

Spencer F. Baird, the Commissioner of American Fisheries, for the great trouble he has taken and the great liberality he has shown in sending over such varied consignments of fish-eggs. They arrived in splendid condition, a fact which does high credit to those to whom the packing of the eggs was intrusted. I must make one exception as to the condition of the eggs when they arrived. This refers to a box containing ova of the rainbow-trout, which reached London last Saturday. A number of these were dead on arrival, and others have been dying off during the last few days; but I hope some hundreds will be hatched out.

The hatching and rearing of these fish will be watched with great interest; but I think the question should be closely considered as to whether the introduction of any of the above-named would really be an advantage to our home waters. It may be that in some places where the fisheries at present are of little account they would thrive and multiply, but I think that strict caution should be observed in introducing these foreigners to our salmon and trout streams, and that we must not be too sanguine of good results accruing therefrom. The cross-breeding of fish should not be done at hap-hazard, and experiments ought to be carried on with due discrimination. If we can improve on our own salmon and trout (speaking generally), well and good; but I doubt it.

79.—AN ATTEMPT TO IMPREGNATE ARTIFICIALLY THE EGGS OF
ACIPENSER STELLATUS.*

By N. BORODIN.

In 1869 Mr. Owsjanikoff, member of the Russian Academy, made the first attempt to impregnate artificially the roe of the sterlet, which at the same time was the first attempt at the artificial impregnation of ganoids, which for a long time had baffled all experiments. It was, therefore, to be hoped that success would also accompany similar experiments with larger varieties of the *Acipenser*, such as *Acipenser stellatus*, *A. güldenstädtii*, and *A. huso*, which form the objects of extensive fisheries in the Caspian Sea and the rivers flowing into it. Experiments must prove this, however, and these are of special interest, because on them would depend the practical application of fish-culture to these kinds of fish. Thus far these experiments have not been made. It is true that Max von dem Borne, in his "*Fischzucht*," states that the American fish-culturists Seth Green and Marks, in 1875, made experiments with the roe of *Acipenser sturio* in Hudson's Bay; but the description of

* "*Ein Versuch künstlicher Befruchtung des Rogens des Sternhäusén.*" From the *Deutsche Fischerei-Zeitung*, vol. viii, No. 14, Stettin, April 7, 1885. Translated from the German by HERMAN JACOBSON.

the method employed by them leaves room for doubt as to the success which they say crowned their efforts.

Last spring I was commissioned by the St. Petersburg Society of Naturalists to make experiments with the roe of the *Acipenser stellatus*. These experiments were made at the mouth of the Ural River, not far from the Caspian Sea. In spring the Uralian Cossacks are in that place engaged in extensive fisheries for various kinds of *Acipenser*. The manner of fishing is so peculiar that it is mentioned in some well-known German works.* At the end of May I obtained an *Acipenser stellatus* with mature roe, and made the experiment of impregnation according to the dry or Russian method, with previously prepared milt. The roe was put on plates; the water was changed twice a day; and some of the roe was put in a basket and placed in the river. The development (at a temperature of 17° or 18° R., or about 71° F.) progressed very rapidly. On the second day a small furrow could be observed on the eggs, and on the third day some of the fish had slipped out of the eggs. In the river the development progressed more rapidly, in spite of the lower temperature (16° R., or 68° F.), but here the roe was covered too much with mud and most of it perished. The development on the plates was very satisfactory. It should be stated, however, that, owing to the sticky character of the roe, it has to be put in single layers, separated from each other as much as possible; otherwise much of it will perish. After five days the young fish can easily be recognized as *Acipenser stellatus*; after twelve days the umbilical sac disappears entirely, and the little fish strongly resembles the grown fish, with the exception of the snout, which is not as long as in the *A. stellatus*, but short, as in the *A. huso* and *A. sturio*. It should be noted that these young fish, like the young of the sterlet, have strongly developed teeth (in number $\frac{6.6}{5.5}$), which are not found in the grown fish.

By these experiments it has been demonstrated that it is possible to impregnate artificially the roe of *Acipenser stellatus*. It has also been proved that in the Ural the so-called "salt-water fish-culture," as with the Americans, may be begun with the culture of the *Acipenser stellatus* and probably other varieties of the *Acipenser*.

It is to be hoped that in the near future practical experiments on a large scale may be made in the Ural. This is all the more feasible, as the river for a distance of 500 versts [about 330 miles] and a portion of the sea, belong to the same Cossack community, with a population in all of 80,000.

As regards the other kinds of *Acipenser* (*A. huso*, *A. guldenstädtii*, &c.), I did not succeed in making experiments last spring, because I had no assistant. This spring, however, I shall endeavor to make up for lost time, and shall not fail to report the results of my experiments to the German fish culturists.

* Pallas, "Reise," Vol. I. Hansteen: "Reise-Erinnerungen aus Sibirien," "Die uralischen Kosacken und der Fischfang auf dem Uralstrom," Aus allen Welttheilen, 1873, August.