alogues. Twenty-five species were collected by the *Discovery*.

Among the small collection of echinoderms was the *Promachocrinus* first obtained by the *Challenger*, six Holothurians, two species of *Antedon*, three Echini, eight Starfishes, and ten or eleven Ophiurans. The collection of larvæ yielded the discovery of two pelagic forms and of the brood-pouch in *Cucumaria crocea*. A well-marked axial sinus and pore-canal in the *Cucumaria* embryo is of importance as definite evidence of a structure about which doubt had previously existed.

Two species of Myzostomidæ are treated in great detail. The sipunculoids comprise about thirty specimens which were all small and are considered as belonging to a single species of *Phascolosoma*.

The Actinians comprised six genera and eight species, of which six are Antarctic, two having been obtained at the Auckland and Falkland Islands.

The Tetraxonid sponges are exquisitely illustrated with colored plates of the finest quality.

There are six forms of Tetractonellidæ described, of which two are new varieties. The species are equally divided between the genera *Craniella* Schmidt, and *Cinachyra*. Of Monaxonellida there are forty-three species, with four new genera. Of the species, when obtained, twenty-two were new to science, besides seven new varieties.

The calcareous sponges collected comprise eighteen species and one variety, out of which six new genera and two new family groups have been constituted. All but five belong to the Heterocœla. In the discussion Jenkin proposes a new arrangement, founded in the main upon the classifications of Polejaeff and Dendy. The most interesting features of the collection are the large number of species containing chiactine spicules; five new species with "linked" flagellated chambers; a sponge, *Megapogon villosus*, with larger spicules than any hitherto recorded for a calcareous species; the unusual development of the gelatinous mesoderm in *Leucandra gelatinosa;* and the duplicate ovum, apparently a new form of egg cell in *Megapogon raripilus*, and *Achramorpha nivalis*. In the latter case the ovum appears to be made up of two unequal parts. The larger part is very similar to the ordinary large ovum cell and contains a large transparent nucleus and a small, strongly staining, nucleolus. The smaller part appears to be a multicellular structure, consisting of a large inner cell surrounded by a sheath of small cells, but it is possible it may be a single cell, the large portion being the nucleus. The inner cell contains two structures; one strongly staining like the nucleolus of the larger part, the other a hyaline sphere packed with about a dozen grains of one color, and an odd one which stains a different shade. The cells forming the outer layer have each a nucleus and a nucleolus. This layer, or sheath, in some cases surrounds the inner sphere completely, in others only surrounds the outer part, not existing between the inner spherical cell and the twin half of the ovum. It is possible that the smaller twin may be a feeding cell for the nourishment of the larger twin.

All the species of calcareous sponges were obtained at the winter quarters and in comparatively shallow water.

W. H. Dall

Hygiene and Public Health. By Louis C. Parkes, M.D., D.P.H., University of London, and Henry R. Kenwood, M.B. Edin., D.P.H., London. Third Edition with Illustrations. 8vo, pp. 620 with 96 illustrations. Philadelphia, P. Blakiston's Son & Co. 1907.

The third edition of this valuable work under the conjoint authorship has been carefully revised and brought up to date. The book is divided into thirteen chapters and deals in a very comprehensive way with Water; The Collection, Removal and Disposal of Excretal and Other Refuse; Air and Ventilation, Warming and Lighting; School Hygiene; Soils and Building Sites; Climate and Meteorology; Exercise and Clothing; Food, Beverages and Condiments; The Contagia; Communicable Diseases and Their Prevention; Hospitals—Disinfection; Statistics; Sanitary Laws and Administration.

In the chapter on water, it is noteworthy that some of the large cities in Great Britain are rapidly following the example of ancient Rome to bring pure water from quite a distance. So, for example, Glasgow is supplied with water from Loch Katrine, thirty-four miles north of the city. Manchester has recently obtained a new source of supply from Thirlmere, ninety miles from the city, and by the construction of a dam the level of the lake has been raised and its storage capacity increased. Liverpool by immense engineering works has impounded the waters of the Vyrnwy in Wales. The work involved the construction of a massive masonry wall across a narrow part of the valley, creating an artificial reservoir four and three fourths miles in length and conveying the water a distance of sixty-eight miles.

Birmingham is likewise engaged in the task of bringing water from the upper sources of the Wye. There can be no question as to the sanitary and economic effects of these changes. It is well known that the greatest reduction in typhoid-fever rates has everywhere been accomplished when a pure water supply has been substituted for a previously contaminated one.

The vital statistics of our own country as analyzed by the present writer in his address on the "Conservation of Life and Health by Improved Water Supply, White House, 1908," show that the combined average death rate from typhoid fever in cities with a contaminated water supply was 69.4 and after the substitution of a pure supply it fell to 19.8 per 100,000, a reduction of 70.5 per cent. The reduction in ten cities in the state of New York, according to a paper published in the Bulletin of the New York State Department of Health, April, 1908, amounted to 53.4 per cent. One of the tables based upon data obtained from Dr. Wilbur, of the Division of Vital Statistics, U. S. Census Bureau, shows that during the last twenty-five years the death rate from typhoid fever has fallen in fourteen countries and large cities from an average of 42.3 to 18.1 per 100,000, a reduction of 54.3 per cent. It may be urged that improved methods of medical treatment are responsible for a considerable reduction in the death rates, but when we see such a striking change immediately after the installation of filtration plants as in the case of Albany, Watertown, Lawrence and Cincinnati, we are forced to the conclusion that water purification plays the most important rôle. We note that the authors still quote 27.08 gallons of water as a fair daily average per capita consumption. In most of our American cities the per capita consumption for household, trade and manufacturing and municipal purposes is three to four times greater.

The chapter on the collection, removal and disposal of excretal and other refuse is very complete, as are most of the English textbooks on the subject. Attention is directed in the comparison of methods on page 81 to the fact that in Nottingham, where middens, pails and water closets are in use in different parts of the town Dr. Boobbyer has shown that the greatest prevalence of enteric or typhoid fever is to be found in the houses with middens and the least in the water closeted houses, those with pails occupying an intermediate position. In 1902 there were thrice as many cases of enteric fever proportionately in "pail" houses as in "w. c." houses, and fourteen times as many in "midden" houses as in "w. c." houses.

The writer in 1895 in his typhoid fever investigation in Washington observed similar facts and offered as an explanation that the sewers carry away the filth which otherwise would be a source of danger chiefly through the agency of flies, who may carry the germs on their feet and infect the food supply of neighboring houses.

The value of pure air and outdoor life is pointed out on page 169, by referring to Dr. Ogle's researches which have shown "that of all the industrial classes, those which are the healthiest and have the lowest death rates are the gardeners, farmers, agricultural laborers and fishermen—those namely, whose occupations are carried on in the open air. The death rate from phthisis in these cases is only half that of the male community generally, and they enjoy about the same amount of

freedom from diseases of the respiratory organs. Differences in food or housing accommoderations can not account for the comparative freedom of these classes from pulmonary disease."

The causal relation of foul air to tuberculosis is shown by the fact that since the British government has payed attention to air space and ventilation the death rate from consumption among the soldiers, sailors and prisoners which was formerly excessive is now considerably less than among the civil population.

The dangers of sewer air are being revived again by recent experiments of Horrock's at Gibraltar, which gave results at variance with those obtained by Laws and Andrews. He found that specific bacteria present in sewage may be recovered from the air of drains and sewers, even when the sewage is flowing smoothly and without splashing. He believes that they may be ejected into the air by: (*a*) the bursting of bubbles at the surface of the sewer, (*b*) the separation of dried particles from the walls of the sewers and pipes, and probably (*c*) by the ejection of minute droplets from flowing sewage.

A similar explanation was offered by Uffelmann over twenty years ago and Horrock's experimental data, which also showed that the disconnecting trap on a house drain prevents the passage of bacteria present in sewer air into the house drains, will naturally tend to revive the opinion, formerly held, that sewer and drain air may be the means of spreading infectious diseases unless the house drain and fixtures are properly trapped.

The section on vitiation of air in industrial occupations is very complete and the table on page 182, giving the comparative mortality figures for males engaged in different dust-inhaling occupations shows conclusively that the hard, sharp and angular fragments of mineral and metallic dust are especially calculated to cause irritation and abrasions of the respiratory passages and thus favor the invasion of the tubercle bacillus and also the production of other diseases of the respiratory organs in general.

The book is accurate and up to date in every respect and can be confidently recommended to all interested in hygiene and public health.

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Soils and Fertilizers. By Harry Snyder, Professor of Agricultural Chemistry and Soils, University of Minnesota. Third edition. 8vo, 350 pp. New York, The Macmillan Company. 1908.

The first edition of Snyder's book, then entitled "Chemistry of Soils and Fertilizers," was at the time of its publication in 1899 a most welcome addition to the libraries of teachers of agriculture. It gave in logical and systematic form a brief course in agricultural physics and chemistry, and in the practise deducible therefrom, and was widely used in our agricultural colleges by both students and teachers. But the rapid advance of agricultural science made it advisable to publish a revised second edition in 1905, without, however, materially increasing the length of the text. In the new, third edition we have instead of the 287 pages of the previous editions, 344 pages, slightly smaller than before.

The increase is partly due to the addition of illustrations, as in the excellent chapter on laboratory practise, which has been enlarged from 13 to 19 pages, and forms one of the most useful features of the book for the guidance of teachers, who often fail to illustrate the facts and principles of their course in a manner both attractive and profitable to their students. Many of these experiments and apparatuses are original with Snyder, and very cogent. The twelve pages of review questions, also, are very well calculated to impress upon the student the practical applications of what is brought before him during his course, and to induce attention in advance of the final examination, in place of the "cram" so commonly indulged in at the end of the session.

The body of the text itself has been thoroughly revised so as to include the results of the latest researches in the agricultural field, and one recognizes plainly the ring of the diction of one who knows whereof he speaks from personal investigation. This influence, difficult to define exactly, is nevertheless most