inspection of experimental plots at Glen Head and in visiting a few of the large truck farms for which Nassau County is famous. An evening meeting will be held at New York City.

The experimental test plots consist of plantings of healthy, mosaic, and leaf roll seed tubers obtained from northern and central New York, Vermont, Maine, Long Island, Prince Edward Isle, and Bermuda. Records of the behavior during 1918 of the parent plants will be compared with the behavior this year of the progeny. Much of this seed has been planted under the direction of pathologists who have been investigating these diseases. An opportunity will also be afforded to compare fields planted with seed from the north and with Long Island grown seed; of fields planted with mature and with immature seed.

Noted potato pathologists from the United States, Canada and Bermuda will be present to explain the various tests, to point out the characteristic symptoms, and to discuss the results observed here as well as other experiments they have conducted. The bearing of these observations and studies on seed certification will be given consideration at the conferences held during the tour. Invitations have been extended to a pathologist of England, of Ireland and of Holland, and some assurance has been received that one or more of these men will be present. It is expected by means of these observations and discussions that considerable light will be thrown upon the nature and behavior of these serious and baffling diseases and that thereby measures for control will be better understood.

Every pathologist interested in potatoes or in these particular types of diseases should plan, if possible, to attend, for the occasion is unusual in material available for study and in instruction presented. Horticulturists, agronomists and other persons interested are invited to join the pathologists.

Persons planning to attend should at once inform the writer in order that accommodations may be reserved for them. The farmers of Long Island have generously offered to provide the means of transporting the party about the island.

M. F. BARRUS,
Chairman, Committee of Arrangements

SCIENTIFIC BOOKS

Appendages of Trilobites. By CHARLES D. WALCOTT, Smithsonian Misc., Coll., Vol. 67, No. 4, Cambrian Geol. and Pal., IV., December, 1918, pp. 115–216 + index, Pls. 14–42, Text Figs. 1–3.

IN this recent paper Dr. Charles D. Walcott summarizes his investigations of the appendages of trilobites during the past forty-five years, a research undertaken in pursuance of a promise made to Professor Louis Agassiz in 1873. Since that time, he writes, "I have examined and studied all the trilobites that were available for evidence bearing on their structure and organization."

His summary of 1881[2] is reviewed and corrected, together with later papers discussing his various discoveries in this subject.[3] The highly organized trilobite, *Neolenus serratus* (Rominger), from the Burgess shale quarry opened by Dr. Walcott, near Field, B. C., several years ago, shows most graphically in the ten plates devoted to its illustration the highly specialized development of appendages, which is also figured in plates of the Ordovician trilobites, *Isotelus, Triarthrus, Calymene* and *Ceraurus*. In the figure of *Neolenus* the appendages include antennules, caudal rami, endopodites, epipodites, exopodites, exites and protopodites. The evidence of appendages is supplemented by numerous figured sections of *Ceraurus* and *Calymene*.

[2] The Trilobite: New and Old Evidence Relating to its Organization, *Bull. Mus. Comp. Zool.*, Cambridge, Mass., Vol. VIII., No. 10, 1881, pp. 191–224, Pls. I.–VI.

[3] *Proc. Biol. Soc. Washington*, Vol. IX., 1894, p. 94. *Smithsonian Misc. Coll.*, Vol. 57, 1912, pp. 164, 208, Pl. 24, Figs. 1, 1*a*. *Idem*, 1911, Pl. 6, Figs. 1, 2; 1912, Pl. 24, Figs. 1, 1*a*; Pl. 45, Figs. 1, 2, 3, 4. Text-book Pal. (Zittel), Eastman 2d ed., 1913, Vol. I., p. 701, Fig. 1,343, p. 716, Figs. 1,376, 1,377. *Smithsonian Misc. Coll.*, Vol. 57, 1912, pp. 149–153.

After discussing the mode of occurrence, conditions of preservation, manner of life including method of progression, food, defense and offense, the author describes species with appendages, which include besides the genera already mentioned, *Kootenia dawsoni* (Walcott), two species of *Ptychoparia* including a new one *P. permulta* from the Burgess shale quarry, *Odonotopleura trentonensis* (Hall), *Trinucleus concentricus* Eaton, and an unidentified Ordovician crustacean leg. The work of C. E. Beecher with *Triarthrus* is reviewed in some detail, and a different conclusion arrived at in certain features.

In section two of the paper the structure of the trilobite receives attention, the author again referring to Beecher and other writers including Jaekel, Beyrich, Barrande and de Volborth. He then discusses in detail the appendages, summarizing them as follows:

Cephalic: (1) Antennules, (2) antennæ, (3) mandibles, (4) maxillula, (5) maxilla.

Thoracic:

Abdominal:

Caudal rami:

Further comparisons are with the recent *Anaspides tasmaniæ* G. M. Thomson, a Malacostracan from Tasmania, *Koonunga cursor* Sayce, and *Paranaspides lacustris* Smith, also the parasitic crustacean *Cyamus scammoni* Dall, illustrations of all of which are given. After the extraordinary interest of the finely developed specimens in the plates representing *Neolenus,* attention will be drawn by those of *Isotelus, Triarthrus becki* Green, and other Ordovician trilobites, together with the sections of Cambrian and Ordovician trilobites, and finally the author's conclusions as expressed by several diagrammatic restorations, also sketches of thoracic limbs of trilobites and recent crustaceans, crustacean limbs, and six plates of tracks and trails of trilobites, each adding evidence to the author's deductions as to the appendages.

Some conclusions drawn are that the trilobite's appendages show him to have been a marine crustacean far more highly developed than would have seemed possible in a period so infinitely remote.

In its younger stages of growth a free moving and swimming animal, it later became a half-burrowing, crawling and sometimes swimming animal and moving at times with the flow of the tides and prevailing currents. Eggs have been found both within and free from the body. . . . It was at home on many kinds of sea-bottom and was able to accommodate itself to muddy as well as clear water.

It was intensely gregarious in some localities and widely scattered in others, depending upon local conditions, and habits of the various species.

Trilobites had an ample system of respiration by setiferous exopodites, epipodites, and exites attached to the cephalic, thoracic and abdominal limbs [as shown in restorations of the limbs on plates 34 and 35].

The structure of the gnathobases of the cephalic limbs indicates soft food such as worms, minute animal life and decomposed algæ. . . . The trilobite persisted from far back in pre-Cambrian time to the close of Carboniferous time . . . and left its remains more or less abundantly through about 75,000 feet of stratified rocks.

The paper is profusely illustrated and carefully indexed.

G. R. Brigham

SPECIAL ARTICLES

PRESOAKING AS A MEANS OF PREVENTING SEED INJURY DUE TO DISINFECTANTS AND OF INCREASING GERMICIDAL EFFICIENCY

In the course of investigations on the bacterial black-chaff disease of wheat, under the direction of Dr. Erwin F. Smith, a new method of seed treatment has been discovered which practically eliminates seed injury due to the use of disinfectants, and at the same time renders pathogens on the seed coats more susceptible to the action of the disinfectant. This is accomplished by allowing the seeds to absorb water for a definite period in advance of treatment. The saturation of the cells and cell-walls with water before treatment, by diluting the full-strength disinfectant beyond the point of injury as it enters the tissues, in accordance with the law of diffusion of dissolved substances, is the explanation of the results obtained. Not only is injury to germination prevented, but the germination of seeds thus treated is stimulated, reducing the danger of