



SATURDAY, NOVEMBER 2, 1929.

CONTENTS.

	PAGE
Ships of the Atlantic Ferry	677
The Lancashire Witches	678
Foraminifera. By E. H.-A.	680
Transmission and Distribution of Electrical Energy	682
Pure Mathematics. By Prof. L. M. Milne-Thomson	683
Our Bookshelf	684
Letters to the Editor :	
Earthquake Sounds heard at Great Distances.— Andrew Thomson ; Dr. F. J. W. Whipple	687
Vacuum Spark Spectra in the Extreme Ultra- Violet down to 100 Å.—Bengt Edlén and Algot Ericson	688
Natural Selection.—Prof. E. W. MacBride, F.R.S.	689
The Scattering of Light in Colloidal Solutions and Gels.—K. Krishnamurti	690
A New Species of <i>Cronartium</i> from the Hima- layas.—Dr. Krishnadas Bagchee	691
Raman Effect from Powdered Crystals.—Prof. R. Bär	692
Golgi Body and Vacuome.—Prof. D. R. Bhatta- charya and Dr. R. S. Das	692
Lethal Action of Ultra-Violet Light on Micro- Organisms in a High Vacuum.—Dr. D. A. Wells	693
Witchcraft and the Black Mass.—H. Wallis Chapman ; The Reviewer	693
Dipterous Parasites of Tsetse Flies.—Prof. T. D. A. Cockerell	693
Final Report on the Great Barrier Reef Expedition. By Dr. C. M. Yonge	694
The Vegetable Tannins. By Prof. K. Freudenberg	697
Obituary :	
Dr. E. E. Slosson	699
Prof. Heinrich Beckurts	700
News and Views	700
Our Astronomical Column	704
Research Items	705
Population Studies in South Africa	708
The Pectic Substances of Plants	709
Locomotive Firebox Stays and Plates. By F. C. T.	709
University and Educational Intelligence	710
Calendar of Patent Records	710
Official Publications Received	711
Diary of Societies	711

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Ships of the Atlantic Ferry.

IN the story of man's struggle with the forces of Nature, there are few more fascinating chapters than that relating to the conquest of the Atlantic by steam. To cross the western ocean is an everyday affair, and except that no ship can be built that will not roll and pitch amidst the great waves of an ocean swept by gales for more than half the year, travellers are carried in comfort and luxury and with regularity and dispatch undreamt of a century ago. The first ever to carry passengers by steamboat, to form a steamboat company, and to advertise his project, was John Fitch, whose experiments were made on the Delaware and who died in 1798. There were many other pioneers, but of them all, Fitch alone envisaged the future of steam on the western ocean, and with prophetic vision wrote of steam navigation that "The Grand and Principle Object must be on the Atlantick, which would soon overspread the wild forests of America with people, and make us the most oppulent Empire on Earth".

Forty years separate Fitch's untimely death and the first voyage of the famous *Great Western*—Brunel's fine ship which definitely established trans-Atlantic steam navigation. Other ships had crossed the ocean before 1838, partly by steam, partly by sail, but the real pioneer ship of the Atlantic ferry was the *Great Western*, the performances of which, from the day she left Bristol on her maiden voyage until she came to the Thames to be broken up, reflected nothing but credit on her designers and constructors. Followed soon by the *Royal William*, the *Liverpool*, the *British Queen*, by Cunard's ships, the *Britannia*, *Acadia*, and *Caledonia*, and by the ill-fated *President*, before the close of 1840, the Atlantic had been crossed and recrossed by steam vessels more than forty times, and ever since, the Atlantic has been the testing ground and the racecourse of the finest ships in the world. Wooden ships have given way to iron ships and steel ships, paddle ships to screw ships; simple expansion engines were replaced by compound engines, and these again have been superseded by triple expansion engines and Parsons' steam turbines; the displacement of ships has risen from 1000 tons to nearly 60,000 tons, passenger lists runs into thousands, and the time of passage has been reduced from the sixteen days of the *Great Western* to the four days of the *Bremen*; and with greater size and greater speed has come vastly increased safety.

During the first years of the Atlantic ferry,

progress was almost entirely due to men trained in the hard school of practical experience, and the designers who possessed more than a passing acquaintance with the scientific principles underlying the work of the naval architect could be counted upon the fingers of one's hands. With the foundation of the Institution of Naval Architects in 1860, the opening of the Royal School of Naval Architecture at South Kensington four years later, and with the work of Woolley, Merrifield, Rankine, Scott Russell, Barnaby, and especially William Froude, the study of the theory of naval architecture became a recognised part of the training of every constructor, and this with immensely important results to our shipbuilding industry.

This aspect of the subject is recalled by the paper on "Atlantic Ships" read to the Institution of Engineers and Shipbuilders in Scotland by Sir John Biles on Oct. 8. A Portsmouth Dockyard apprentice, Sir John Biles was one of the last students of the old school at South Kensington, from which he passed to Greenwich; in 1876 he was employed on the construction of the notable little vessels H.M. ships *Iris* and *Mercury*, and then in 1880, leaving the Admiralty, he joined the firm of J. and G. Thomson of Clydebank and became concerned with the designing of ships for the Atlantic. Beginning with the *Aurania* and the *Pavonia*, he designed the *America*, the *City of Paris*, and *City of New York*, all remarkable ships in their day, and there is probably no one alive to-day with a more intimate knowledge of the history of subsequent developments or indeed of shipbuilding in all its branches. Given a free choice, it was therefore but natural for Sir John Biles to take for his subject "Atlantic Ships", and his paper is not only a valuable historical review of the achievements of the last half-century but also an interesting introduction to the problem of the Atlantic ship of to-day. His own ships, the *City of Paris* and *City of New York*, were soon surpassed by the *Campania* and *Lucania*, and these again by the German vessels the *Kaiser Wilhelm der Gross* (1897), *Deutschland* (1900), *Kronprinz Wilhelm* (1901), and *Kaiser Wilhelm II.* (1903). With these vessels speeds had increased to 22½ knots and the time of crossing had been reduced to 5½ days. Our reply, as everyone knows, was the construction of the *Mauretania* and *Lusitania*, which began running in 1907. The sinking of the *Lusitania* in 1915 then left the *Mauretania* without a rival, and until the coming this year of the new German ship *Bremen*, she has retained the blue ribbon of the Atlantic.

Though Sir John Biles begins his paper by

remarking that the way to regain the blue ribbon will no doubt be found by the wise young men of the period, he says the problem seems to be much the same as when the *Mauretania* was projected. "Examination of the best information available shows that a ship 1000 feet long by 110 feet beam, if built for Atlantic conditions with geared turbines and water-tube boilers of 500 lb. pressure, would realise a speed of probably 33 knots when fully loaded." But whether such a ship would pay, only the owners could possibly determine. The type of machinery for such a vessel was dealt with by General E. de Vito in a paper at the recent meeting of the Institution of Naval Architects at Rome, but the relative merits of the geared steam turbine, the turbo-electric drive, and the Diesel electric drive for very high speed ships has yet to be determined. It is evident, however, that Sir John Biles does not think that we shall regain the record with a Diesel electric ship.

The Lancashire Witches.

The Trial of the Lancaster Witches, A.D. MDCXII.

Edited with an Introduction by G. B. Harrison.
Pp. xlvii + 188. (London: Peter Davies, 1929.)
10s. 6d. net.

IN "The Wonderful Discoverie of Witches in the Countie of Lancaster" we have one of the most authentic documents in the whole literature of witchcraft. It was written as an account of the trial of a number of witches arraigned at an assize held at Lancaster in 1612 by the Clerk to the Court, Thomas Potts, at the request of the two judges before whom the case was tried, and was revised by one of them. It is, therefore, of the highest authority. The book was completed and entered on the Stationers' Register before the end of the same year, and is dated 1613. Not unnaturally it is of great rarity, while the reprint by the Chetham Society, edited by James Crossley in 1845, is not often available. Mr. Harrison's reprint, which follows the original exactly, is therefore cordially to be welcomed in view of the recently revived interest in the subject of witchcraft.

The story of the trial was made familiar to the reading public by Harrison Ainsworth's novel, "The Lancashire Witches"—as a work of fiction perhaps now almost forgotten. The protagonists were two old women of eighty living in the Pendle Forest. One of them, Mother Demdike, had made witches of all her family, her daughter and grandchildren, by name Device. Her rival, Mother