermined by his strenuous work at the Admiralty, White gradually took up various appointments where his experience and ability were valuable. Thus he was a member of the Cunard Commission which settled the question of the type of machinery to be placed in the "Lusitania" and "Mauretania," and was a director of Messrs. Swan, Hunter and Wigham Richardson, Limited, the builders of the latter vessel, during her construction. He was a director of Parsons Marine Turbine Company, and consistently advocated the application of the system, and later, the use of gearing. He was also a director of the Grand Trunk Railway from the time the company entered upon the ownership of steamships. He designed steamers with geared turbines for the service from India to Ceylon, and recently was appointed by the Government Commissioner to inquire into the question of the load-lines of merchant ships.

Reference has been made to White's services to the science of shipbuilding, apart from his design work. His "Manual of Naval Architecture," first published in 1877 and since revised, is a classic, and has been translated into German, Italian, Russian, and Spanish. No less valuable is his "Treatise on Shipbuilding." It would occupy too much space to enumerate his contributions to technical societies. His 11 years' lectureship (1870-1881) resulted in the accession to the naval service, and to the ranks of the staffs of private works, of a new and much-needed class of designer, who combined with sound practical training a fuller theoretical knowledge than formerly obtained. White's researches on the stability of ships, already referred to, were described in a paper to the Institution of Naval Architects, and incited others towards work on similar lines, while advancing theoretical knowledge generally. His exposi-

tion on the design of the "Royal Sovereign" was a treatise of high educational value. Notable among others were his papers on the rolling of sailing ships and on the effect of bilge-keels on the rolling of battleships.

His long and peculiarly intimate connection with this Institution and the many valuable services which he rendered it are recited in the terms of the Council's Resolution appended to this memoir. Many other societies elected him to offices of distinction. He was a Fellow of the Royal Society, and an Honorary Vice-President of the Institution of Naval Architects. His list of presidencies is probably unexcelled, including, amongst other bodies, the Royal Society of Arts, the Institution of Mechanical Engineers, the Institution of Marine Engineers, the Junior Institution of Engineers, and the recently-formed Institute of Metals. In 1909 he was President of the Institute of Metals, and in 1909-10 was chairman of the Council of the Society of Arts. He was also President-Designate of the British Association, of the Mechanical Science Section of which he was president a few years ago. To each institution he delivered an address which was characterised by breadth of view, lucid diction, and elevated sentiment. Of the dignity of the profession he was a jealous guardian and an active advocate from the time that he succeeded, soon after he became Chief of the Constructive Department, in inducing Admiral Sir Houston Stewart to create the Royal Corps of Naval Constructors at the Admiralty. He was head of the corps, his official designation thenceforth being Director of Naval Construction, as well as Assistant Controller. The corps has certainly lived up to the high ideal he set at the time. He greatly encouraged all technical colleges, and was in frequent request as a speaker at the distribution of prizes and other functions, when he stimulated students by his practical advice. He was a member of the governing body of the Imperial College of Science and Technology.

Several universities also honoured him. He was a D.Sc. of Cambridge, LL.D. of Glasgow, D.Eng. of Sheffield, and D.Sc. of Durham and of Columbia, N.Y. He was a Past Master of the Shipwrights' Company of London. Many foreign institutions elected him an honorary member, and in 1911 the John Fritz Medal was awarded him for his "notable achievements in naval architecture," by a special Board of Award appointed by the four leading engineering societies in America. The King of Denmark conferred upon him the dignity of Knight Commander of the Order of Dannebrog.

Sir William White's personal character was known to many

engineers. He was, above all, straight and manly. His mind was of the judicial type, ready to see the points of his opponents, but he was as vigorous and steadfast in the advocacy of his own convictions as he was tolerant of the views of those disagreeing with him. There remained after a fight in dialectics, which he dearly loved, no feeling of resentment. He was impatient of shams or of opinions based on self-interest; but was ever encouraging to the youth who had something to say at a technical meeting. These qualities were often displayed in his conduct of public meetings and his frequent participation in debate. Equally useful work was done by him in the committee rooms. He was of those whose presence in any deliberative committee could not remain for an instant undisclosed. In private he was a genial companion, a great and attractive talker, reminiscent and instructive, but never far from professional work.

He was twice married, first to Miss Alice Martin, who died in 1886, daughter of Mr. F. Martin, a chief constructor in the Navy; second, in 1890, to Miss Annie Marshall, daughter of Mr. F. C. Marshall, who, as directing engineer of Messrs. Hawthorn Leslie and Company, did so much for the advancement of naval machinery. By his first marriage, he had issue three sons and one daughter. Two sons are officers in the Navy and the third is at Elswick shipyard.

The funeral took place on Monday the 3rd March, the body being conveyed from Cedarcroft, Putney Heath, to Holy Trinity Church, Roehampton, where the first part of the service was held, the interment subsequently taking place at Putney Common Cemetery. Simultaneously with the service at Roehampton, a memorial service was held at St. Margaret's, Westminster, which was attended by distinguished representatives of the Admiralty and Naval service, and of the many scientific and other bodies and City Companies with which Sir William was connected. On Tuesday the Ordinary Meeting of The Institution was adjourned as a mark of respect, and the following Resolution was adopted:—

“That the Council regret deeply the death of their esteemed and respected colleague, Sir William Henry White, K.C.B., D.Sc., LL.D., D.Eng., F.R.S., Past-President, and desire to convey to Lady White and the members of his family an expression of deep sympathy with them in this bereavement; and at the same time to record their high appreciation of the services which Sir William White has rendered to The Institution of Civil Engineers throughout the period of his membership.

“He was elected a Member in 1882; became a Member of the

Council in 1893; and was elected President in 1903. His brilliant contributions to the Proceedings, including the classic account of the progress of shipbuilding and marine engineering contained in his Presidential Address, have added in a marked degree to their value and authority. His special services as a Member of the Council include his Chairmanship of the Committee on the Education and Training of Engineers, which was constituted in 1904; his membership of the Examinations Committee; and his Chairmanship of the New Building Committee, over which he presided continuously since the negotiations for the acquisition of The Institution premises and its rebuilding were opened by the Government in 1903. In 1904 he acted as leader of the party of members of The Institution which was then visiting the United States and Canada, an account of which he gave as an Address to The Institution on the 10th January, 1905. One of his most recent acts was to influence the formation of a fund by British and American Engineers for the purpose of erecting in Westminster Abbey a memorial to the late Lord Kelvin; and as Chairman of the Executive Committee of that fund he took a most active part in the work up to the time of his death.

“His colleagues desire to record the value they have attached to his great gifts of learning, judgment and expression; and their sense of the loss which they, in common with the whole of The Institution and the Engineering profession generally, have sustained by his death.”

PARKER ROSCOE ALLEN died at Bellary, India, on the 20th December, 1912. Trained at Coopers Hill College, he joined the Indian Public Works Department in 1882, and was first employed in connection with the Periyar Irrigation project. He later acted as Chief Engineer for Irrigation to the Nizam's Government, and reverting to the Madras service in 1903, became Superintending Engineer in 1907.

Mr. Allen was elected an Associate Member of The Institution on the 3rd December, 1889, and was transferred to the class of Members on the 11th December, 1901.
