one of his earliest papers he has remarked: "Such a veritable littoral algal vegetation within the tropical zone, where everyday the algæ are laid dry for several hours, exposed to the heat of the burning sun and the strong evaporation in this very dry part of India is so far as I know something quite unknown." He has also confirmed that the geographical distribution of some tropical and sub-tropical marine algæ is discontinuous. The marine myxophyceæ have not been touched by him excepting the five species found at Bombay. As a result of his investigations he has added five new genera and thirty-eight new species to science and altogether he has recorded near about two hundred species from the Bombay Presidency alone.

All these years the freshwater algæ made no headway and they had been practically neglected. However, in 1931 the author published a short paper on the Charophytes and this was followed by a series of papers on other freshwater algæ of the Province.[7-10] Twenty species of Charophytes and about seventy-five species of other algæ have been recorded. In 1936 Apte published an account of four species of Volvox from Poona in the *Journal of the University of Bombay.*

Apart from the taxonomic and morphological work mentioned above, practically no work has been done so far on other aspects of algal life. In 1930 the writer[11] determined the percentage of iodine in certain algæ and in 1935 Cooper and Pasha[12] investigated the osmotic pressure and H-ion concentration of seaweeds in relation to those of sea-water.

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[2] Kirtikar, K. R., *J. Bom. Nat. Hist. Soc.*, 1886, **1.**

[3] Hansgirg, A., *Prag. Citz. Ber. Bohm. Gess. Wiss.*, 1902 & 1903, No. 28.

[4] Groves, J., *J. Linn. Soc.*, 1924, **46,** 359.

[5] Boergesen, F., *Det. Kgl. Danske Videnskabernes Selskab. Biologiske Meddelelser*, 1933, **10.** 8.

[6] —, *Ibid.*, 1935, **12,** 2.

[7] Dixit, S. C., *J. Ind. Bot. Soc.*, 1940, **18.**

[8] —, *Proc. Ind. Acad. Sci.*, 1936, **3.**

[9] —, *Ibid.*, 1937, **5.**

[10] —, *J. Univ. Bom.* March 1940.

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OBITUARY

SIR ROBERT HADFIELD

THE death of Sir Robert Abbot Hadfield, BT., D.Sc., F.R.S., removes the most outstanding figure in the field of Metallurgy. He really belonged to the latter half of the last century, having become world-famous by the discovery of his Manganese Steel in 1888. The importance of manganese in the making of steel was first realised by Sir Henry Bessemer, but it was not until the systematic researches of Sir Hadfield on the alloys of iron and manganese culminated in the discovery of the famous Manganese Steel, that the further development of alloy steels became possible. Quite apart from the wonderful properties of the newly discovered alloy, the method of Sir Robert Hadfield's researches attracted wide attention from all the leading metallurgists of the day. It may not be out of place to refer here to the tribute paid to him in 1903 by Prof. Osmond, one of the great leaders in the development of modern metallurgical thought:

"The series of the Hadfield alloys had been prepared with a degree of technical skill which upset many falsely conceived ideas, resulting from imperfect preparation or from faulty manipulation. Hadfield's method was a truly scientific one, by means of which all the independent variables which could be disposed of were eliminated. With the materials for investigation thus prepared, which for a long time had been unrivalled, the results obtained were at once clear, coherent and definite. Moreover, Hadfield had not only made the best personal use of this wealth of material but with never-failing generosity, of which the writer had many times availed himself, he had placed it at the disposal of those inventors who were desirous of subjecting it to their methods and using it for their researches. Consequently the useful results had gone on increasing and from the accumulations of these the general laws had been evolved,

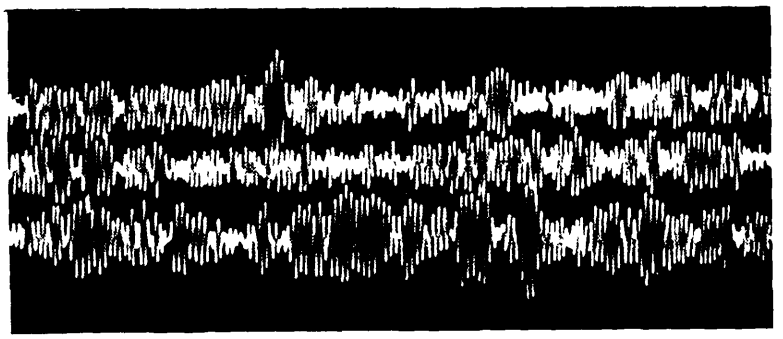
which formed the main object of all research."

That Sir Robert was not only the inventor of Manganese Steel, but also the pioneer in the field of other alloy steels is not generally known. It is claimed by some that he was a true prophet in regard to the ever-increasing importance of these special steels. In his paper on "Alloys of Iron and Chromium" presented to the British Iron and Steel Institute in 1892, he said, "The author cannot but think that the special question of steel alloys or combinations will be eventually found to possess considerable practical importance to the world at large and perhaps be the means of eventually enabling our Civil and Mechanical Engineers to design and carry out works of great magnitude". How true this forecast is, made thirty years ago, will easily be realised by the modern technicians.

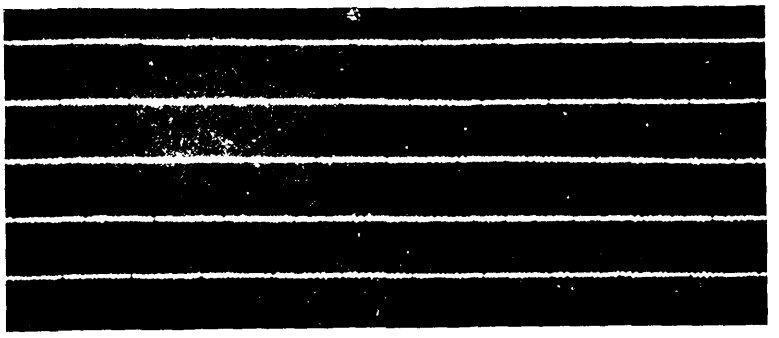
Sir Robert Hadfield was Chairman of the firm Hadfields Ltd., Sheffield, and director of a number of other companies. He was connected with a number of technical societies and was President of British Iron and Steel Institute from 1905–07. He was awarded in 1904 the Bessemer Gold Medal. In 1908 he was knighted and the following year became F.R.S. He has contributed a number of valuable papers to the Iron and Steel Institute and other technical Institutions.

THE SEVERE CYCLONIC STORM OF 16th OCTOBER 1940

A DEEP depression off the Konkan-Kanara coast developed into a severe cyclonic storm which moved towards Bombay at 2 a.m. (I.S.T.) on the 16th October 1940, and about six hours later crossed the coast near Bombay causing considerable damage in and round the City.



Microseisms at the time of the Cyclonic Storm on 16-10-40



Microseisms on the day previous to the Storm

The barometer at the Colaba Observatory showed a fall of 0·27 inches between 10–30 p.m. on the 15th and 8 a.m. on the 16th. The minimum reading of the barometric pressure was 29·42 inches as read from the microbarograph. This occurred at 7–45 a.m. on the 16th at which instant a single gust of wind reached a hurricane force of 75 miles per hour, and the wind force remained very high from about 7–30 a.m. till about 8–30 a.m. during which the average windspeed was as high as about 60 miles per hour. Both these values are so far the highest on record at the Colaba Observatory.

The Milne-Shaw seismograph recorded the strongest microseisms ever recorded by the instruments here till now. Portions of this record as also that of the day previous are reproduced here for comparison.

The microbarograph shows very rapid fluctuations of the pressure between 5–45 a.m. and 10–45 a.m. on the 16th. The storm abated at about 12–30 p.m. on the 16th.

M. R. RANGASWAMI.
Colaba Observatory,
Bombay,
October 17, 1940.