

DR. JONATHAN HEARDER.

JONATHAN NASH HEARDER was for many years one of the most active and energetic contributors to the scientific department of the Society's pursuits.

He was born at Plymouth in 1809. At an early age he acquired great dexterity in the use of tools, and was enabled to produce for himself electrical and chemical apparatus, wherewith he acquired knowledge experimentally, and which eventually led on to the prosecution of lengthened investigations of a very important character.

He was soon distinguished for his ability in the production of electrical machines of very remarkable efficiency. He was also very successful in devising electrical apparatus, and in the execution of experiments illustrative of the phenomena of electricity. At the early age of seventeen he gave courses of lectures in Plymouth and at Exeter on electrical and chemical subjects; and from that time until comparatively a recent period he continued to give lectures throughout the Western Counties and elsewhere, which were distinguished for their eloquent lucidity of explanation and brilliancy of experimental illustration. His bright, cheerful style of treatment of difficult subjects had such a charm for his audience that he gained adherents to the pursuits of science, and sealed the fate for life of at least some of his young hearers. He was a thoroughly scientific man; no mere show lecturer, but one who pursued science for its own sake. In his lectures he always challenged discussion; and it was no uncommon thing in his early days for the discussions to excite such interest as to lead to repeated adjournments.

His early-acquired dexterity of manipulation stood him in good stead; for at the age of twenty-one he lost his sight through the accidental explosion of silver fulminate; but his perseverance was such that he continued to make his own apparatus at the lathe, and his associates have regarded with envy and admiration pieces of work that he could turn out, quite beyond their capability. It was not easy for a stranger to believe that he was blind, looking at his movements behind the lecture table, well covered with complicated apparatus.

His lectures at the Athenæum were always looked forward to, not only by the members, but also by outsiders, with interested

anticipation ; and the enjoyment of them was considerably enhanced by his good-tempered, trenchant style of dealing with opponents in the discussions following, not only his own, but others' lectures. Many of his Athenæum lectures were characterized, not merely by his ability in treatment, but also by their great amount of laborious preparation, and for thoroughness of experimental illustration, rarely, if ever, excelled.

While young he was distinguished for almost superabundant energy. To his graver associates his scientific pursuits seemed to absorb his whole attention ; but with others, in cricketing, boating, fishing, swimming, he was recognized as first amongst the first.

For some years after the loss of his sight he kept a school, and many of his old pupils have good reason to be thankful for and to remember, the energy with which he pressed them forward with their studies. He was no mean musician, and was a considerable contributor to the local periodical and newspaper literature.

At the time that Sir W. Snow Harris's lightning conductor for the protection of ships was introduced, he took a very active part in combating a very energetic opposition that was raised against its adoption. By public discussions of a very lively character, and by newspaper correspondence, he did very much in diffusing a large amount of very useful knowledge of electrical matters.

Amongst his earliest and most remarkable lectures were some on combustion, which were not only brilliantly illustrated but also thoroughly explained. His early recognition of the importance of the subject has been most completely verified by the successful developments of chemical manufactures, and by the history of marine navigation. Dr. Hearder continued to give great attention to the subject, both practically and theoretically. The importance of some of his investigations has hardly even yet been properly recognized ; for his investigations of the conductivity of metals to heat and to electricity, and of the phenomena of combustion *in vacuo*, were extensive and profound.

When lucifer matches were first introduced, and were selling at one shilling per box, he took up the manufacture ; but subsequently turned his attention to the making and introduction of Arnott's stoves, in which he made several important improvements.

After his father's death he continued the family business, that of the manufacture of fishing tackle, on which matter he was the authority of the district.

From an early period he devoted much attention to medical electricity, and introduced a very admirable modification of the induction coil machine, which has obtained considerable celebrity.

He experimented largely on the production of power by electricity, and on the utilization of the electric light, and was an early, if not the earliest, proposer of its use for military and naval purposes. In concert with the local authorities he showed the possibility of exploring the country around at night by the use of the light from the top of the Devonport Column. In 1846 he exhibited at the Royal Cornwall Polytechnic Society an arrangement of primary and secondary coils, with which sparks were obtained in air, and discharges several inches long through rarefied air, and with which Leyden jars were charged. In 1853-4 he brought out an induction coil, which was a great improvement on the Ruhmkorff. He was one of the earliest advocates of the use of submarine telegraphs, and invented a form of cable which with some modification was used as a sea-cable. The subjoined list of papers published by him will give some faint idea of his industry. His lamented decease leaves a vacancy in the ranks of the members of our Society which will prove very difficult to fill.

- "On Arnott's Stoves." Read at the Plymouth Meeting of the British Association, 1841.
- "On a New Magnetometer, a New Rotating Electro-motive Engine, and a New Thermo-Electrometer." Royal Cornwall Polytechnic Society's Report, 1844.
- "On a New Form of Medical Galvanic Machine, with Double Index Graduation." Royal Cornwall Polytechnic Society's Report, 1846.
- "Some New Effects of Induction Apparatus for Medical Purposes." *Ibid*, 1848.
- "A New and Powerful Cast Iron Magnet." *Ibid*, 1848.
- "A New and Powerful Form of Static Induction Coil." *Ibid*, 1856.
- "A New Arrangement of the Induction Coil." *Philosophical Magazine*, 1856.
- "Some New Statical and Thermal Effects of a Powerful Induction Apparatus." Royal Cornwall Polytechnic Society's Report, 1856.
- "New Form of Telegraph Cable intended to reduce the effects of Inductive Action." Royal Cornwall Polytechnic Society's Report; "*Philosophical Magazine*," 1859.
- "Electrical Conductivity of Metals." "*Philosophical Magazine*," 1860.
- "The Inductometer." Royal Cornwall Polytechnic Society's Report, 1860.
- "On the Imperfection in the Present Mode of Fitting Lightning Conductors." *Devonshire Association Transactions*, 1863.
- "New Deep-Sea Pressure Gauge." *Ibid*, 1862.
- "Some Experiments with the Electric Light." *Devonshire Association Transactions*, 1865.

- "Remarks on the Cost of Light from Magnesium, as Compared with other sources of Illumination, with an Account of some New Inflammable Explosive Compounds of Magnesium." Devonshire Association Transactions, 1865.
- "Some Experiments to determine the Rate of Magnetic Development in Iron whilst under the action of Electrical Currents." Devonshire Association Transactions, 1866.
- "Review of Professor Tyndall's Recent Investigations concerning Sensitive Flames." Plymouth Institution Transactions, 1868.
- "Recent Earthquakes and Volcanic Eruptions." *Ibid*, 1869.
- "The Fulgurator. A New Arrangement of Leyden Jars for the Production of Electro Sparks of Enormous Length." Devonshire Association Transactions, 1870.
- "On the Degeneration of our Deep-Sea Fisheries." Devonshire Association Transactions, 1870.
- "Aurora Borealis." Plymouth Institution Transactions, 1871.
- "Electro Therapeutics." British Medical Association Transactions, 1871; Devonshire Association Transactions, 1872.
- "Guide to the Fishing of Plymouth and Neighbourhood."
- "Application of Cast Iron as a Substitute for Steel in the Construction of Permanent Magnets."
- "On the Comparative Power of Cylinder and Plate Electrical Machines." Plymouth Institution Transactions.
- "Treatise on Medical Magnetism."
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