THE TRICHINÆ IN SHAD.

BY JOHN MICHELS.

A mischievous report has been recently circulated by the public press, stating that shad of the present season were infested with trichinæ, one of the most disgusting and dangerous forms of human parasites.

Although the rumor was absurd and appeared to require no contradiction, those in the trade stated that the public were alarmed and the trade much affected. Thinking that a specific statement would be welcome, I made an investigation into the merits of the case, to discover what had given rise to this libel on a wholesome and delicious fish.

Fish in the New York market were carefully examined and large quantities of the offal searched; this was followed by a microscopical examination for more minute organisms. The same work was continued on the schooners, and both masters and men closely questioned on the subject.

The result showed the shad to be perfectly healthy, and free from any form of life that need cause any alarm. The key of the mystery is probably as follows: I found most fish, both large and small, troubled with a thread-like worm, in length about three quarters of an inch. They were met with in the gills and intestines of the large red snapper from the far South, and in small fish from the Bay of New York.

Having secured various specimens of these worms, they were prepared and mounted in the usual manner. Trichinæ are not visible to the ordinary vision, the cyst in which they lie coiled being 1-50 of an inch. So clearly these worms, three quarters of an inch long, were not trichinæ.

What were they? I should describe them as belonging to the order of free *Nematoideæ*, called *Anguillulæ*, which are found almost everywhere, and abound in surface mud of rivers, aquatic plants, etc., etc.

The marine species are considered perfectly harmless, and die shortly after desiccation. They probably enter the fish with the food, and are thus met with in the intestines and about the gills. Of course they are all removed when the fish are gutted and cleaned, and would be powerless for evil if they remained.

The *Nematoid* group is divided into two groups, the first including such formidable and well known human parasites as the celebrated trichina, the Guinea worm, and the *Ascaris lumbricoides*, and a host of more or less note; and secondly, of a class still more numerous, which are not parasitic at any period of their life, and lead a free existence. The worms recently observed by me belong to the second class, and never become encysted, and therefore can never be mistaken for trichinæ. Much interest is attached to the family of *Anguillulidæ*, which is known to include over 180 varieties; and numerous workers are in the field, among whom we may name Dr. Cobbold, of England, and our own Professor Leidy.

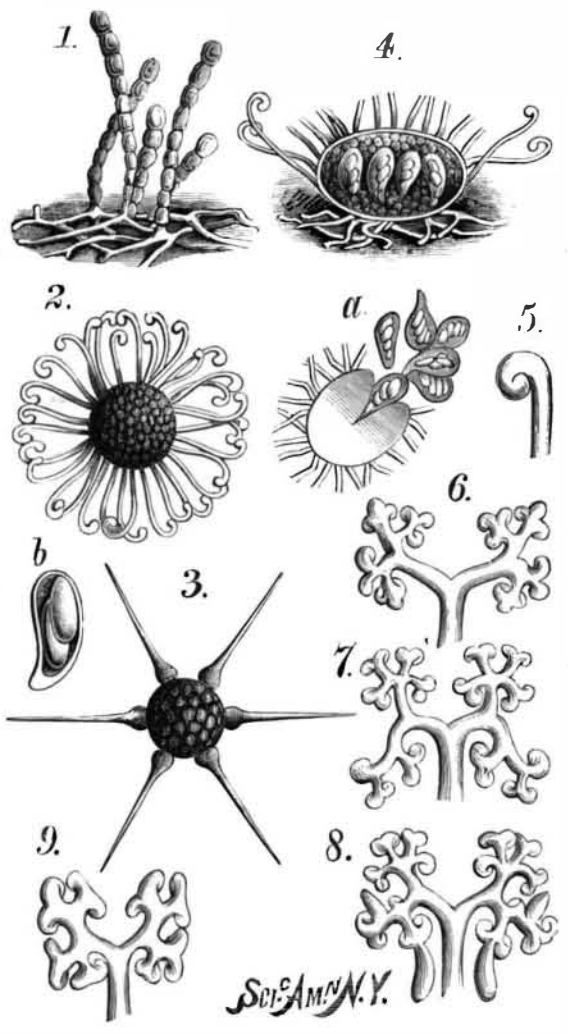
In regard to trichinæ, I may mention the fact that M. Colin confirmed the observations of Fuchs and Pagenstecher, that it is only in mammals that the trichinæ are enabled to pass into the muscular system and remain imbedded there, preserving their vitality. Such being the case, fish can always be eaten with perfect safety, so far as danger from trichinæ is concerned.

Composite Portraits.

At a recent meeting of the Anthropological Institute, London, Mr. Francis Galton, F.R.S., read a paper "On Composite Portraits, made by combining those of various Persons into a single Resultant Figure." The author remarked that when images of many different persons are successively thrown for a short time on the same portion of a sensitive photographic plate, the composite figure that results is found to have an unexpectedly good definition. No person who saw one of these composites for the first time would doubt its being the likeness of a real person, whereas it is no such thing; it represents the average of many. Of course the component images must all be in the same attitude and of the same size, but exactitude in these respects is unnecessary. The important requisite is that the images should be carefully superimposed, and this is a very easy matter to effect. The author begins by collecting photographs of persons of the same general type of features and taken in the same attitudes. These are reduced photographically to the same size. Then they are severally adjusted under fixed cross wires until one wire cuts the pupils of the eyes and the other bisects the interval between them. Then a hinged arm, carrying two points, is pressed down and pricks two register marks. When all the portraits have been thus prepared they are hung one in front of the other on two pins sticking out of a screen in front of the camera and passing through their register holes. They are photographed successively by removing one after the other to the last. Suppose there are ten component portraits, and that it would require 100 seconds exposure to get a satisfactory image of any one of them, then each of the ten portraits is exposed ten seconds only. The composite retains what is common to all the components, while individual peculiarities have in it no perceptible trace; the result is a handsome and regular face. Many specimens were exhibited. Even two faces will often make a fair combination, but the larger the number the better, if they all have the same general cast of features. The uses of the process are to procure anthropological types, to compare the average likeness of a family of brothers and sisters with that of their near ancestry—namely, two parents, four grandparents, and the uncles and aunts on both sides; and to obtain a good likeness of the same person by averaging many portraits. The author exhibited methods of optically combining portraits. A stereoscope will do this in some sense, but the best instrument for the purpose is a "double image prism" of Iceland spar.

MICROSCOPY.

The Erysiphei or "Blights."—Those who are accustomed to go about with their eyes open, and are observant of the commoner things in nature—and we by no means wish to include in this class the recent purchasers of 'alligator wood"—can scarcely fail to observe here and there by the wayside, in June, clumps of grass which have the appearance of being covered with a hoar frost. Let some of these specimens be carried carefully home and examined under a low power of the microscope, and the observer will be amply repaid for his trouble. The apparently chalky dust will reveal itself under the form of a forest of vegetable crystallization; "little bundles of delicate threads, clear and crystalline, composed of numerous roundish or spherical cells attached to each other in a bead-like manner," will be seen seated on a network of slender branching filaments called collectively a *mycelium* (Fig 1). This curious and interesting object is the primary stage of a minute parasitic plant belonging to the large and widely disseminated order of cryptogams, the *Fungi*. A mould which has for many years caused great havoc among the grape vines of Europe is just another such incomplete fungus, called *Oidium tuckeri*. The leaves of nearly every lilac bush will be observed in midsummer to be covered with irregular patches of a whitish substance that might, to the casual observer, suggest a coating of dust derived from the road. If one of the leaves be examined at this stage with a powerful lens this apparent dust will be found to consist of delicate cobweb-like threads, branching and interlacing in every direction. Later in the season another examination will reveal, seated on these filaments, numerous little spheric objects, some exceedingly minute and white, others a trifle larger and yellow, and others again brown. The white and yellow bodies are the young, and the dark brown ones the mature fruit of one of these fungi. These interlacing, delicate filaments (called a *mycelium*), along with their fruit, constitute what is popularly known as a "white mildew," "white mould," or "blight;" and such a one as we have described, in company with a host of similar forms, infesting various plants, go to make up the group known to botanists as the *Erysiphei*.



PLANT BLIGHTS OR MOULDS.

1. Grass mould (*Oidium*). 2. Willow blight, magnified 80 diameters. 3. Hazel blight, 80 diameters. 4. Section of willow blight, highly magnified. 5. Tip of appendage of willow blight, magnified 500 times. 6. Tip of viburnum blight, 500 times. 7. Tip of chestnut blight, 500 times. 8. Tip of honeysuckle blight, 500 times. 9. Tip of guelder rose blight, 500 times. *a*. Sporangia escaping from a ruptured conceptacle. *b*. Sporangium of No. 3, with the two spores, magnified 160 diameters.

These little parasites are of melancholy interest to the horticulturist and gardener, to whom they often prove great pests. For most of them grow on living leaves and fruits, and are very destructive, either by "directly diverting the nutritive juices from their proper office and appropriating them to their own use, or by blocking up the *stomata* of the leaves and impeding the free action of the rays of light and of the surrounding atmosphere."

Professor C. E. Bessey, of the Iowa Agricultural College, has recently sent us a paper, with the title which heads this article, in which he has endeavored to collect the scattered literature of the subject, and to give "an enumeration and description of the species known" to occur in America, "and which have been catalogued; with descriptions of all the species." This paper will undoubtedly prove of great service to those beginning the study of the fungi, and who find it difficult to obtain the necessary publications on the subject. Our own experience, however, is that it is very unsafe to rely on descriptions alone for the identification of these microscopic plants, authentic specimens being necessary for comparison. And this is made the more necessary from the fact that more than one species frequently establishes itself on the same host.

But to return to our subject: If one of the brown spherical bodies be placed in a drop of water, under a thin cover, and examined with a high power of the microscope, there will be seen to escape from it, on rupturing its membranous walls by a slight pressure on the cover (*a*), several pyriform, transparent sacs, in which are inclosed a definite number of spores, which vary in different species. The arrangement of these spore cases (*sporangia*) in the interior of the conceptacles is shown in a vertical section at Fig. 4. The number of spore cases (*b*) contained in each of these brown conceptacles varies, according to the genera and species, from one to twenty, or more. The remarkable feature about these little plants, however—that which is calculated to give them an interest outside of any scientific consideration—is the beauty of their ornamentation, which renders them desirable objects for mounting and preservation in the cabinet of every microscopist. Surrounding each conceptacle may be seen, radiating from every side, numerous (usually colorless) appendages. In the genus *Erysiphe*, from which the group takes its name, these appendages are long and floccose; in another genus they are only six or eight in number, and short and needle-shaped, from a bulbous base (Fig. 3); in another they are hooked or curled at their apices (Figs. 2 and 5); in another, again, they are long and once or twice forked; and finally in one genus, *Microsphæria*, the tips of the appendages assume in their ramifications the most exquisite and varied forms. It is almost impossible to do justice to these elegant objects with the pencil, and their marvelous beauty and symmetry can only be appreciated by viewing them under the microscope. We have endeavored to give an idea of their general form in the annexed figures, 6, 7, 8, and 9. There is a wide field for study and investigation in the life history of these little plants, which might well be undertaken by some of our microscopists who have good instruments and no definite work in hand. The Rev. M. J. Berkeley has already described and figured (*Transactions Horticultural Society*, vol. ix., p. 68) five different forms of fruit which are produced during the course of the development of the hop-blight: First, the moniliform threads on the mycelium, which we have already alluded to as *Oidium* (Fig. 1); second, large stylospores produced in sporangia; third, smaller stylospores generated in pycnidia; fourth, sporules formed in the joints of the necklace-like *Oidium* stage; and fifth, the sporangia containing the spores produced in conceptacles, such as we have described, and which is the mature fruit of the fungus.

The Olive as an American Product.

The olive has been successfully grown in California and in South Carolina, though not for profit. Gen. A. C. Jones, of the Department of Agriculture, after a careful investigation of the matter, is confident that there is no good reason why olive culture should not be profitably added to the list of our industries. The forthcoming annual report of the Department contains a paper in which is given a large amount of information with regard to the soils and climates most favorable to these trees, and the inducements they offer to the cultivator. In full bearing the olive tree yields from two to three bushels of fruit, producing from fifteen to twenty pounds of oil. An acre of land properly planted should contain about one hundred trees, and grass or other crops may be cultivated between the trees to advantage. Throughout the Mediterranean region the olive is an important source of industrial wealth; and since, in many parts, the climate of our country is not unfriendly to the tree, its cultivation may prove a real and valuable addition to our resources.

Our Exports.

The value of fifteen of our principal articles of export for the year 1877 was as follows: Cotton, $171,118,508; petroleum, $61,789,438; bacon and ham, $49,512,621; wheat, $47,135,562; Indian corn, $41,621,245; tobacco, $32,020,214; lard, $25,562,665; gold and silver, coin and bullion, $42,966,035; wheat flour, $21,603,947; lumber, $15,041,747; cheese, $12,700,627; wool and woolen goods, $9,834,849; tallow, $7,883,616; beef, $7,503,475. It is a notable fact that petroleum, the product of a small area in an otherwise worthless region, stands second on the list. It brings to this country from abroad more gold than any other commodity except cotton. Fifteen years ago not a barrel had been exported. For ages petroleum had been known in the Old World, yet its use was comparatively insignificant until American inventors devised the means for collecting it in unlimited quantities, and a thousand other means for transporting, refining, and applying it to profitable uses. Who can tell what other natural products of incalculable value are still lying undeveloped, waiting for the genius of our inventors to call them into life and usefulness?