from the establishment of conflicting standards by different groups within the industry. If the request of the society is approved, a technical committee representing all branches of the industry will be organized under the procedure of the American Standards Association.

THE Federal forest research work in the Lake States region, carried on by the Lake States Forest Experiment Station of the University of Minnesota, in cooperation with the university, has been expanded by the establishment of three field laboratories, with a total of approximately 5,400 acres and located within the Chippewa and Superior National Forests. One of these laboratories is to be known as the Cutfoot Experimental Forest, situated about 24 miles from Deer River and well stocked with growing timber, mainly Norway and jack pine. The second is the Pike Bay Experimental Forest, approximately six miles from Cass Lake, and is predominantly an aspen hardwood type. The third is the Kawishiwi Experimental Forest of 2,635 acres, about thirteen miles from Ely, and representing a distinctive region, including the jack pine, black spruce and aspen types.

DISCUSSION

OBSERVATIONS WITH THE RIFE MICROSCOPE OF FILTER-PASSING FORMS OF MICROORGANISMS

RECENTLY, I reported to the staff of the Mayo Clinic the more important observations made during three days, July 5, 6 and 7, 1932, spent in Dr. Kendall's laboratory at Northwestern University Medical School, Chicago. I went there at the invitation of Drs. Kendall and Rife, to share with them their observations in a restudy of the filter-passing forms of *Eberthella typhi* as seen with an improved model of the Rife microscope. They asked me also to bring with me my cultures of the streptococcus from poliomyelitis.

I would like to repeat here that portion of my report which had to do specifically with the Rife microscope.

Owing to the novel and important character of the work, each of us verified at every step the results obtained. Microscopic examinations of suitable specimens was made as a routine by Dr. Rife with his high-power microscope, by Dr. Kendall with the oil immersion dark field, and by myself with the ordinary Zeiss microscope equipped with a 2 mm apochromatic oil immersion lens and × 10 ocular giving a magnification of about 900 diameters. Most observations with the Rife microscope were made at 8,000 diameters. In order to check the magnification, gram and safranin stained films of cultures of *Eberthella typhi,* of the streptococcus from poliomyelitis, and stained films of blood, and of the sediment of the spinal fluid from a case of acute poliomyelitis, were examined. Bacilli, streptococci, erythrocytes, polymorphonuclear leukocytes and lymphocytes were clearly seen, and in each instance were, as nearly as could be estimated, about nine times the diameter as when examined with the 2 mm oil immersion at about 900 diameters.

The following principles and methods were stated by Dr. Rife as being essential in order to visualize clearly the objects at this and higher magnifications by direct observation. Spherical aberration is reduced to the minimum and magnification greatly increased by using objectives in place of oculars. Proper visualization, especially of unstained objects, is obtained by the use of an intense beam of monochromatic polarized light created by rotating wedge-shaped quartz prisms placed between the source of light and the substage quartz condenser. Dispersion of the transmitted rays of light, as they pass upward to the eye, is prevented by passing them through a series of quartz erecting (90°) prisms. Projection of the rays of light through air is not greater than 30 mm at any point.

In my original report[1] I summarized as follows:

There can be no question of the existence of the filterable turquoise blue bodies of *Eberthella typhi* described by Kendall. They are not visible by the ordinary methods of illumination and magnification, not because they are too small, but rather, it appears, because of their peculiar non-staining hyalin structure. Their visualization under the Rife microscope is due to the ingenious methods employed rather than to excessively high magnification. Examination under the Rife microscope of specimens, containing objects visible with the ordinary microscope, leaves no doubt of the accurate visualization of objects or particulate matter by direct observation at the extremely high magnification (calculated to be 8,000 diameters) obtained with this instrument.

The findings under the Rife microscope of cocci and diplococci in filtrates of cultures of the streptococcus from poliomyelitis, and in filtrates of the viruses of poliomyelitis and herpes encephalitis, not detectable by the ordinary methods of examination, and which resembled in form and size those found in the respective cultures, and the absence of minute forms, suggest that the filterable, inciting agent of these diseases is not necessarily extremely small, as is universally believed. Indeed, the filterable, inciting agent may be the non-staining, highly plastic, hyalin

[1] Proc. Staff Meeting Mayo Clinic, 7: 408–413 (July 13), 1932.

stage of the visible, stainable, cultivable organism, the streptococcus.

It is, of course, possible that these unstained, invisible forms revealed by ordinary methods of examination are not the inciting agents or "viruses" of these diseases and that they represent merely the filterable or other state of the streptococcus. A consideration of the great difficulty one has in isolating the streptococcus and demonstrating diplococci in lesions in these diseases and the ease with which the bodies are found in the filtrate indicate clearly that the "invisible" forms of the streptococcus, if such they be, are present in large numbers in the host, as in positive cultures of the streptococcus. Their form, size and color are too characteristic and true to type to permit considering them as artifacts or as being expressive of etiologically unrelated, contaminating streptococci. Non-infectivity of the filter-passing forms, except in the cases of virus diseases, their presence in large numbers in filtrates, both of cultures and of infected tissues, and the great difficulty in obtaining the visible forms in cultures of filtrates indicate that "invisible," filter-passing forms represent a certain stage in the development of microorganisms.

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ON THE TAXONOMIC POSITION OF ECHINORHYNCHUS SAGITTIFER LINTON

WHILE working over a collection of acanthocephala from fishes of the Woods Hole region I have found it necessary to pay attention to changes in nomenclature which have been made since my earlier papers were published, at which time it was still customary to refer all species of the group to the genus Echinorhynchus.

Van Cleave in 1923[1] created the name Serrasentis for the genus in which *E. sagittifer,* in the following year, was included as a distinctive species. In 1924[2] he gives the synonymy of the genus Serrasentis, and *E. sagittifer* Lt., 1889, is placed as synonym under *Serrasentis socialis* (Leidy, 1881).

Leidy's description of *E. socialis*[3] is:

> Body white, cylindrical, with a dilation of the anterior fifth: narrowed posteriorly, with a white spiral band passing around the whole length and giving the appearance of transverse annulations.
>
> Proboscis moderately long, cylindrical, with twenty-six transverse rows of simple re-curved hooklets, sixteen in each row.
>
> Male furnished with a posterior vesicular appendage.
>
> Length from ½ an inch to 2 inches 4 lines: breadth of larger individuals anteriorly ⅝ of a line; posteriorly ⅜ of a line.
>
> *Habitation.*—Found frequently in considerable numbers in the intestine of *Platessa plana.*

An error has been made by some one in copying the first paragraph of Leidy's description of *E. socialis,* which in Van Cleave's paper (*l.c.,* p. 327) reads:

> Body white, cylindrical, with a dilatation of the anterior fifth; narrowed posteriorly, with spiral (white) band passing around the whole length, and giving the appearance of transverse rows of simple recurved hooklets, sixteen in each row.

With the exception of the "white spiral band," which may be accounted for without attributing to it specific value, the above description fits the species which has been recorded under the name *E. acus,* now known as *E. gadi,* found in many species of fish in the Woods Hole region, and frequently occurring in considerable numbers in *Pseudopleuronectes americanus,* a synonym of *Platessa plana.*

The proboscis of *E. sagittifer* in the original description of the species[4] is thus characterized:

> The proboscis is clavate, bluntly rounded in front, increasing slightly for a short distance back, and then narrowing gradually to the base, thickly beset with recurved hooks, of which there are about twenty series, counting from base to apex, and about fifteen visible in the longest spiral.

Leidy makes no mention of spines on the body of *E. socialis,* while they are a conspicuous characteristic of *E. sagittifer.*

Furthermore, *E. sagittifer* in the Woods Hole region has been found but sparingly, and then only in immature forms, encysted on the viscera and peritoneum of its hosts. It has been found in the adult stage only in the southern host *Rachycentron canadus*[5].

In 1884 when I was beginning work on the helminth parasites of fishes I wrote to Joseph Leidy enclosing a sketch of an acanthocephalan, which I later described under the name *E. sagittifer.* He replied that he was unacquainted with this form.

I conclude, therefore, that *E. socialis* Leidy should be regarded as a synonym of *E. gadi* and that *E. sagittifer* Linton belongs properly in Van Cleave's genus Serrasentis and should be written *Serrasentis sagittifer* (Linton).

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[1] Trans. Am. Mic. Soc., 42: 186.
[2] Proc. Acad. Nat. Sci. of Phila., 76: 325–328.
[3] Proc. Acad. Nat. Sci. of Phila., 5: 156, and Smithsonian Mis. Col., 46: 46.
[4] Report U. S. Fish Com. for 1886, p. 494.
[5] Bull. U. S. Bureau of Fish., 24: 371.