

river, and dock works are carried out by the Government; the department charged with this work being under the command of a chief engineer, who, with a small staff, has his headquarters at the seat of Government; the other officers of the corps being stationed throughout the country wherever their presence is required. In the same way the lighthouses, buoys, and sea marks are under the charge of a Government department, the chief of which is the Secretary of the Treasury; the other members of the Board consisting of two officers of the Navy, two of the Corps of Engineers of the Army, two civilians of scientific attainments, with an officer of the Army and one of the Navy as secretaries. The coast is divided into districts, each under the charge of an engineer. All works in connection with fortifications and defences and military engineering are managed by the department of the Secretary of War. The quartermaster's department takes charge of all stores, transport, and military buildings; and another officer of the War department has charge of all public buildings and parks.

For the guidance of the officers of these several departments a code of regulations is drawn up as to the management and conduct of contracts, and of works performed by the department. This code provides that "the importation and migration of foreigners and aliens under contract or agreement to perform labour in the United States is forbidden." That, except in cases of extraordinary emergency, the services of labourers and mechanics employed on any public works are limited to eight hours in the day. Legal holidays for employes of the Government are January 1, February 22, July 4, and December 25. Day-workmen are paid for these days, and for such other days as may be designated days for national thanksgiving by the President. The first Monday in September, known as "Labors Holiday," is a legal holiday. In the case of contracts, all persons tendering are to be notified of the time when the tenders are to be opened, and may be present, either in person or by their agents. Any officer or agent of the Government, or any member of Congress, who receives money or other bribe in connection with any contract or work, is deemed guilty of misdemeanor, and is liable to imprisonment for a period not exceeding two years, and to be fined a sum not exceeding 10,000 dollars.

The design of Captain Black's book is to show the prescribed business methods of those of the executive departments which principally control the Government work, and to describe the nature of the works and the plant and materials most frequently required. The general laws and regulations under which all the public works are carried on are given; also a description of the departments, and of the works executed by them. Engineering principles are not dealt with, but there are numerous descriptions of works, with their cost, and illustrations of the plant used, and the method of carrying them out. These include fortifications, sea and lake shore protection works, river training works, lighthouses, public buildings, &c.

It is the practice of the Works Department of the Corps of Engineers to issue annually full reports of all works going on in the several departments. These reports are often fully illustrated, and contain numerous details as to contracts entered into, cost of the work, and

results attained. Any one who is familiar with these, will at once recognise that the contents of the book are largely taken from them. This, however, in no way detracts from its value.

Although the book is written for and would be of great service to engineers in the United States, it yet contains a great deal of information respecting the works carried out in that country in training and improving rivers; and the various methods of dredging in use and the cost, and also as to the works for lighting the coast, which would be found useful and instructive to English engineers. "Suction" dredging has been much more largely used in the United States than in this country, whether as applied to the removal of sand or of clay and harder material. The methods used for disintegrating hard material, and either pumping it up by centrifugal pumps or pulsometers, or by a vacuum chamber, is fully described. In the latter case, steam is admitted to a cylinder or vacuum chamber, then condensed with cold water, the vacuum formed causing an inrush of the materials to be raised through a suction-pipe; this material is then driven out through the discharge-pipe by the admission of the steam. As an illustration of the nature of the materials this method of dredging is capable of dealing with, it is stated that a 1300 lb. stone was picked up and forced through the pipes on one occasion, and on another an iron safe measuring 25 inches by 16 inches by 14 inches.

#### OUR BOOK SHELF.

*Wild Life of Scotland.* By J. H. Crawford, F.L.S. Pp. 280. (London: John Macqueen, 1896.)

PASTORAL life has charms for a large proportion of the reading public, if one may judge from the quantity of literature dealing with its scenes and events. Perhaps the strain under which men now work in cities, has resulted in a reaction in favour of a return to nature. Certain it is that there is a demand for simple papers on subjects of outdoor natural history; and though much of the supply to meet is not above criticism, still the taste for descriptions of rural scenes and wild nature is well worth cultivation. Mr. Crawford has a passion for wild nature. He would like to rehabilitate some of the isolated hills and woodlands of Scotland with the reindeer, beaver, and wild boar; but the general opinion of his correspondents appears to be: "We cannot afford to grow wood for beavers to gnaw, or for boars to whet their tusks on." To see nature at her best in Scotland, he has gone away beyond enclosures, and has observed and judged of her ways for himself. This collection of papers, which represent the result of his observations and meditations, are typical of the forms of life in the woods and waters of Scotland; they are pleasantly written and attractively illustrated, and will interest all country naturalists.

*A Cosmographical Review of the Universal Law of the Affinities of Atoms.* By James Henry Loader. Pp. 93. (London: Chapman and Hall, Ltd., 1896.)

It is a little difficult to understand the theory presented in this book. To do justice to the author, and at the same time enable readers of NATURE to appraise the contents at their proper value, we give a few extracts. It is stated that men of science have concluded "that all space must be composed of an element extremely rarefied, and that element they denominate ether." Having accepted this opinion himself, the author infers that the ether is "the primary essence of all matter, whether in a gaseous