this purifying apparatus has not been given any more than a preliminary trial. From this, however, it is quite evident that it will prove satisfactory in operation. For the purpose of carrying out this scheme of high-grade purification, a liquid-air plant was installed by the University of Toronto. Motors and an electric current supply were furnished by the Hydro-Electric Commission of Ontario, and a special financial grant was made by the Honorary Advisory Council for Scientific and Industrial Research of Canada to supplement that made by the Admiralty and the Air Board of Great Britain.

Final Design of Helium-extracting Apparatus.

Every step in the production of high-grade helium has been carefully examined and tested. From the experience gained, we have been able to draw up specifications for a commercial plant which will enable one to treat the whole of the natural gas of the Bow Island supply in Alberta. The unit proposed will deal with about 1600 cubic metres or 56,500 cubic feet of gas per hour at normal pressure and temperature. At the altitude of Calgary, this would be equivalent to 62,200 cubic feet per hour. The machine would easily cope with 66,000 cubic feet per hour or 1100 cubic feet per minute. Of these machines, six would deal with 9,500,000 cubic feet of gas per day, and would thus take about the average daily supply available from the field, as based on records of the average yearly consumption. In order to have sufficient machines to operate regularly to capacity, it would probably be advisable to have eight helium columns included in the plant.

The cost of a commercial plant suitable for treating the whole of the supply of the Alberta field would probably be less than 150,000*l*. The amount of helium of upwards of 97 per cent. purity obtainable per year from the field would be about 10,500,000 cubic feet. This is based on the assumption of an efficiency of 80 per cent., which experience has shown is obtainable. As to operating costs, our experience has shown that, allowing for interest on the investment, a ten years' amortisation, salaries, supplies, and running charges, helium can be produced at the Alberta field for considerably less than 10*l*. per 1000 cubic feet. This sum does not, of course, include the cost of purchasing cylinders or of transporting them from and to the works. Neither does it include any compensation to the owners of the field for the supply of gas.

(*To be continued.*)

Obituary.

PROF. JOHN PERRY, F.R.S.

THE death of Prof. John Perry on August 4, at the age of seventy, leaves a blank in our scientific circle which cannot well be filled. A man of original mind and original manner, a warm-hearted Protestant Irishman, impulsive and enthusiastic in whatever cause he might engage, simple-minded to a degree and a thorough-going optimist, one of the most delightful of companions, he was of the class of lovable men and popular accordingly; he will be much missed, particularly at meetings of the British Association, of which he had been the general treasurer of late years.

Perry was educated in Belfast, finally at Queen's College, where he came under Andrews, one of the ablest and most original men of his day; it was from Andrews that he imbibed his feeling for chemistry, unusual in the engineer and mathematician: at least, he learnt to appreciate the part played by the electrolyte in chemical interchanges—as he once told me, through having fused out the bottom of Andrews's platinum crucible by heating potash in it. Later he was an assistant to William Thomson (Lord Kelvin). Under the influence of two such men his genius could not but unfold.

Perry began his career at Clifton College. I first met him at Clifton, at a dinner, where, of course, he out-talked everyone: I can well recollect how he amused us and how he called Sir Walter Scott an upholsterer. He was always a voracious novel-reader and remembered what he had read in an extraordinary way. On the occasion of the British Association visit to Winnipeg, he often astonished his travelling companions by his local knowledge, as he identified spot after spot with Fenimore Cooper's characters.

From Clifton, Perry went to Glasgow to assist Thomson, I imagine on Andrews's recommendation. In 1875 he went to Japan and was one of the band who gave the Japanese their first lessons in science—to be cast off when done with; like Ayrton and Divers, however, he was an ultra-enthusiastic Japanophile. In Japan he became associated with Ayrton and a constant flow of communications, mainly on electrical subjects, to the Royal and other societies was the consequence of the partnership. In those days what Ayrton and Perry did not know or do or claim to have done was not worth knowing, doing or claiming; no two men, in the exuberance of their youth, were ever better satisfied with themselves. They were in remarkable contrast: entirely diverse yet complementary natures, each cognisant and respectful of the other's special ability. Ayrton was the worldly, practical member of the firm, Perry the dreamer. Ayrton always had a sense of what was wanted and what would pay: he, I believe, usually set the problem; Perry worked out a solution, which Ayrton then criticised and referred back to Perry for development. In the same manner, I believe, he co-operated, during the war, with the mechanical genius of Sidney Brown—the husband of his niece—in the development of the gyrostatic compass.

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The partnership with Ayrton was continued several years after their return to England in 1879. They were in the van of electrical progress, in some respects before their time—as in the case of Telpherage, which they developed in association with Fleeming Jenkin. Those were wonderful days: we were just learning to know and use electricity. A little later, Perry's house was often the scene of most stimulating debates, especially when Larmor and Lodge forgathered there with Fitzgerald, whom Perry adored.

Perry's best work was done at the Finsbury Technical College. Ayrton and I were called on to lay the foundations of the work of the City and Guilds Institute for the Advancement of Technical Education in October, 1879; we began in temporary quarters in Cowper Street, Finsbury. I found not only that plans were prepared for a separate chemical laboratory but also that steps had already been taken towards the erection of the building. I took exception to the scheme on the ground that more than a mere knowledge of chemistry would be required of the technical chemist of the future: that he must know something of the fundamentals of mathematics, of physics—especially electricity—and of engineering—drawing in particular. My view prevailed and we set to work to excogitate a practical programme and design a building. In 1871 we roped in Perry to our aid: our trio always fought like thieves over every detail but remained as one man throughout. The outcome was the present Finsbury Technical College and the original Finsbury scheme: I say "original" because our successors were never whole-hearted followers of our convictions and aspirations. This much I may assert as the last of the Finsbury Mohicans—we were in advance of our time and our fate has been the usual fate of pioneers and prophets. We cut the college adrift from all external examinations. We imposed an entrance examination on applicants. Not only was the course comprehensive but also the methods were special, practical and advisedly educative rather than informative; our students were young and their period of training was short but at its close, although they did not know a great deal, they had learnt to think for themselves and to do by themselves, so that they were mentally prepared to continue learning when left to their own devices. Now the college is to experience the fate of our scheme; it is said that it will be closed next year. When established it was the most original school in the country and it has been a remarkable success. We are a strange people: we seem never to know when we have hold of a good thing and cannot long maintain a consistent policy. In abandoning Finsbury the City and Guilds Institute signs its own death-warrant; but it has long been practically defunct, the men of imagination and outlook who founded it having bred no successors.

Perry did not leave Finsbury until 1896, when he became professor of mathematics and mechanics in the Royal College of Science, South Kensington. He had the advantage of being a practical engineer by training; this, added to his mathematical genius and his intimate knowledge of electrical science, not forgetting his literary proclivities, made him a man of unusual breadth and sanity of outlook. No special scientific achievement is to be associated with his name; his real interest lay in the work of education and he will go down to fame as an original and constructive teacher who laid the foundation of a new era. He made mathematical teaching practical and taught many who could never have mastered the abstract subject to use such knowledge and ability as they had with effect. As examiner in mathematics to the Science and Art Department he exercised a wide and beneficent influence on the teaching of this subject. His methods were not everywhere popular, but this was mainly because of the special demands their practice made on the intelligence of the teacher. As he more than once remarked to me, few really understood him. Still, the written word remains: Perry has left much on record which will be of service to a future, more appreciative generation.

H. E. A.

PROF. PERRY'S love of research and restless spirit of inquiry have inspired the lives of innumerable students who came under his influence. Who can measure what the nation owes to Perry for the intellectual gifts he distributed so freely to so many men? Who can measure the boundaries to which his influence will reach through the lives and activities of his students? The man who inspires is in time forgotten, but those whom he stimulates inspire others, so that his influence increases as time goes on. An engineering work like a fine bridge can be seen of all, and the builder is applauded and rewarded. The scientific spirit is apprehended by few, and those who possess it and spend their lives in the true service of the nation by cherishing it and by passing it on to others are unknown and unrewarded by authority, but are held in respect and affection by those who receive from them what so few are able to give. Perry gave lavishly, and his students responded with enthusiastic affection. He ranged wide in the regions of science. In Japan he and his friend and colleague Ayrton experimented furiously. Paper after paper came red-hot from their intellectual forge until even Lord Kelvin said that the pole of scientific research had shifted to Japan.

Finsbury Technical College was founded to do something in technical education which had not been done before. Perry and his colleagues, Ayrton and Armstrong, launched the college. They made it a pioneer in technical education. They made it world-famous. Everything which these men did was new, unorthodox, stimulating, and vastly interesting to the keen young men who flocked from the workshop to the college to hear and often to help them. Perry was unorthodox of the unorthodox. He taught his students to mistrust authority and to try things out for themselves.

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