

Professor G. Cesàro: On a Numerical Relation of the Sum of the Symmetry-axes situated in the Symmetry-planes of a Polyhedron. If $N, \Lambda_n, P, \Lambda_p, Q, \Lambda_q \dots$ are the axes of symmetry lying in the planes of symmetry, then $4 \{Nn(n-1) + Pp(p-1) + Qq(q-1) + \dots\} + 1 = C$, and the number of planes of symmetry is given by $X = \frac{C+1}{2}$

OBITUARY.

ARTHUR ROOPE HUNT, M.A. (CANTAB.), F.L.S.. F.G.S.

BORN JANUARY 8, 1843.

DIED DECEMBER 19, 1914.

WITH the close of the past year another of our old friends has been taken from us, and one who for a quarter of a century was not only a friend, but a frequent contributor to the pages of the *GEOLOGICAL MAGAZINE*.

Arthur Roope Hunt was descended from an old Devonshire family, who had resided for generations in or near Dartmouth. He was the son of Mr. Arthur Hunt, partner in the firm of Messrs. Hunt, Roope, & Teage, wine exporters of Oporto, and there, in 1843, young Hunt was born. But his residence in Portugal was only of brief duration. When only 8 or 9 years of age he left with his parents hurriedly in an English war vessel, as the lives of the British residents in Oporto were endangered by a revolution.

His family settled in Torquay in 1852. Here he commenced his English education under the tuition of the Rev. Townsend Warner, whose pupils included the present Lord Rayleigh, one of Hunt's school, college, and lifelong friends. Another youthful companion, only two years his senior, was afterwards to become Field-Marshal Lord Grenfell.

Those early years must have been very happy ones, for although always a delicate lad, Arthur Hunt enjoyed abundant outdoor pleasures and had many friends willing to share his society and encourage his pursuits.

It must be borne in mind that Torquay had been, from an early date, a very active centre of scientific life in all its diversified branches. The well-known Torquay Natural History Society, which was founded by William Pengelly and others, now in its seventieth year, afforded an admirable focus to a very wide circle of men of leisure and education resident in South Devon. In addition to Mr. Pengelly, Hunt's earliest instructor in geology, may be mentioned the naturalist, Mr. Philip Henry Gosse, the Rev. T. R. K. Stebbing, the Rev. G. F. Whidborne, Mr. John Edward Lee, Mr. E. B. Tawney, Mr. Daniel Pidgeon, Mr. R. H. Worth, and in later years Mr. Arthur Champernowne, Mr. W. A. E. Ussher, Mr. A. J. Jukes-Browne, and Mr. Alexander Somervail, to all of whom Hunt was intimately known.

Mr. Hunt displayed much knowledge of engineering, and had his constitution been more robust he might have carried on much more elaborate investigations; but his health forbade it, and he devoted himself to open-air pursuits, chiefly to geology, marine physics, and zoology.

Mr. Edmund Gosse, writing of his father, Philip Henry Gosse (the well-known author of many works on marine zoology), says: "When he [Gosse] took sailing excursions he often had the company of Mr. Arthur Hunt of Torquay, a young naturalist of knowledge and enthusiasm who possessed a yacht, the *Gannet*, in which the friends undertook frequent scientific excursions, especially over the sandy *zostera*-beds in Torbay, among the little archipelago which lies off Hope's Nose, at the mouth of Brixham Harbour, and off Berry Head."

At 18 A. R. Hunt proceeded to Trinity College, Cambridge, where in 1864 he took his degree of M.A. He then studied law, "ate his dinners" at the Inner Temple, and was duly "called to the Bar", but he never practised.

After spending a few years in the business house of a cousin in the city of London, he abandoned town permanently, and in 1874 settled down at Southwood, Torquay, only varying his residence to visit his estate at Foxworthy, Moreton Hampstead.

In 1870 he was elected F.G.S., and in 1884 he became a Fellow of the Linnean Society.

In company with Mr. Pengelly he devoted much time to the exploration of Kent's Cavern, and wrote many papers thereon. What he learned from Pengelly he applied to the Scottish cave at Borneess, Kirkcudbrightshire, which he explored with the co-operation of Adam Corrie & W. Bruce-Clarke,¹ a very complete and excellent piece of cave-work.

Accompanied by Pengelly, Tawney, and other of his friends, he made numerous geological investigations in Devonshire and neighbouring counties. He also specially studied the subject of ripple-mark and its origin and the submarine geology of the English Channel off the coast of Devon and Cornwall. Mr. Hunt secured numerous rock-specimens brought in by the Brixham trawlers, many of which were sliced and examined microscopically and reported upon by him. With Mr. R. N. Worth he devoted special attention to the age of the Dartmoor granites, the Devonian rocks of South Devon, and the metamorphic schists and Lizard serpentines, and published numerous papers thereon. Over these subjects he was both the giver and the recipient of much keen criticism from General MacMahon, Professor Bonney, and others. Many of these controversies were carried on in the pages of the GEOLOGICAL MAGAZINE, the Transactions of the Devonshire Association (1892-7), and other journals.

For many years he attended the meetings of the British Association, and he took a keen interest in the papers read in the various sections, and joined in the discussions with his usual enthusiasm.

Like other able young men of science Hunt felt attracted by and tempted to cope with questions relating to many and diverse branches of research, and delighted, as the Athenians of old, "to tell or to hear of some new thing." Had he devoted himself exclusively to any one of the varied subjects he at times pursued with so much ardour, he might have earned a more distinguished name for himself in science outside Devonshire, where, and especially in Torquay, he will be long

¹ See Proc. Soc. Antiqu. Scotland, vol. x, 1873-4, illustrated by six octavo plates prepared from photographs by A. R. Hunt.

remembered. The stimulus of *necessity* was, however, wanting, and Mr. Hunt could allow himself the pleasant freedom of the amateur to take up and lay aside a number of diverse pursuits, to turn from the microscope and the study of igneous rocks to pen a long letter to the local or provincial press, voicing his views on the various actions of the Municipal Authorities and the needs of Torquay and its harbour, and on the hundred and one other matters a Corporation undertakes.

In early years I paid many pleasant visits to my old friend Mr. John Edward Lee, antiquary and geologist, at Torquay. There I met Arthur Roope Hunt, and with him I studied ripple-mark, and in his boat we visited the raised beaches on the Thatcher. He also showed me his model arrangement for demonstrating the force and velocity of waves and their action on the stability of lighthouses. He was full of enthusiasm and interest, and I look back to my friendship with him as a most pleasant memory. The loss of such a versatile man of genius will be much felt by the wide circle in Devonshire and elsewhere with whom he came in contact, either personally or by correspondence, for he was a great letter-writer.

Between 1890 and 1913 Mr. Hunt frequently contributed to the *GEOLOGICAL MAGAZINE*, and to the Transactions of the Devonshire Association from 1873 to 1913. His paper on "Ripple-mark" was read by Lord Rayleigh before the Royal Society in 1882 (see Proc. Roy. Soc.). Other products of his pen appeared in the publications of the Torquay Natural History Society, the Proceedings of the Royal Dublin Society, the Linnæan Society, the British Association, the Society of Antiquaries of Scotland, and in the *Westminster Review*. He published altogether nearly a hundred papers, whilst his letters on scientific and general topics in the *Torquay Directory* and other newspapers probably reached several hundred in number. He was a past President of the Torquay Natural History Society, one of the founders and managers of its Museum, and its frequent benefactor. On no less than three occasions he felt compelled to decline the proffered honour of the presidency of the Devonshire Association.

In his yachting days he was a member of the Royal Dart Yacht Club; he was a former Captain of the Torquay Golf Club; and Captain of the Miniature Rifle Club at Walls Hill. Amongst his varied attainments he was an enthusiastic musician, and an accomplished photographer.

Mr. Hunt leaves a widow and a son, Mr. C. A. Hunt, M.A., Barrister-at-Law, and one married daughter, Mrs. Ernest Smith.

H. W.

FREDERICK WILLIAM RUDLER, I.S.O., F.G.S., ETC.

BORN JULY, 1840.

DIED JANUARY 23, 1915.

THE death of Mr. F. W. Rudler took place at Tatsfield, Surrey, on January 23, and will cause the deepest sorrow to a very wide circle of geological and other scientific friends, by whom he was highly esteemed for his wide literary and scientific attainments, and beloved for his gentle and kindly disposition. His modesty almost amounted to shyness. He was a friend to those in trouble and a generous helper to those in need. Some fifty-five years have passed away