papers with excellent half-tone illustrations. A full index closes this most interesting volume, which in the words of the editor "will be a souvenir to those who know the Vancouver coast and love the memories of the happy days and nights under the sheltering roof of the 'Sea Palms,' or beside the white water." To others it will certainly justify the hope that it 'will have some scientific and permanent value.'

CHARLES E. BESSEY

THE UNIVERSITY OF NEBRASKA

SOCIETIES AND ACADEMIES

THE BIOLOGICAL SOCIETY OF WASHINGTON

THE 419th meeting was held on November 3, 1906, President Knowlton in the chair and twenty-seven persons present.

Dr. Theo. N. Gill presented the first paper of the meeting, on 'The Work of Pterophryne and the Flying-Fishes.' The combination of two such different fishes as sargasso fish, or *Pterophryne,* and the exocœtoid flying-fishes is the index of a curious history.

In December, 1871, one of the most accomplished naturalists of the nineteenth century, Professor Louis Agassiz, made a famous voyage for discovery to Brazil and while traversing the Gulf Stream, found a globular nest-like mass of sea-weed filled with eggs, which he examined and noticed in a letter published in the *American Journal of Science.* These eggs were identified as those of the sargasso fish, now generally known as *Pterophryne histrio.* In 1887 many more such masses were found in the sargasso meadows off the coast of Africa, and, accepting the identification by Agassiz, Professor Leon Vaillant explained how the *Pterophryne* made the nest. In 1894 Professor K. Möbius described still more in detail the eggs and nest and likewise assumed the correctness of the identification of the mass as a nest made by *Pterophryne.* He described in detail and figure the bipolar filaments of the eggs found in connection with such masses and found, by examination of the ovaries of a *Pterophryne,* that the ovarian eggs had no filaments and were smaller than the eggs found in the nest-like masses. He consequently postulated that the filaments must be acquired during the passage of the eggs through the oviduct. Such were the opinions up to last year. It was then found that the *Pterophryne* had nothing whatever to do with the nest-like masses of sargasso!

In the fall of 1905 Dr. Hugh Smith invited the speaker to call at his office and see some eggs that had been laid by a *Pterophryne* in an aquarium under his own observation. To his surprise, those eggs had no filaments and were smaller than those that had been described by Möbius. Subsequently Dr. E. W. Gudger sent him a notice of similar eggs and explained that they were extruded in a long jelly-like mass, in fact like that issuing from an angler (*Lophius piscatorius*).[2] It became evident, therefore, that the nest-like masses of sargasso must be made by a very different fish from the *Pterophryne.* The only eggs like those found in the sargasso weed are those of flying-fishes. In fine, the nest-like masses of sargasso are not made by any fish at all, but by the eggs themselves. The eggs must be laid on the fronds of the weed and the long motile tendril-like filaments clasp the finely cut branches of a frond till a globular mass is brought together. As Professor Agassiz had not noticed any bipolar filaments on the eggs examined by him, Dr. Gill thought it was possible that a lot of the eggs of a *Pterophryne* might have drifted in a mass with flying-fish eggs. The different times of oviposition of the sargasso-fish and the maker of the nest-like masses, it is true, were an objection to such a hypothesis, but it was assumed that there might be exceptional coincidence. To test the hypothesis, Dr. Alexander Agassiz, the discoverer of the peculiar oviposition of the angler, sent eggs taken from outside of a nest-like mass figured by him and they proved to have the filaments characteristic of flying-fishes. That hypothesis must, therefore, be abandoned, and the one crediting the formation of the nest-like masses to the flying-fish alone be accepted for the present at least.

Dr. Hugh M. Smith in discussing the subject described the spawning of *Pterophryne*

[2] See 'A Note on the Eggs and Egg-laying of *Pterophryne histrio,* the Gulf-weed Fish,' by E. W. Gudger, in SCIENCE, December 22, 1905.

in captivity and exhibited one of the characteristic egg-rafts and a photograph of another. During September, 1906, three fishes that had been under his observation in the aquarium at Woods Hole for some time spawned. The rafts were quite transparent, somewhat elastic, and non-adhesive, and floated at or near the surface in a partly collapsed condition; they were from 45 to over 90 cm. long, about 7.5 cm. wide and about 6 mm. thick, with abruptly tapering ends; the eggs are .6 mm. in diameter and exceedingly numerous, thickly infiltrating the jelly. One fish that produced a band of eggs 45 cm. long on September 24 laid another string 92 cm. long on October 8. The consecutive ripening of the ovaries is doubtless normal, but there is at least one observation (at Woods Hole, several years ago) of the simultaneous discharge of two egg-bands. In none of the cases where these fishes have spawned in captivity have the eggs been fertilized, and the embryology remains unknown.

The second paper was by Dr. M. W. Lyon, Jr., on 'Local Races of Bornean Squirrels.' He exhibited eight different forms of squirrels of the *Sciurus prevostii* group found in northern and western Borneo, pointing out their characters and showing how the extreme forms were connected by forms possessing intermediate characters. Material at the present time is not sufficient to show complete specific intergradation. A large river proved a very effectual barrier in separating two very distinct races. In the discussion which followed, Dr. Hitchcock asked if two or more of the exhibited races coexisted in the same locality. Dr. Lyon replied that such was not known to be the case, and that as a rule among mammals when two species of the same genus inhabit the same area, they usually belong to very different groups in that genus or to different subgenera. He thought that the squirrels under discussion should form a distinct subgeneric group. Dr. Gill deplored the increasing number of genera and subgenera based on slight characters. Dr. Stiles remarked that in some groups of animals a good criterion for establishing genera had been found when two forms possess a character not found in a third form; two distinct genera are then present, but the author he referred to makes no use of subgenera in this scheme. Dr. Stejneger said that whether definite natural groups were called genera, subgenera or comprehensive species was merely a matter of definition of terms, the facts expressed remained the same. Dr. Lyon thought the multiplication of genera and species was deplored by the non-specialist but was of much assistance to the specialist in any large group of organisms.

The third paper was read by Mr. Karl F. Kellerman, on 'The Use of Copper in Sanitation.' It is evident that a scourge of polluting algæ is an emergency condition. The employment of copper sulphate to eradicate this pollution is satisfactory both from the theoretical and the practical standpoint. Similarly, copper treatment of unfiltered supplies for the purpose of controlling or stamping out water-borne diseases should be considered an emergency contingency and should never be more than a temporary expedient which local conditions might make necessary until permanent means of purifying the water could be established. The question of sterilizing or disinfecting a water supply even two or three years ago was looked upon with great disfavor, but is now recognized by sanitary engineers to be necessary or at least desirable in some cases.

Many chemicals have been proposed to effect sterilization of this character, among which, besides copper, may be mentioned electrolytic chlorine, ozone, lime, silver chloride and various specially named trade products. The selection of the most suitable chemical and the method of applying this chemical for continuous disinfection of a water supply are problems for the future. Such treatment probably will be carried on in connection with filtration, both because of the greater opportunity for removing the chemical employed and because of the necessity of keeping the water free from sediment and similar impurities.

As with the algæ, the different species of bacteria vary in their sensitiveness to copper. Many of the saprophytic bacteria usually present in water are highly resistant, some, which are usually regarded as water bacteria, are extremely sensitive; *Bacillus typhi* and *Bacillus coli* seem somewhat between the two extremes.

Emphasis should be laid upon the intimate relation between sewage disposal and water purification. Proper sewage disposal, whether the varying conditions mean that this should be interpreted as sterilization or merely slight improvement, is logically the first step in the problem of securing and maintaining a safe and potable water supply.

The use of copper in sterilizing a sewage or in improving the quality of the effluent from a sewage purification plant is in many ways comparable to the use of copper for the purpose of removing pathogenic bacteria in a municipal water supply. Briefly, the use of copper in sewage treatment should be restricted to occasionally treating crude sewage from small communities where the initial expense of installing a sewage disposal plant is prohibitive, in improving the effluent of sewage disposal plants of poor quality and in the emergency of an unusual and serious accident to a sewage disposal works.

M. C. MARSH,
Recording Secretary

THE AMERICAN CHEMICAL SOCIETY NORTHEASTERN SECTION

THE seventy-second regular meeting of the section was held in the rooms of the Trade Club, 77 Summer Street, Boston, on Friday, December 21, with President L. A. Olney in the chair. About forty-five members were present.

Dr. W. C. Bray, of the Research Laboratories of the Massachusetts Institute of Technology, presented a paper by Professor Arthur A. Noyes and himself upon 'An Improved Scheme of Qualitative Analysis for the Tin Group, including the Detection of Platinum, Gold, Selenium, Tellurium and Molybdenum.' The work upon which the paper was based was begun at the Massachusetts Institute of Technology some six years ago, under Professor Noyes's direction, and has been continued to the present time. The analytical scheme is to be universally applicable, and to include all the elements. It will permit of the detection of quantities as small as one or two milligrams of any element in a mixture. The innovations of the system are especially this quantitative character of the work and the systematic method devised for preparing the solution of the substance for analysis. In this paper only that part of the scheme which related to the tin group was considered. It was shown that in the cases of the sulphides of arsenic, antimony and tin, 1 milligram of any one of the three, could be detected in the presence of 500 milligrams of either of the others. In the case of platinum, gold, selenium, tellurium and molybdenum, the quantities which could be detected ranged from one half to one milligram in 500. Confirmatory tests have been introduced in all cases where the original test might be misinterpreted through faulty work on the part of the analyst. Demonstrations of several of the tests were made, to show the characteristic reactions: Thus, the separation of selenium and tellurium by solution in concentrated hydrochloric acid, and reduction and precipitation of the selenium in the cold solution by sulphurous acid—a bright red precipitate separating. The tellurium may then be precipitated by diluting the solution and adding potassium iodide, whereby a black precipitate falls. The precipitation of gold by means of oxalic acid, yielding a purple precipitate, and the detection of molybdenum by use of potassium sulphocyanide and metallic zinc, whereby a brilliant red color was obtained, which soon faded to pale yellow as the reducing action of the zinc continued, were also shown. In the discussion of the paper the speaker brought out certain objections to the usual Marsh test, and showed the advantages of the proposed procedure, in which the magnesium-ammonium arsenate precipitate is redissolved in hydrochloric acid, and the arsenic again thrown out with hydrogen sulphide. The method of separating tin and antimony was also dwelt upon.

FRANK H. THORP,
Secretary