despite the protests of responsible superintendents and engineers.

The methods of sewage disposal in use on the Continent are discussed in a generally accurate, though non-technical fashion. The Paris and Berlin sewage farms are described in course. The Gennevilliers irrigation fields in the sandy peninsula opposite St. Denis are not, as might perhaps be inferred from Mr. Shaw's statement, directly controlled by the municipality, but the individual occupants regulate at will the amount of sewage turned into the trenches. At Berlin the sewage farm system has achieved its most brilliant success. A great variety of crops is grown upon these farms; on one farm roses are cultivated for the purpose of manufacturing the perfume attar of roses.

The housing of the working classes deservedly receives a good deal of attention, particularly in connection with the author's study of the German cities, where the overcrowding is in some cases almost incredible. In Breslau in 1885 no fewer than 150,000 people out of a population of 287,000 lived in habitations containing only one room that could be warmed. In Berlin in 1890 the average number of inhabitants in a dwelling house (Grundstück) was 73 as against an average of 67 in 1885. The point is taken, however, that the German municipal authorities have the facts of the case well in hand and are trying to remedy the evil.

Our author notes here and there various interesting facts relating to the general sanitary oversight and organization in European towns. The control of food supplies, the supervision of abattoirs and the disinfection service all receive merited attention. Where so much is included it would be ungracious to remark the omission of some interesting and important topics.

The chapter on *Hamburg and its Sanitary Reforms* takes careful note of the wave of reform that has lately swept over the great port. The dearly-bought lesson of the cholera outbreak of 1892–'93 has not been thrown away, and the energetic administration of Dr. Dunbar and his staff of expert assistants has not only made a brilliant success of the attempt to purify the Elbe water, but has also wrought great improvement in the general sanitary condition of the city. The story is told by Mr. Shaw in his best vein. We trust, however, that the following statement: "In July, 1893, the imperial health authorities at Berlin issued a warning to the municipal governments of the country not to supply their citizens with a drinking water containing more than 100 *cholera* germs to the cubic centimeter" (p. 398), will not be taken as a literal transcript of the German decree. Mr. Shaw should have been told that all germs netted in the Elbe were not cholera germs.

EDWIN O. JORDAN.

SOCIETIES AND ACADEMIES.

TORREY BOTANICAL CLUB, JANUARY 27, 1897.

THE scientific program was as follows:

Dr. H. H. Rusby, 'Remarks on some Solanaceæ.'

Mr. A. A. Tyler, 'The Origin and Functions of Stipules.'

Dr. J. K. Small, '*Aster gracilis* Nuttall.'

Mr. George V. Nash, 'New and Noteworthy American Grasses.'

Dr. Rusby exhibited a number of Solanaceous plants and remarked upon their relationships. It was pointed out that the general appearance and chemical and physiological characteristics of these plants frequently fail to indicate their structural affinities. Cestrum and Sessea, Atropa and Datura were cited as illustrations of the separation of otherwise naturally related groups through their possession respectively of baccate and capsular fruits. Nicotiana was referred to as connecting those tribes having a radical symmetry with the tribe Salpiglossidæ, having a bilateral symmetry and thus connecting the family with the Labiales. The Androcera and Andropeda sections of the genus *Solanum* were instances of the appearance of this bilateral symmetry in a widely separated part of the family where radial symmetry is the otherwise invariable rule.

Dr. Britton discussed the subject and remarked upon this instance of development of two divisions of a group along different lines, in this case through baccate and capsular fruits. He cited similar parallelisms in other families tending to produce different resulting characters, as in *Capparidaceæ*, and remarked that an indication of the lines along which these genera

have been derived may be read in these characters.

The second paper by Mr. A. A. Tyler, on 'The Nature and Origin of Stipules,' presented conclusions derived from studies extending through several years. The subject was treated at length in the light of geological, morphological, anatomical and developmental evidence. Discussing Mr. Tyler's paper, which will shortly be published in full, Dr. Britton remarked that "the outcome of this very important paper is most interesting; it emphasizes the significance of basal scales and those of buds and rootstocks; and it is the more convincing from the nicety with which it accords with the seemingly haphazard distribution of stipules widely but irregularly here and there through the vegetable kingdom."

Mrs. Britton discussed the paper further, referring to the different phases presented in *Fissidens*.

Of the remaining papers, that by Mr. Nash was read by title and will appear in the *Bulletin;* and that by Dr. Small was, on account of the lateness of the hour, deferred till the next meeting.

Edward S. Burgess,
Secretary.

NEW YORK ACADEMY OF SCIENCES—SECTION OF ASTRONOMY AND PHYSICS, MARCH 1, 1897.

F. L. Tuffts presented an abstract of work recently done by him in further testing the correctness of the results obtained with the original form of the Rood flicker photometer. By a very elaborate series of tests by various methods, he found that the true 'flicker,' which appears when the speed is just sufficient to give a uniform background, is independent of color and depends only upon differences of luminosity.

The paper was discussed by R. S. Woodward and W. Hallock. W. Hallock described several forms of maximum thermometers used in subterranean temperature work, and described a new form which it is believed will obviate some of the difficulties of the U. S. signal service form, which has been used so successfully.

Mr. Hallock also reported upon recent work on subterranean temperatures referring especially to the Sperenberg well, near Berlin, 4,300 feet; the Wheeling, W. Va., well, 4,500 feet; the new Pittsburg well, 5,386 feet; the Schladebach well, near Leipzig, 5,740 feet, and the incomplete well at Paruschowitch, near Reibnik, which two years ago was 6,600 feet deep and was planned to go 2,700 meters (8,800 feet). The well at Pittsburg gave results practically identical with those obtained in the Wheeling well, which is forty miles distant but in practically the same geological strata. The observations at Pittsburg were preliminary, and it is hoped that a very complete and satisfactory series of temperatures will be obtained, owing to the generous public spirit of the Forest Oil Co., who have practically placed the well at the service of science. It is planned to drill it much deeper.

W. Hallock,
Secretary of Section.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

At the meeting of the Academy of Science of St. Louis, of March 1, 1897, Mr. William H. Rush presented a demonstration of the formation of carbon dioxide and alcohol as a result of the intramolecular respiration of seeds and other vegetable structures in an atmosphere containing no free oxygen. The theory of the dissolution and reconstruction of the living nitrogenous molecules was explained in connection with the experiments, and the different behavior of these molecules when supplied with or deprived of free oxygen was indicated.

Mr. H. von Schrenk briefly described certain œdematous enlargements which he had observed at the beginning of the present winter, near the root tips of specimens of *Salix nigra*, growing along the edge of a body of water. The speaker compared these with the œdemata of tomato leaves and apple twigs which were studied some years since at Cornell University.

Professor J. H. Kinealy exhibited a glass model illustrating the mode of action of the Pohle air-lift pump, the efficiency of which he had discussed at the preceding meeting.

One name was proposed for active membership.

William Trelease,
Recording Secretary.