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Stopcock of Easy Construction. 2 figures.
A Railway Brick Kiln. 1 figure.
The Gravity Roads of Pennsylvania. Railroads without locomotives.

II. CHEMISTRY AND TECHNOLOGY.—The History of Alizarin and allied Coloring Matters, and their Production from Coal Tar. By W. H. PERKIN, F.R.S. The first of two important lectures recently delivered before the Society of Arts, London.
Notes on Uranine. By PROF. J. W. MALLETT.
Progress of Industrial Chemistry. By J. W. MALLETT. A review of the most important recent applications of chemistry.—Fuel and methods of burning.—Slag wool.—Metallurgy.—Iron.—Steel.—Wrought and cast iron.—Remarkable appliances.
Phosphorescence. Produced by heat.—By mechanical effects.—By electricity.—Spontaneous phosphorescence.—Phosphorescence by insolation. 2 figures.
Material for Standard Weights and Measures. Black marble.—Rock crystal.—Glass.
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Purification of Mercury.
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The Supply of Nitrogen. By W. D. PHILBRICK.
Beet Sugar in France and Germany. By JOHN SPARROW. Importance of the beet sugar industry.—Methods of Cultivation.—Preservation of beets.—Advantages of beet raising.—How to start and conduct the industry.

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The Custard Bean Plant.—By HON. EDWARD BALLAINE. The Plant. Cultivation.—Harvesting.—Popping the Bean.—Yield.—Profit, etc.
Cleansing Trees with Soap. Cost and advantages of soaping trees.
Cheap Charcoal Stove for Conservatory.

VI. ANATOMY AND PHYSIOLOGY.—Food, Physiology, and Force. By DR. E. L. STURTEVANT. An exceptionally instructive paper from the last annual report of the New Hampshire Board of Agriculture.
The Autopsy of an Elephant. By A. J. HOWE, M.D. The anatomy of "The Conqueror." The characteristics of living and extinct elephants.

VII.—ARCHÆOLOGY.—The Standing Stones of Callanish. 1 illustration.

VIII. ART.—The Last Call. Mr. C. B. Birch's group at the Royal Academy, representing a mortally wounded hussar and horse. 1 illustration.

IX. VERSES.—The Owl Critic.

X. LAW.—The Ejection of Passengers from Railway Cars.

THE AMERICAN POLAR EXPEDITION.

On the afternoon of July 8 the steamer Jeannette sailed from San Francisco for a cruise in the Arctic Sea by way of Behring's Strait.

The Jeannette is a bark rigged steamer of 420 tons register, 200 horse power, and admirably constructed for meeting the perils of Arctic navigation. She was built in 1862 by the British Government. She was then known as the Pandora, and made a voyage to the Arctic seas. Last year she was purchased by Mr. James Gordon Bennett, and by special act of Congress registered as an American vessel under her present name. Lieutenant Geo. W. De Long, U.S.N., was, with the approval of Secretary Thompson, placed in charge of her and took her out to San Francisco, where, at Mare Island, she was thoroughly overhauled and put in order for her polar voyage. Her bows were filled in with solid timber, and her hull was materially strengthened by bracing. The engine was thoroughly overhauled, two extra propellers, duplicates of all parts of the machinery likely to break, and a complete set of machinists' tools with stock being also provided.

She has a steam launch, five strong whale boats rigged with sails and boat covers, and a folding boat that can be used in the water or upon runners on the ice. The sails, including rolling topsails that can be furled from the deck, are all new and stout; the spread of canvas is 6,858 square feet.

In the outfit are included eight Arctic tents, each 6 feet by 9, a suit of spare sails, and a number of ice saws with which ice from 10 to 15 feet in thickness can be cut. A deck house roofed over and fastened together by mortises and screw bolts is provided, which can be taken down and put up at will. The cabin and fore-cabin are padded inside with several thicknesses of felt, and the poop deck is covered with three thicknesses of stout canvas painted over. The ship will be heated by stoves burning soft coal.

The officers of the ship and the scientific members of the expedition are eight in number: Lieutenant George W. De Long, U.S.N., Commander; Lieutenant C. W. Chipp, U.S.N., Executive Officer; Lieutenant John W. Danenhower, U.S.N., Navigating and Ordnance Officer; G. W. Melville, U.S.N., Engineer; Dr. J. M. M. Ambler, U.S.N., Surgeon; Jerome J. Collins, Meteorologist and Chief of Land Parties and Sledging Expeditions; Raymond L. Newcomb, Naturalist; Captain William Dunbar, Ice Pilot. The crew, including seamen, machinists, carpenters, firemen, and coal passers, number twenty, and there are three Chinamen to serve as cook, steward, and cabin boy. The principal officers have all seen Arctic service; and the crew have been carefully selected for their physical and mental fitness for their arduous undertaking. The choice was made from 1,300 applicants.

Special pains have been taken to secure the most perfect outfit possible in the way of clothing and provisions. The ship is provided for three years, and, with the exception of flour and its preparations, all the food stores are in the form of condensed meats, vegetables, and fruits. Ample rations of beer, tea, and coffee will be served. The whole cost of the expedition—in many respects the best equipped that ever set sail for the Arctic regions—will be defrayed by Mr. Bennett.

The grand object of the expedition is to add to our knowledge of the unexplored regions in the neighborhood of the North Pole—if possible to attain to that long sought and apparently unapproachable geographical position. The magnetic and meteorological problems to be studied and possibly solved in those parts are of high importance; and there is no telling what geographical and climatic surprises may not await the plucky voyagers, who have started on the first deliberate assault upon the pole by way of the Pacific. Should the warm current which enters the Arctic Sea through Behring's Strait prove of sufficient volume to have a material influence on the climate within the seventieth parallel, we may reasonably expect that the Jeannette will at least do something to remove the great blank which covers our maps on that side of the pole.

PROPOSED EXPLORATION OF WESTERN ASIA.

A scheme for a systematic and competent exploration of the seats of ancient empire in Western Asia is talked of in England. The success which has attended the exploration of Palestine and the limited research that has been made in other parts of Asia Minor give assurance of grand discoveries to result from such an enterprise. Speaking of the relics already possessed, throwing light on the ancient Babylonian empire, the London Globe remarks that they cannot but fill with astonishment any one who will take the trouble to examine them, showing, as they do, that in an age of the world which we are accustomed to regard as an age of all but universal darkness and savagery, there flourished a degree of learning and civilization which seems in many respects to have been but little behind our own. It is really startling to find a library catalogue compiled some 4,000 years ago, appended to which is a direction to the student to write down and hand to the librarian the number of the book he wishes to consult, just as he would have to do today at the British Museum or the Guildhall Library. There are now in the collection at Bloomsbury, Assyrian bas-reliefs testifying to an extinct but advanced civilization to an extent of which comparatively few persons have any idea.

Fortunately the ancient libraries of Mesopotamia were largely made up of tablets composed of clay, and the fact that many of these have survived the wreck of the empires,

and the extinction of the learning and civilization to which they testify, and are now in our possession, of course affords abundant reason to believe that Western Asia still possesses hidden treasures of a similar kind, such as would certainly have the most profound interest for every department of learning. So great an addition has recently been made to our knowledge of this old world that it is a matter for wonder that men and money and state influence have not by this time been secured for the prosecution of earnest and extensive exploration.

FLINT IMPLEMENTS OF THE ABORIGINES.

On another page will be found an interesting article on flint implements and their mode of manufacture by the earlier tribes of Indians. Mr. Frank H. Cushing, the author of these researches, is a man only about twenty-three years old, and holds the office of Curator of the Ethnological Department of the Smithsonian Institution, Washington. Up to the time when Mr. Cushing undertook, by putting himself in the identical position of the Aztecs and mound builders—using nothing but sticks and various shaped stones, such as he found on the river banks, to work with—the problem of how these implements of the prehistoric races were made had puzzled the antiquarian student. Mr. Cushing has kindly furnished us the sketches from which our engravings are made, and the description is from the author's paper read before the Anthropological Society at the Smithsonian Institution at its last meeting. We are sure the result of Mr. Cushing's researches will be read with interest by scientists and antiquarians in all parts of the world.

Sir William Fothergill Cooke.

The projector and constructor of the first telegraph line in England, Sir William Fothergill Cooke, died recently. He was born at Ealing, in 1806, and after graduation at the University of Edinburgh, spent five years in the service of the East Indian Army. On his return he took up the study of anatomy and physiology first at Paris, continuing at Heidelberg. At the latter place, in 1836, his attention was directed to the subject of electricity, to which he soon devoted himself exclusively. He constructed an experimental telegraphic instrument, which he took to England and endeavored to introduce on the Liverpool and Manchester Railway. This was two years after Professor Morse had privately demonstrated the success of his invention. Associating himself with Wheatstone, Cooke perfected his invention, so far at least as to make it practicable, and in June, 1837, Cooke and Wheatstone together took out the first patent for an electric telegraph, the mechanism of which, however, was quite unlike that of the Morse instrument. The first line constructed by Wheatstone and Cooke was finished early in 1839, and several other lines had been set up in England before Morse's Washington and Baltimore line was constructed in 1844. Cooke was knighted in 1869, and pensioned in 1871.

The Great Suspension Bridge between New York and Brooklyn.

At a meeting of the Trustees of the New York and Brooklyn Bridge, July 7, the contract for supplying the steel and iron for the suspended superstructure was awarded to the Edgemoor Iron Co. The contract calls for 10,728,000 pounds of steel and 34,000 pounds of iron. The bid of the Edgemoor Iron Co. was 4 $\frac{1}{2}$ cents a pound, amounting to \$468,147. Chief Engineer Roebling said that when the change from iron to steel was first contemplated he supposed that the difference in price would be at least \$100,000, but in fact the lowest bid for steel exceeded by only \$4,000 the accepted bid for iron last year. The difference between the lowest bid and the lowest bid for crucible steel was \$364,000.

Both towers of the bridge have been completed, the last work on the Brooklyn tower having been finished July 5. Mr. Kingsley expressed the belief that through this contract it would be possible to complete the bridge by January 1, 1881. The financial condition of the bridge on June 30 was as follows: Total receipts, \$10,623,492.94; total expenditures, \$10,523,574.86; outstanding liabilities, \$112,807.62.

No Favoritism—No Presents.

Mr. Franklin B. Gowen, the indefatigable President of the Philadelphia and Reading Railroad, who has put himself so emphatically on record against the tyranny of trades unionism, has recently, according to the *Railway Review*, issued an order regarding the employment of new men on his road, which we regard eminently just and proper. Premising that he has discovered that bosses and superintendents have shown great favoritism in the employment of men, setting aside prior and worthy applicants, and giving positions to those who are related to them, or belong to the same society, lodge, church, or political party as themselves, or who have contributed toward making them presents, he calls the attention of those who have charge of the employment of men to the fact that the company "knows neither politics, sect, religion, nor nationality." He says: "Every able-bodied man of good moral character, no matter what may be his politics, nationality, or religion, is entitled to employment (if there is a vacancy) in the order in which his application is made." This is the correct doctrine; and the order which follows should be among the regulations of every railway company. It is, that any superintendent or boss who, in any manner, directly or indirectly, receives any presents or other valuable consideration from his employees, or who may be found unjustly discriminating in the employment of men in favor of his relatives, or in favor of