

sugar remains. No one need fear it because oil of vitriol by magical catalysis compelled the starch from being  $C_{12}H_{20}O_{10}$  to become  $C_{12}H_{12}O_6$ ; that is, to lose four atoms of water (which is  $H_2O$ ) from its composition and become glucose.

No, no! It is true, when we start to buy sugar we naturally would be glad to get what we had in mind; but if adulterations were no worse than this, we well might think little of them.

#### "FISH CULTURE FOR PROFIT."

In our paper of September 1 we printed a communication headed "Fish Ponds for Farms," and we wish to add to it here some items which we hope may make it of more direct and immediate value, as bringing it within the range of more speedy returns for the money and labor invested. We have selected the title above given, because any one can turn to the *Bulletin* of the United States Fish Commission, for 1881, page 382, and see that we are not talking at random. "Fish Culture for Profit" is discussed there by authority.

We have long had the belief that the worthless swamp lands, found along so many of the brooks and streams, throughout the country, might be made, by means of an outlay which would be almost nominal, to pay a more certain and a greater return annually, than any parts of the same farms devoted to corn, grain, or hay, counting acre for acre, so that Mr. Hiesters' article in the *Bulletin* interested us greatly, and our correspondent of September 1 gives us occasion for calling the subject up here.

The fish to which so much attention has been given of late years for pond-growth we must set aside, every one of them. Trout have had the greatest name of all, but in the waters which we propose to utilize they will never thrive, in fact can scarcely be made to live at all. They must have either a running stream or a pond which is fed with clear cold water. They bring, it is true, a fine price, but they are very delicate, subject to many vicissitudes, and they require constant care, and much attention to their supply of food.

Black bass, yellow perch, and pickerel have all been used for stocking ponds, and with more or less of success, but they are all such voracious brutes that they speedily clear the water of every living thing that can swim, including even their own young, and the consequence is that only a very limited supply can be secured from a given amount of space. Their remarkably healthy appetites ruin them for profit.

German carp have been now extensively introduced, and their value is beyond question very great. We have nothing to say against them, and they will doubtless retain a strong hold on popular favor, for they deserve it. But we have that which is decidedly to be preferred, when we are looking for profit. The carp grow to a fine size, and it is a grand sight to watch them cruising about on a warm summer's day, in a pond—great fellows, six, eight, ten pounds and more, close to the surface, dorsal fin perhaps out of water. No, we have no charge against the carp, and we are almost ashamed and afraid to bring up our little protegee in comparison. But then it is the dollars for which we are looking, and we propose to show how a swamp meadow can turn out more money to the acre from bull heads than the same space will readily pay in any other manner, wet or dry.

The fish to which we refer is the *Ameiurus nebulosus*, and is called bull head, horned pout, and, in some parts of New England, minister. It is a catfish. There are many American species of catfish, but this is the only one common in the regions of New York and New England; and it is a fact worthy of note that though we have nine or ten species of *Ameiurus*, the only type of the genus which is found beyond the limits of North America is more closely allied to the *nebulosus* than any one in our own waters; it is the *A. cantonensis*, a native of China.

The horned pout is never a large fish, one weighing a pound being much over the average, and in raising them for the market they will afford the greatest profit when not exceeding half a pound. The advantages which they afford over the other fish mentioned, for remunerative cultivation, are that they are perfectly hardy, not liable to disease, thrive to the best advantage in sluggish and warm waters, need no care or feeding, live on aquatic plants and insects, and can thus secure abundant food from a small space, multiply rapidly, and are ready for market at the age of a year, which is much earlier than any other fish.

The demand for them, a small pan fish without bones, is almost unlimited and the price good. Mr. Hiesters quotes them as selling by the ton at ten cents a pound. His estimate is that ten feet square of pond area will yield annually over ten pounds of fish. On these data, an acre will return \$420 dollars at the least. This seems too great for belief, and yet he assures us that it is done; a half or even a quarter of it would satisfy most land owners, especially as the land needed and taken for this purpose is that part of the farm which for other uses is without value.

The preparation of the pond involves very small expense, for it is best that the water should be shallow, not over four or five feet deep. In most cases a spot can be selected where a dam of but a few rods in length across one of our swamp streams will be sufficient to overflow from one to two acres to the depth required. The only expense beyond building the dam is to so far smooth the bottom that a net can be dragged over it. The removal of bushes and rocks, and perhaps a little work with plow and scraper, will do this, and the pond is ready for stocking. It is easy to procure the

catfish in most localities, and nothing further is required. That acre of swamp land was before this worth practically nothing; it might perhaps yield a nominal amount of pasturage. It is best to leave it two years, so as to allow the fish to increase and grow. After that time they can be taken out at convenience. A net should be used which allows the small ones to pass through. None under five inches (preferably six) should be caught, and it is wise always to retain in the pond a good proportion of full grown fish, for the sake of more rapid increase in numbers. The fish can readily be taken at such times as to scarcely interfere at all with the labor of the farm. They can be sent to market as they are caught, or they can be skinned and packed in boxes ready for use, according to what the sale demands.

Every other acre of the farmer's land which yields him a crop involves the expense of fertilizers and labor, for weeks and months. This acre of pond surface on worthless swamp land costs not a dollar of expense annually beyond that of drawing the net and preparing the fish for market, and on the faith of the *Bulletin's* estimates it will yield \$400 and upward. What part of his fertile land will pay as well?

#### DIPTEROUS LARVÆ IN THE HUMAN BODY.

BY PROF. C. V. RILEY.

Several papers on this interesting subject have recently been published by American and European authors, partly from the entomological standpoint. De Franz Loew, in a paper on myiasis and its originators (in Dr. Wittelsboefer's *Wiener Mediz. Wochenschr.*, vol. xxxiii, pp. 972-975, 1883) corroborates by further testimony his views expressed in a former article, viz., that the disease known as myiasis is caused not by larvæ of *Cæstridæ*, as has been and is still so frequently assumed, but solely by species belonging to the "flesh flies" (*Sarcophagidæ* and *Muscidæ*). In fact, so far as reliable observations and determinations have been made there are but two species concerned, viz., *Sarcophila wohlfarti* Portsch (= *magnifica* Schin.) in Europe, and *Comptosomyia macellaria* Fabr. in America. The latter species is distributed throughout North and South America, and has an extensive synonymy, as not only the *Calliphora anthropophaga*, Couill, *C. infesta* Philippi, and *Lucilia hominivorax* Coquerel, but no less than 23 other "species" have proved to be synonymous. On the synonymy and on the geographical distribution of *C. macellaria* two papers were published some time since by E. L. Arribalzaga (in *Anu. Soc. Cientif. Argentina*, vol. vii, p. 253, 1879; and vol. x., p. 248, 1880), but M. F. Bigot, the well known French dipterist, hesitates to accept the synonymy (*Ann. Soc. Ent., France*, 1883, Bull., p. cliv.), and further thinks that myiasis in America may also be caused by other species of *Lucilia* and *Pyrellia*.

Attacks on man by *Cæstridæ* are of very rare occurrence. There are but three well authenticated cases known caused by hypoderma, two in Europe and one in this country,\* while a few others have been caused by *dermatobia*, all in the tropics. Quite recently Dr. Laboulbène (*Ann. Soc. Ent. France*, 1883, Bull., p. cxxvi.) observed a case in France caused by *Dermatobia noxiatis*, but this was imported from Brazil by the person infested with the larva. *Cæstrid* larvæ in man are always found singly in various parts of the body under the skin, which may otherwise be in a healthy condition. Moreover, *Cæstridæ*, which, like *gastrophilus* and *cæstrus*, infest internal organs, are never known to attack man. The occurrence of *cæstrid* larvæ under the human skin must be looked upon as accidental, and the celebrated "*Cæstrus hominus*" as a myth. The removal of the larva is neither difficult nor attended by any serious consequences.†

The larvæ of flesh flies, on the other hand, always occur in large numbers, and only in diseased or injured places in the skin or mucous membrane. The parent fly is attracted to such places, and especially to sores. Thus persons suffering with *ozæna* are liable to be affected with myiasis; and as the flies oviposit during the daytime, the disease has, with few exceptions, been observed in persons who have slept outdoors during the day in summer.

#### IMPOVERISHMENT OF LAND.

M. Deherain, in his interesting discourses upon the exhaustion of the soil by cultivation, makes some statements that are striking and suggestive.

In speaking of the evaporation of water from the leaves of plants, he says that in one hour, exposed to the sun, a leaf of barley exhales a weight of water equal to its own; and calculating upon these figures, a hectare (2.5 English acres) of maize will lose, under the same circumstances, 25 cubic meters of water. Hales, an English observer, has said that a hectare (2.5 English acres) of cabbages loses each day 20 cubic meters of water, and Lawes and Gilbert, in their studies on this subject, proved that a plant which has formed one kilogramme of substance within itself has carried in circulation through its tissues 250 to 300 kilogrammes of water.

Humus or decayed vegetable matter is the body which is most efficacious in retaining and keeping in a pure state the terrestrial waters. It can absorb an amount of water greater than its own weight, holds it more tenaciously than clay and infinitely better than sand. Analyses show that humus abounds in the prairies, or unused lands, and that it diminishes greatly in cultivated districts. M. Boussin-

\* C. H. Allen, in *Proc. A. A. S.*, Detroit meeting, vol. xxiv., p. 230.

† See Dr. J. L. Le Conte's remarks in his edition of *Say's writings*, vol. ii., pp. 37-38.

gault found in a pasturage of Argentan, in a kilogramme of soil, 40 grammes of carbon belonging to organic matters, and only 28 and 24 in the same quantity of cultivated land. M. Truchot found 10, 12, 14, 18 grammes of carbon in the districts of Limagne and Auvergne, which were highly cultivated, while he reports 110, 120, 148 grammes in the prairie lands of the high mountains which were roamed over by cattle, but never received fertilizers. The reasons for this difference are not difficult to determine. In the unused fields the earth is not broken up or exposed to the oxidizing and destructive action of the air, and the decaying roots, sprays, and scapes of the grass or herbs constantly increase or maintain unchanged its percentage of humus.

M. Deherain has demonstrated the cause of this loss. He divided his experimental land into parcels, and devoted many of them to a continuous cultivation. Some from 1875 to 1879 have borne potatoes, others corn, other each year beets. In 1878 the land planted with maize, in one kilogramme contained 16, 15, 13 grammes of carbon; at the end of 1879, 18 months later, the same weight of soil gave 14.4, 10.4, 13.1, 12.3, and at the end of 1881 the amount had been reduced to 8.0, 7.6, 6.1 grammes of carbon per kilogramme of soil.

In 1879 he examined the land planted with beets and corn, having yielded three harvests of beets and one of corn, and found the quantity of organic substances oscillating around 13 grammes per kilogramme. He then sowed this ground with sainfoin, which remained undisturbed for three years, and yielded excellent crops. At the end of the experiment he found the amount of carbon per kilogramme of soil had scarcely changed, being in fact 11.4, 13.0, 13.3, 12.8, 12.1, or a mean of 12.5, contrasting to great advantage with the reduced amounts in the harrowed and turned up grounds.

Apart from the reduction of organic matter in soils upon being turned up, the oxidation which removes the organic matter M. Deherain attributes to chemical change, by contact with air and to fermentation, but also largely to the activity of living organisms, plants and animals; for he observes, "The soil is not simply a mass, porous and inert, of clay, sand, and humus, but rather a center of organic activity."

Although MM. Schloesing and Muntz have shown that the formation of carbonic anhydride goes on in a sterilized soil, it is yet probable that microscopic germs and other living occupants of the earth are the principal agents in its production ordinarily.

These inferior beings play an important role, and MM. Lawes, Gilbert, and Warrington have shown that the mushrooms, which at some seasons appear in such numbers, decompose and assimilate large quantities of the organic contents of soils. The well known *Styria circles* in fields are due to a luxuriant growth of grass following the disappearance of the mushrooms, which first formed them. These chemists found that outside of these circles the ground contained 3.30 per cent of combined carbon, while within, and after the occupancy of the space by these parasites, the samples yielded 2.78 per cent. This difference corresponds to almost 9,000 kilogrammes of carbon to 1 hectare (2.5 English acres) of land!

#### The Locomotive Whistle.

We have given a number of statements from observers who certify to hearing the whistle for distances of over 15 miles. Here are others: Mr. J. J. Stranahan states that the whistle and the noise of the train on the trestle at Erie were formerly heard at Boeuff, Pa., a distance of 19 miles, air line.—W. J. McC., of San Pablo, Cal., writes that on calm, clear days, especially in the fall, they hear the rumble of the cars on a trestle located 18 miles distant.—J. H. S. says he has frequently heard the railway shop whistle at Grand Island, while living at Orville, a distance of 28 miles, and has seen moving trains with the unaided eye 12 miles.—Mr. C. V. Swarthout, Cape Vincent, N. Y., frequently hears the railway whistle at Kingston, Ont., 18 to 20 miles, also the rumbling of the trains; also musketry firing at Fort Henry, same place, while the sound of the cannon fired there sometimes is so strong as to shake his house.

#### Aniline Dye Adulterated with Sugar.

In a paper read at the November meeting of the Dublin Scientific Social Club, Mr. H. C. Daper said that a sample of magenta dye, purchased from an English firm, was found to contain crystalline matter insoluble in alcohol. The writer, on examination of the bulk of the dye, found that, mixed with the characteristic crystals of rosaniline chloride, was a large number of small cubes of a darker color. These, on further examination, proved to be crystals of sugar "faced" with roseine, and many of them so slightly coated that the dye was easily removed by rubbing them with the fingers. As the sugar crystals could be readily distinguished by inspection, they were picked out by hand from a weighed quantity of 10 grammes, and it was found that they amounted to no less than 95 per cent of the whole. A fresh quantity of 10 grammes of the dye exhausted with absolute alcohol left a sugar residue equal to 59.5 per cent.

It would be interesting to know to what extent this somewhat ingenious form of adulteration is carried.

#### A Steam Magnet.

C. Thouvenot, as did previously Tommasi, obtains an electro-magnet by passing steam of the pressure of two atmospheres through a copper tube of 1.5 millimeters in diameter coiled round an iron core.—*Weidemann's Beiblätter*.