

with ancient civil engineering works, and the remaining parts relate to bridge construction, waterworks for cities and towns, railroad engineering, and the Nicaragua and Panama routes for a ship canal. In the parts relating to modern engineering, the practice and examples described are those followed in America, therefore for English engineers Prof. Vernon Harcourt's book on "Civil Engineering as Applied in Construction," recently reviewed in NATURE, which includes the subjects dealt with in the book now under notice, would be found of more service.

The first part, relating to ancient civil engineering, contains a great deal of interesting information, but not of a specially original character. The author points out that the science and profession of engineering dates from very early times, and that many large works that would reflect credit on engineers of the present day were executed in the very dawn of history. The anciently populous country at the head of the Persian Gulf was irrigated and made prosperous by a complete system of canals and irrigation works carried out in the remote past, and traces of hydraulic works, including dams and regulating appliances, are to be found spread over a large territory in the vicinity of Babylon. From the remains still existing, it is calculated that some of these canals must have been from 25 to 30 feet in depth. It is recorded that Alexander the Great, when marching through the Assyrian country, found the River Tigris obstructed by masonry dams constructed for irrigation purposes. The present Suez Canal was preceded between 3000 and 4000 years ago by a channel cut to connect the Red Sea and the Nile. The extensive hydraulic works for regulating the supply of water from the Nile, some of which were carried out seventy centuries ago, involved engineering work of such magnitude as almost to put the great dam at Assuan recently constructed in the shade.

The immense blocks of stone used in the construction of the pyramids and temples and for obelisks show that a knowledge of mechanics must have been well developed in very early times. The remains of many of the ancient buildings afford evidence that both round and pointed arches were made use of. Later on the Romans excelled as engineers, whether as bridge builders, road makers, or in works required for sanitation. The Appian Way, constructed more than two thousand years ago, is only one example of the roads constructed by the Romans, both in Italy and in the lands they conquered, the remains of many of which are to be found at the present day. This road was 350 miles long, and formed a perfect highway between Rome and Brundisium. Water supply was another matter in which the Roman engineers excelled, some of the aqueducts along which the water was conveyed for the supply of their towns extending to a length of from 40 to 60 miles. The streets of Rome were provided with a complete system of sewers, and building laws were enacted for regulating the thickness of the walls and height of buildings, and the quality of the materials of which they were composed. The harbours at Ostia and those at Tyre and Sidon testify to the knowledge

of the ancients in this department of engineering, and there are bridges still in existence the foundations of which were laid two thousand years ago.

With regard to the two Isthmian canals, the author sums up their respective capabilities as follows. He considers both routes feasible and practicable; that neither route has any commercial advantage over the other; the harbour features may be made adequate for either canal; the time that will be required for completion is about the same in either case; the control of the water supply will be simpler in the case of Panama; the relative seismic conditions in neither case are of sufficient gravity to cause anxiety; the question of cost is in favour of Panama.

OUR BOOK SHELF.

An Account of the Indian Triaxonia, collected by the Royal Indian Marine Survey Ship "Investigator."

By Franz Eilhard Schulze. The German Original translated into English by R. von Lendenfeld. (Calcutta: By Order of the Trustees of the Indian Museum, 1902.)

THIS admirable report, the latest of the *Investigator* series, deals with 120 examples of Triaxonid Sponges dredged between the years 1885-1890, and it is in reality a revised edition of three memoirs contributed by Prof. Schulze during the years 1894-1900 to the *Abhandl. Kais. Preuss. Akad.*, now put into form for translation into English, as modified in respect to important redeterminations arrived at in the study of the *Albatross* collection, and under the influence of contemporary research.

A main distinction is drawn between the Amphidiscophora and the Hexasterophora, the former embracing a description of the Hyalonematidæ (four genera, fifteen species described), the latter of the Euplectellidæ (five genera, eight species), Rossellidæ (three genera, three species), Farreidæ (one genus, one species), and Melittionidæ (one genus, three species). Then follow three tables, of which the first gives a list of the Indoceanic Triaxonia known independently of the *Investigator*, the second a list of the *Investigator* series, of which there were thirty-one species, eight of them from depths exceeding 1500 fathoms, the third a full classification of the known forms, with stations and localities, twenty-four genera and fifty-four species in all, including records of genera and species of the Asconematidæ, Euretæ, Coscinoporidæ and Maeandrospongidæ of the *Challenger* and *Pola* expeditions.

There are twenty-three magnificent plates, and the forms most noteworthy are *Hyalonema masoni*, in which the Palythoa crust is replaced by Cirripedes; *Saccocalyx pedunculata*, now removed from the Asconematidæ to the Euplectellidæ; *Lophocalyx spinosa*, remarkable for the possession of "silica pearl" spicules; and *Lophophysema inflatum*, a much modified Hyalonematid obtained by the *Investigator* in the Andaman Sea at 498 fathoms, bearing an annular ridge, which sharply subdivides the body into an upper cylindrical portion and a lower conical one, characterised by the presence of large irregular cavities belonging to the inhalant system.

We congratulate Dr. Alcock and the Trustees of the Indian Museum upon this valuable addition to their reports, which rank high in the literature of marine zoology.